# Chapter 12
# New Malignancies Following Cancer of the Bone and Soft Tissue, and Kaposi Sarcoma

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## Synopsis

**We evaluated the risk of subsequent primary cancer in 4,807 persons with malignancies of bone, 12,448 persons with malignancies of soft tissue, and 11,679 persons with Kaposi sarcoma (KS). The overall risk of subsequent cancers was significantly increased among survivors of bone sarcomas (O/E=1.24, O=223, EAR=13 per 10,000 person-years) and soft tissue sarcomas (O/E=1.19, O=1,006, EAR=20). Among patients with bone or soft tissue sarcomas, there were excess risks of subsequent primary tumors of bone or soft tissue. Some tumors were of the same histologic type (osteosarcoma, chondrosarcoma, neurilemmoma), representing multicentric lesions. In other cases, radiotherapy for the primary malignancy or an underlying hereditary predisposition (e.g., Li-Fraumeni syndrome) played a role. The effect of radiotherapy was greatest in patients with Ewing sarcoma, who displayed 60- to 70-fold excesses of bone and soft tissue sarcomas, arising mostly in the field of radiation. Radiotherapy, chemotherapy, and/or hereditary syndromes may also account for observed excesses of lung cancer and acute non-lymphocytic leukemia (ANLL) following bone sarcomas. Radiotherapy and/or increased surveillance may have contributed to excesses of stomach and thyroid cancers following soft tissue sarcoma, whereas both radiotherapy and chemotherapy were likely related to the increased risk of ANLL. The nearly 2-fold elevation in risk of melanoma following soft tissue sarcoma could have been caused by shared risk factors or diagnostic overlap. No new cancers were found in excess following KS diagnosed before 1980 (O/E=0.89 excluding subsequent KS, O=43). However, beginning in 1980, with the onset of the acquired immunodeficiency syndrome (AIDS) epidemic, KS was significantly associated with several subsequent malignancies (O/E=4.77 excluding subsequent KS, O=716, EAR=230). Most notably, non-Hodgkin lymphoma (O/E=75.99) occurred in marked excess following KS, caused by the strong immunosuppressive effects of human immunodeficiency virus infection on lymphoma risk. Immunosuppression was also likely responsible for the 9-fold increase in risk of Hodgkin lymphoma. In addition, patients with KS during the AIDS era were prone to cancers of the anus, cervix, and liver, likely caused by concomitant viral infections. A 3-fold increase in the risk of ANLL also was observed in individuals with AIDS-related KS, possibly related to chemotherapy.**


*Abbreviations: O=observed number of subsequent (2nd, 3rd, etc.) primary cancers; O/E=ratio of observed to expected cancers; CI=confidence interval; PYR=person-years at risk; EAR=excess absolute risk (excess cancers per 10,000 person-years, calculated as [(O-E)/PYR]×10,000).*

## Bone and Joint Sarcomas

Malignancies arising in bones and joint cartilage account for 0.2% of new cancers and 0.2% of cancer deaths (Miller et al, 1996; Jemal et al, 2005). Three distinct histologic subtypes constitute the majority of cases (osteosarcoma 35%, Ewing sarcoma [ES] 16%, and chondrosarcoma 28%) (Table 12.A). There is a slight predominance of males with bone/joint malignancies overall (57%) and within each of the 3 major subtypes. Prognosis varies by histologic subtype, with 5-year relative survival rates of 62.2%, 56.8%, and 84.1% for osteosarcoma, ES, and chondrosarcoma, respectively. Osteosarcomas have a bimodal age of onset, with peaks of incidence in adolescence and old age. The adolescent peak and the predominance of tumors arising in the metaphyses of long bones suggest that the pubertal growth spurt may be etiologically important. ES occurs in adolescence and young adulthood; it is very uncommon after age 30 years. It appears to be derived from primitive neural tissue and often affects the axial skeleton. For unknown reasons, the tumor is extremely rare in blacks (1.6% of ES cases in SEER). Chondrosarcoma, which develops in joint cartilage, steadily increases in incidence with advancing age. Treatment for bone/joint malignancies usually includes surgical resection, although many patients with ES receive primary radiotherapy instead (Table 12.A). Beginning in the 1980s, multidrug adjuvant chemotherapy, including doxorubicin and often an alkylating agent, has become an important part of the treatment of osteosarcoma (Malawer et al, 2001). Similar chemotherapy regimens have also been used for ES.

Several risk factors for bone sarcomas have been identified, but together they explain only a small portion of cases. Radiotherapy and chemotherapy with alkylating agents, given in high doses to treat other tumors, increase the risk for osteosarcoma in a dose-response manner (Tucker et al, 1987; Le Vu et al, 1998). Sarcomas can also arise as components of hereditary neoplastic or preneoplastic disorders. For example, Li-Fraumeni syndrome (LFS) is a dominantly inherited constellation of

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**Table 12.A:** Risk of subsequent primary cancers by age at initial diagnosis and histologic type of bone and soft tissue sarcoma, SEER 1973-2000.

| Histologic type | Age at initial diagnosis, yr | Number of patients | Mean age at initial diagnosis, yr | Mean PYR | Radiation, % | Surgery, % | O | O/E | EAR |
|---|---|---|---|---|---|---|---|---|---|
| **All bone sarcomas** | **All ages** | **4,807** | **37.4** | **6.7** | **26.5** | **73.5** | **223** | **1.24*** | **13.27** |
| Ewing sarcoma | All ages | 789 | 17.9 | 6.0 | 62.1 | 44.7 | 23 | 6.45* | 41.04 |
| Osteosarcoma | <18 | 750 | 13.3 | 7.1 | 6.5 | 80.4 | 10 | 5.15* | 15.11 |
| | 18-29 | 376 | 22.8 | 7.2 | 10.1 | 82.4 | 6 | 2.51 | 13.44 |
| | ≥30 | 578 | 55.5 | 4.7 | 25.1 | 70.8 | 36 | 1.42 | 39.29 |
| Chondrosarcoma | <30 | 243 | 21.9 | 10.2 | 12.8 | 87.7 | 2 | 0.86 | -1.29 |
| | ≥30 | 1,106 | 55.6 | 7.4 | 14.6 | 86.3 | 104 | 1.09 | 10.76 |
| Other histologies | All ages | 965 | 49.9 | 6.3 | 37.2 | 71.5 | 42 | 0.85 | -12.16 |
| **All soft tissue sarcomas** | **All ages** | **12,448** | **50.2** | **6.5** | **40.8** | **84.8** | **1,006** | **1.19*** | **19.81** |
| Rhabdomyosarcoma | <18 | 361 | 7.8 | 6.8 | 65.9 | 60.4 | 5 | 8.25* | 17.94 |
| | ≥18 | 320 | 48.1 | 4.4 | 50.3 | 72.2 | 19 | 1.37 | 36.72 |
| Fibrosarcoma | <18 | 248 | 10.8 | 9.8 | 21.8 | 90.7 | 7 | 8.35* | 25.25 |
| | 18-29 | 421 | 24.5 | 9.2 | 33.7 | 91.4 | 15 | 3.60* | 27.85 |
| | ≥30 | 3,821 | 61.1 | 6.2 | 43.9 | 90.4 | 402 | 1.18* | 26.23 |
| Neuroblastoma | All ages | 342 | 6.2 | 8.5 | 34.2 | 71.1 | 0 | 0.00 | -4.14 |
| Liposarcomas | All ages | 2,158 | 56.9 | 8.4 | 39.0 | 91.9 | 259 | 1.04 | 5.95 |
| Leiomyosarcomas | All ages | 1,299 | 58.4 | 5.3 | 28.4 | 83.2 | 103 | 1.17 | 21.27 |
| Other histologies | All ages | 3,478 | 45.9 | 5.5 | 42.4 | 78.5 | 196 | 1.31* | 24.77 |

Abbreviations: O=observed number of subsequent (2nd, 3rd, etc.) primary cancers; O/E=ratio of observed to expected cancers; PYR=person-years at risk; EAR=excess absolute risk (excess cancers per 10,000 person-years, calculated as [(O-E)/PYR]×10,000).

*P <0.05.

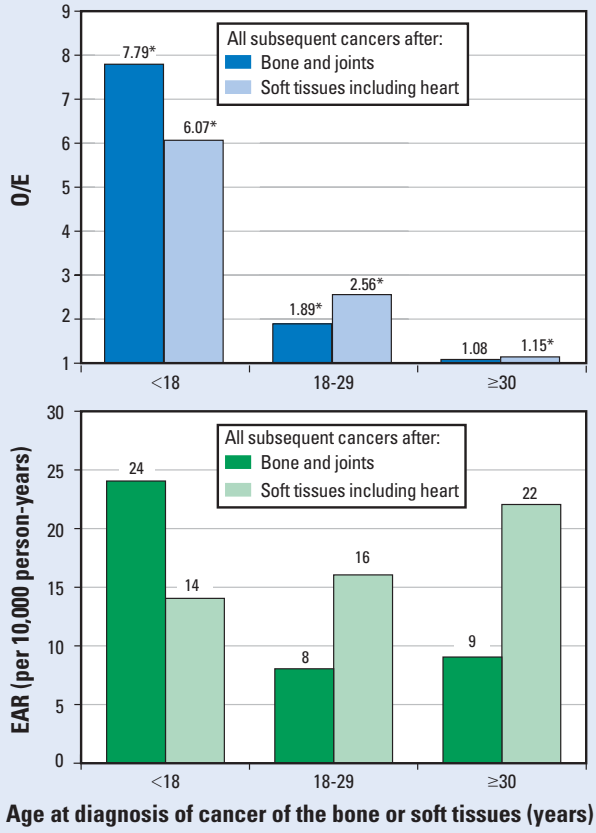
diverse malignancies in children and young adults, including osteosarcoma, chondrosarcoma, soft tissue sarcomas, brain tumors, adrenocortical neoplasia, breast carcinoma, acute leukemia, and other tumors to a lesser degree (Li et al, 1988; Hisada et al, 1998; Nichols et al, 2001). Patients with this syndrome are prone to multiple primary cancers and to the carcinogenic effects of radiotherapy. Most LFS cases have been associated with germline mutations of the p53 tumor suppressor gene. In addition, osteosarcomas occur excessively in individuals with germline mutations of the RB1 gene (hereditary retinoblastoma) or the DNA helicase genes (Werner syndrome and Rothmund-Thomson syndrome) (Miller et al, 1996; Spurney et al, 1998). The excess risk of osteosarcoma among adults with Paget disease of bone, which has a hereditary component, contributes to the subsequent primary peak of this tumor in later life (Miller et al, 1996). Chondrosarcoma, osteosarcoma, and other bone tumors have been reported in association with various disorders of skeletal development, including fibrous dysplasia and hereditary osteochondromas (Miller et al, 1996; Gigante et al, 2001). In contrast, no clear-cut risk factor for ES has been identified.

## *Results and Discussion*

A total of 223 subsequent primary cancers were observed in 4,807 individuals surviving at least 2 months with a primary bone/joint tumor (O/E=1.24, 95% CI=1.08-1.41, EAR=13 per 10,000 person-years). The cumulative incidence at 25 years of developing a second cancer, adjusted for the competing risk of death due to other causes, was 8.6% (95% CI=7.2%-10.1%). The risk of developing a new malignancy was relatively constant over time since initial diagnosis, and overall there was no difference in risk by gender. Risk was especially high for children with bone sarcomas (ages <18 years, O/E=7.79, EAR=24), as noted previously (Neglia et al, 2001); risk was lower for young adults (ages 18-29 years, O/E=1.89, EAR=8) and was not elevated for older adults (ages ≥30 years, O/E=1.08, EAR=9) (Figure 12.1). Risk was increased beyond expectation for acute non-lymphocytic leukemia (ANLL) and for malignancies of the lung, bone, and soft tissue. The overall relative risk and excess absolute risk of new cancers was highest for persons with ES (O/E=6.45, EAR=41). Among persons with osteosarcoma, the relative risk was higher for those younger than age 30 years (O/E=3.69) than for older individuals (O/E=1.42), although the older patients had higher excess absolute risks (EAR=39) than the younger ones (EAR=15). Little elevation in cancer risk was seen among patients with chondrosarcoma (O/E=1.09, EAR=8).

Ten subsequent primary sarcomas of the bone were reported (O/E=30.36). Five of these cases (4 chondrosarcomas, 1 osteosarcoma) represented multicentric primary lesions, as they followed tumors of identical histology and arose at second locations separated by an interval of 0.5 to 5 years. Multicentric osteosarcomas have been reported with genetic susceptibility states such as LFS and Rothmund-Thomson syndrome (Spurney et al, 1998). In addition, 3 bone malignancies, all osteosarcomas, arose in patients with ES (O/E=62.40) at sites previously treated with radiotherapy. The marked excess

**Figure 12.1:** Observed-to-expected ratio (O/E) and excess absolute risk (EAR) of subsequent primary cancers after cancer of the bone or soft tissues, both sexes, SEER 1973-2000.




| Observed No. | 27 | 20 | 13 | 27 | 183 | 959 |
|---|---|---|---|---|---|---|

*P <0.05.
Note: EAR = Excess number of subsequent cancers per 10,000 person-years.

risk of osteosarcoma is consistent with the radiation effect previously described in ES, although chemotherapy and possibly genetic factors could play a role (Tucker et al, 1987; Travis et al, 1994; Kuttesch et al, 1996; Le Vu et al, 1998).

Soft tissue sarcomas also occurred in excess following bone cancer (O/E=9.70, O=9). Risk was much higher when radiotherapy was given during initial treatment (O/E=18.59, O=3) than when it was not (O/E=7.83, O=6). The risk was greatest following ES (O/E=69.43), with most subsequent sarcomas (3 of 4 cases) arising in the field of radiation. The findings are consistent with previous reports documenting an exceptional risk of soft tissue tumors following radiotherapy for ES (Travis et al, 1994; Kuttesch et al, 1996). In 2 cases in our series, soft tissue sarcomas followed childhood-onset osteosarcoma, suggesting underlying LFS (Hisada et al, 1998).

The risk of lung cancer was excessive following bone sarcomas (O/E=1.45). Risk was highest after ES (O/E=8.35, O=2), with the lung cancers arising 9 and 15 years after radiotherapy. This finding is consistent with the elevated risk of lung cancer reported after radiotherapy for breast cancer and Hodgkin lymphoma (Travis et al, 1995; Metayer et al, 2000; Travis et al, 2002). We also found an excess risk of lung cancer following osteosarcoma (O/E=2.73, O=11), arising mostly in the lower limbs, consistent with the notion that chemotherapy may increase the risk of some lung cancers (Travis et al, 2002). The complex of osteosarcoma and lung cancer might also result from genetic susceptibility to both tumors (e.g., LFS or hereditary retinoblastoma) (Sanders et al, 1989; Hisada et al, 1998; Kleinerman et al, 2000; Nichols et al, 2001).

Ten cases of ANLL occurred after bone sarcomas in our survey (7 myeloid, 2 monocytic, 1 not specified, O/E=6.11). The elevated risk was most pronounced for osteosarcoma (O/E=9.96, O=3) and ES (O/E=86.62, O=5). Nine of the 10 cases received initial chemotherapy, suggesting an effect of multiagent chemotherapy (Dunst et al, 1998; Rodriguez-Galindo, 2000), along with genetic factors, particularly because osteosarcoma and leukemia are both components of LFS.

For patients with osteosarcoma, we also observed an excess of tumors at various sites of the digestive system (O/E=2.34), including the esophagus, stomach, colon and rectum, liver, pancreas, and retroperitoneum. This finding is difficult to explain, given the diversity of tumors and the small numbers at each site.

## Soft Tissue Sarcomas, Including Heart

Malignancies that arise in the soft tissues account for about 0.7% of human cancers and 0.6% of all cancer deaths (Zahm et al, 1996; Jemal et al, 2005). This group includes tumors with various histologies derived from the spectrum of cells that make up normal connective tissue. In SEER, 55% of cases of soft tissue sarcoma arose in males, and the median age at diagnosis was 53 years. Among 1,448 children (ages <18 years) the most frequent soft tissue malignancies were rhabdomyosarcoma (25% of cases), neuroblastoma (21%), and fibrosarcoma (17%). Among 11,000 adults (ages ≥18 years), the most common tumors were fibrosarcomas (39%), liposarcomas (19%), and leiomyosarcomas (12%). Some tumors of connective tissue arise in visceral organs (e.g., leiomyosarcomas of the uterus), but they are not included in this analysis. Prognosis was more favorable for soft tissue sarcoma in children than in adults: 5-year relative survival rates were 74.4% for ages younger than 18 years versus 66.9% for ages 18 years or older. Therapy for soft tissue malignancies usually consists of surgical resection, with some patients receiving radiotherapy or chemotherapy as well (Brennan et al, 2001).

The etiology of most soft tissue malignancies is unknown, and because of their rarity, the histologic types are often combined. Risk for soft tissue sarcomas is increased by radiation therapy and possibly chemotherapy for other malignant conditions (Zahm et al, 1996). An excess risk has been suggested for occupational exposures to certain herbicides, but the evidence is not clear-cut (Zahm et al, 1996). In some cases, especially in childhood, genetic factors are important, particularly in

LFS, neurofibromatosis type 1, and hereditary retinoblastoma (Bader, 1987; Li et al, 1988; Hisada et al, 1998).

### *Results and Discussion*

We studied 12,448 individuals who survived at least 2 months with a soft tissue malignancy, a category that included 83 patients (0.7%) with primary malignancies of the heart. A total of 1,006 subsequent primary cancers were diagnosed (O/E=1.19, 95% CI=1.12-1.27, EAR=20). Thirteen percent of patients with soft tissue sarcoma developed a second cancer within 25 years (cumulative incidence 12.9%, 95% CI=11.9%-13.9%). Excluding 342 patients with soft tissue neuroblastomas did not affect the results (O/E=1.19). The relative risk for a subsequent primary cancer was much higher for children diagnosed with a soft tissue malignancy (ages <18 years, O/E=6.07, EAR=14) than for adults (ages 18-29, O/E=2.56, EAR=16; ages ≥30, O/E=1.15, EAR=22) (Figure 12.1), primarily among those with an initial fibrosarcoma or rhabdomyosarcoma (Table 12.A). Risks were similar among males and females and remained relatively constant throughout the first 10 years of follow-up. Significantly increased risks were seen for subsequent cancers of the stomach, thyroid, bone, and soft tissues, as well as for melanoma and acute myeloid leukemia.

Subsequent primary soft tissue sarcomas arose in excess following the initial tumor (O/E=9.30, O=34). Twenty-three of these cases had histologies that were identical or similar to the primary tumors, consistent with multicentric lesions. Six cases had multiple neoplasms of Schwann cells (neurilemmomas, neurofibrosarcomas), possibly caused by neurofibromatosis type 1 (Bader, 1987).

Twelve subsequent primary bone malignancies followed soft tissue tumors (O/E=13.30). Radiotherapy may have been involved (Tucker et al, 1987; Heyn et al, 1993; Le Vu et al, 1998; Cohen et al, 2005), because the risk was higher in irradiated (O/E=25.19, O=8) than in nonirradiated persons (O/E=6.84, O=4); among irradiated individuals, 7 of the bone tumors (5 osteosarcomas, 2 chondrosarcomas) arose at irradiated sites. Genetic predisposition probably contributed to the excess risk (Hisada et al, 1998), which was pronounced in the childhood cases (O/E=47.38, O=5).

An excess of acute myelogenous leukemia (AML) was observed following soft tissue sarcoma (O/E=3.06). Although only 2 of the 18 cases occurred in children, their relative risk was much higher (O/E=23.82 versus 2.76 for adults). Both children developed AML within 3 years of radiotherapy. The overall risk for AML was higher in irradiated (O/E=4.87) compared with nonirradiated individuals (O/E=2.09), consistent with reports of radiotherapy-related leukemia (Preston et al, 1994). However, an effect of chemotherapy also seems likely (Heyn et al, 1994), since 9 of the AML cases received chemotherapy as part of their initial treatment for soft tissue sarcoma.

We observed excess risks for cancers of the thyroid (O/E=2.39) and stomach (O/E=1.80) following soft tissue malignancies, all of which were diagnosed in adult life. Radiotherapy may have played a role, even though risks were similar in patients who were or were not irradiated during their initial course of treatment. It also seems possible that the excess of thyroid cancer could have been the result of increased surveillance.

Finally, the risk of melanoma was elevated (O/E=1.80) following soft tissue tumors with a wide range of histologies, in both irradiated (O/E=2.11) and nonirradiated (O/E=1.62) patients. An association between soft tissue sarcomas and melanoma has been noted previously (Tucker et al, 1985; Berking and Brady, 1997), suggesting common risk factors or diagnostic overlap in some cases (Sandberg and Bridge, 2001).

## Kaposi Sarcoma

Kaposi sarcoma (KS) is a distinctive cutaneous tumor of vascular origin. It occurred only rarely in the U.S. before the 1980-1981 onset of the human immunodeficiency virus (HIV)-associated epidemic of acquired immunodeficiency syndrome (AIDS). In the pre-AIDS era, KS arose almost exclusively in the elderly, particularly among men of Mediterranean or central/eastern European origin (classic KS). The HIV/AIDS epidemic ushered in a sharp increase in KS incidence, especially in homosexual men (Beral et al, 1990). Before the advent of effective anti-HIV therapy in the mid-1990s, KS risk was extremely high in HIV-infected individuals, with a lifetime cumulative incidence of 10% (Frisch et al, 2001).

A recently discovered virus, KS-associated herpesvirus (KSHV, also known as human herpesvirus 8), is a necessary cofactor for KS (Chang et al, 1994). Most KSHV infections are asymptomatic, but in the presence of AIDS-related immunosuppression, KSHV causes KS through incompletely understood mechanisms (Moore and Chang, 2001). KSHV infection is highly prevalent in HIV-infected homosexual men, consistent with sexual transmission (Martin et al, 1998).

By distinguishing KS cases according to year of diagnosis in the SEER Program (1973-1979 versus 1980-2000), it is possible largely to separate classic and AIDS-associated cases. In the earlier group of 210 2-month survivors, 74% were male, the median age was 73 years, and the 5-year survival rate (relative to the general population) was 88%, reflecting the epidemiology of classic KS and its indolent nature. In the later group of 11,469 2-month survivors, 97% were male, the median age was 38 years, and the 5-year relative survival rate was 44%, a pattern consistent with the dramatic rise of KS in young, HIV-infected homosexual men and the poorer prognosis for AIDS patients. Still, recent improvements in anti-HIV therapy have prolonged post-KS survival. Localized KS is usually treated with intralesional chemotherapy or low-dose radiotherapy. Because of the aggressive nature of AIDS-associated KS, it is sometimes treated with systemic chemotherapy (McGarvey et al, 1998).

## *Results and Discussion*

The risk of subsequent primary cancer following pre-1980 diagnoses of KS in 210 patients was not increased overall (O/E=0.89, O=43, 95% CI=0.64-1.19, excluding subsequent KS), consistent with a previous analysis of SEER data (Biggar et al, 1994). Although an Israeli study of classic KS revealed elevated risks of non-Hodgkin lymphoma (NHL)(O/E=3.94, O=8) and melanoma (O/E=5.81, O=5) (Iscovich et al, 1999), we found only a slight, nonsignificant excess of NHL (O/E=1.41, O=2, 95% CI=0.16-5.08) and no cases of melanoma. KSHV is not known to play a major role in NHL in HIV-uninfected persons, though it has been implicated in a rare variant, primary effusion lymphoma (Cesarman et al, 1995).

By contrast, in the AIDS era (1980-2000), our study revealed that 11,469 persons with KS were at elevated risk for subsequent primary malignancies (O/E=4.77, O=716, 95% CI=4.43-5.13, EAR=230, excluding second KS). The 10-year cumulative incidence of second cancer did not change appreciably during the AIDS era (6.2%, 95% CI=5.5%-6.9% for 1980-1989 versus 7.1%, 95% CI=6.4%-7.9% for 1990-2000). Individuals with KS were particularly prone to develop a new malignancy early in the follow-up period (<1 year, O/E=9.60; 1-4 years, O/E=5.22); thereafter the risk declined. Excess risks of subsequent cancer were confined to the 11,175 men with KS (O/E=5.35) with only 23 non-KS tumors seen among the 294 women with KS (O/E=1.12). Risk increases in excess of 4-fold were seen for both whites and blacks. Patients diagnosed at ages younger than 40 years had particularly high risks of subsequent cancers (O/E=29.50, O=362, EAR=264), although approximately 2-fold risk increases were seen among older patients (ages ≥40 years, O/E=2.57, O=354, EAR=190). Several malignancies were significantly increased among KS patients, including cancers of the anus, cervix, and liver, as well as NHL, Hodgkin lymphoma, and ANLL.

A markedly increased risk of NHL (O/E=75.99, O=539, EAR=216) explained most of the overall cancer excess (Cannon et al, 2000). The 10-year cumulative incidence of NHL among KS patients diagnosed between 1980 and 2000 was 5.1% (95% CI=4.7%-5.5%). The relationship between KS and NHL is readily explained by the potent effect of AIDS-related immune suppression on the risks of both tumors (Frisch et al, 2001). In HIV infection, NHL may arise because of defective immunological control of lymphoproliferative stimuli, especially from Epstein-Barr virus (EBV) infection (Shibata et al, 1993). In addition, it is possible that KSHV acts independently to increase the risk for NHL, particularly primary effusion lymphoma or other high-grade variants (Cesarman et al, 1995; Engels et al, 2001), although this effect appears to be small compared with the influence of HIV itself. Risk for NHL was higher in men (O/E=85.50) than women (O/E=3.64), which may reflect varying proportions of classic and AIDS-associated KS cases even in the AIDS era. Supporting this possibility, in the AIDS era only 3% of males with KS were older than 70 years of age at diagnosis, compared with 67% of females.

In the AIDS era, individuals with KS had a 37-fold increase in risk of anal cancer, with all cases arising in men, presumably due to the high prevalence of human papillomavirus infection in homosexual men (Palefsky et al, 1998). Similarly, a 10-fold elevation in risk was seen for cervical cancer, based on 2 cases, probably because of frequent infections with human papillomavirus in HIV-infected women. Hepatitis B and C virus infections as well as alcohol abuse are common in some HIV-infected groups and probably account for the 5-fold increase in risk of liver cancer in our study. AIDS-related immunosuppression and poor control of EBV infection appear to account for an excess of Hodgkin lymphoma reported among persons with AIDS (Frisch et al, 2001), consistent with the relationship we observed between KS and Hodgkin lymphoma (O/E=9.01). An excess of ANLL also was seen following KS, which may be related to chemotherapy, although an elevated risk of AML has previously been reported in individuals with AIDS alone (Frisch et al, 2001).

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**Table 12.1.1:** Characteristics of patients with an initial cancer of the bones or joints, both sexes, SEER 1973-2000.

| Characteristics | Males | | Females | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| **Number of patients with 1st primary cancer** | | | | | | |
| **Total** | 2,749 | 100.0 | 2,058 | 100.0 | 4,807 | 100.0 |
| **Initial treatment** | | | | | | |
| Any radiation | 736 | 26.8 | 537 | 26.1 | 1,273 | 26.5 |
| With surgery | 362 | 13.2 | 298 | 14.5 | 660 | 13.7 |
| Without surgery | 374 | 13.6 | 239 | 11.6 | 613 | 12.8 |
| No radiation | 2,013 | 73.2 | 1,521 | 73.9 | 3,534 | 73.5 |
| With surgery | 1,652 | 60.1 | 1,221 | 59.3 | 2,873 | 59.8 |
| Without surgery | 361 | 13.1 | 300 | 14.6 | 661 | 13.8 |
| **Race** | | | | | | |
| White | 2,357 | 85.7 | 1,717 | 83.4 | 4,074 | 84.8 |
| Black | 199 | 7.2 | 189 | 9.2 | 388 | 8.1 |
| Other | 177 | 6.4 | 132 | 6.4 | 309 | 6.4 |
| Unknown | 16 | 0.6 | 20 | 1.0 | 36 | 0.7 |
| **Age at 1st primary cancer diagnosis, years** | | | | | | |
| < 30 | 1,359 | 49.4 | 939 | 45.6 | 2,298 | 47.8 |
| 30–49 | 555 | 20.2 | 428 | 20.8 | 983 | 20.4 |
| 50–69 | 573 | 20.8 | 393 | 19.1 | 966 | 20.1 |
| 70–79 | 204 | 7.4 | 184 | 8.9 | 388 | 8.1 |
| ≥ 80 | 58 | 2.1 | 114 | 5.5 | 172 | 3.6 |
| **Number of patients with one or more primary cancers** | | | | | | |
| One primary cancer only | 2,624 | 95.5 | 1,978 | 96.1 | 4,602 | 95.7 |
| 1st and 2nd cancers | 114 | 4.1 | 74 | 3.6 | 188 | 3.9 |
| 1st, 2nd, and 3rd cancers | 10 | 0.4 | 6 | 0.3 | 16 | 0.3 |
| 1st, 2nd, 3rd, and additional cancers | 1 | 0.0 | 0 | 0.0 | 1 | 0.0 |
| **Other statistics** | | | | | | |
| Median age at 1st cancer diagnosis | 30.4 | — | 33.8 | — | 31.7 | — |
| Median year of 1st cancer diagnosis | 1987.9 | — | 1988.0 | — | 1988.0 | — |
| Median person-years at risk | 3.5 | — | 4.3 | — | 3.9 | — |
| Percent histologically confirmed* | | | | | | |
| Both 1st and 2nd cancers | — | 96.0 | — | 97.5 | — | 96.6 |
| 1st, 2nd, and additional cancers | — | 96.0 | — | 97.5 | — | 96.6 |
| 1st cancer only | — | 3.2 | — | 2.5 | — | 2.9 |

*Percent histologically confirmed among patients who developed a subsequent primary cancer.

# Bone
## Both Sexes

**Table 12.1.2:** Risk of subsequent primary cancers after cancer of the bones or joints, both sexes, SEER 1973-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 4,807 | | 3,999 | | 2,156 | | 1,250 | | 4,807 | | | |
| Person-years in interval | 3,636 | | 11,418 | | 8,283 | | 8,896 | | 32,232 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 21 | 1.15 | 70 | 1.22 | 55 | 1.24 | 77 | 1.27* | 223 | 180.22 | 1.24* | 13.27 |
| All excluding same site | 20 | 1.10 | 65 | 1.14 | 52 | 1.18 | 76 | 1.26 | 213 | 179.89 | 1.18* | 10.27 |
| **Buccal cavity, pharynx** | 0 | 0.00 | 0 | 0.00 | 1 | 0.84 | 0 | 0.00 | 1 | 4.80 | 0.21 | -1.18 |
| Lip | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.66 | 0.00 | -0.21 |
| Tongue | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.00 | 0.00 | -0.31 |
| Salivary gland | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.45 | 0.00 | -0.14 |
| Mouth | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.22 | 0.00 | -0.38 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.23 | 0.00 | -0.07 |
| Tonsil | 0 | 0.00 | 0 | 0.00 | 1 | 8.29 | 0 | 0.00 | 1 | 0.49 | 2.05 | 0.16 |
| Oropharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.13 | 0.00 | -0.04 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.45 | 0.00 | -0.14 |
| **Digestive system** | 6 | 1.54 | 9 | 0.77 | 10 | 1.13 | 20 | 1.71* | 45 | 36.10 | 1.25 | 2.76 |
| Esophagus | 0 | 0.00 | 3 | 5.03* | 1 | 2.24 | 1 | 1.63 | 5 | 1.85 | 2.70 | 0.98 |
| Stomach | 0 | 0.00 | 1 | 0.85 | 2 | 2.32 | 4 | 3.67 | 7 | 3.54 | 1.98 | 1.07 |
| Small intestine | 1 | 18.32 | 0 | 0.00 | 0 | 0.00 | 1 | 4.94 | 2 | 0.57 | 3.49 | 0.44 |
| Colon | 2 | 1.16 | 4 | 0.77 | 3 | 0.76 | 6 | 1.15 | 15 | 16.10 | 0.93 | -0.34 |
| Rectum, rectosigmoid junction | 1 | 1.42 | 1 | 0.48 | 1 | 0.64 | 4 | 2.00 | 7 | 6.37 | 1.10 | 0.20 |
| Anus, anal canal | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.41 | 0.00 | -0.13 |
| Liver | 1 | 7.58 | 0 | 0.00 | 2 | 6.32 | 0 | 0.00 | 3 | 1.32 | 2.28 | 0.52 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 7.20 | 1 | 0.46 | 2.15 | 0.17 |
| Bile ducts, other biliary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.78 | 0.00 | -0.24 |
| Pancreas | 1 | 2.15 | 0 | 0.00 | 0 | 0.00 | 3 | 2.15 | 4 | 4.31 | 0.93 | -0.10 |
| **Respiratory system** | 4 | 1.31 | 19 | 2.00* | 9 | 1.24 | 11 | 1.16 | 43 | 29.31 | 1.47* | 4.25 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.28 | 0.00 | -0.09 |
| Larynx | 0 | 0.00 | 2 | 2.92 | 1 | 1.98 | 0 | 0.00 | 3 | 2.03 | 1.48 | 0.30 |
| Lung, bronchus | 4 | 1.43 | 17 | 1.96* | 8 | 1.21 | 10 | 1.14 | 39 | 26.90 | 1.45* | 3.75 |
| **Female breast** | 1 | 0.49 | 4 | 0.60 | 3 | 0.56 | 14 | 1.99* | 22 | 21.09 | 1.04 | 0.62 |
| **Female genital system** | 0 | 0.00 | 4 | 1.31 | 2 | 0.85 | 1 | 0.34 | 7 | 9.38 | 0.75 | -1.63 |
| Cervix uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.53 | 0.00 | -1.05 |
| Corpus uteri | 0 | 0.00 | 4 | 2.80 | 2 | 1.85 | 0 | 0.00 | 6 | 4.29 | 1.40 | 1.17 |
| Ovary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.08 | 1 | 2.83 | 0.35 | -1.26 |
| Vagina | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.13 | 0.00 | -0.09 |
| Vulva | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.39 | 0.00 | -0.27 |
| **Male genital system** | 1 | 0.32 | 5 | 0.50 | 8 | 1.03 | 14 | 1.17 | 28 | 32.94 | 0.85 | -2.79 |
| Prostate | 0 | 0.00 | 4 | 0.42 | 8 | 1.08 | 14 | 1.21 | 26 | 31.58 | 0.82 | -3.16 |
| Testis | 0 | 0.00 | 1 | 2.76 | 0 | 0.00 | 0 | 0.00 | 1 | 1.13 | 0.88 | -0.08 |
| **Urinary system** | 3 | 2.17 | 3 | 0.70 | 3 | 0.91 | 3 | 0.65 | 12 | 13.57 | 0.88 | -0.49 |
| Urinary bladder | 1 | 1.07 | 2 | 0.70 | 3 | 1.36 | 2 | 0.65 | 8 | 9.10 | 0.88 | -0.34 |
| Kidney parenchyma | 2 | 5.59 | 1 | 0.87 | 0 | 0.00 | 1 | 0.78 | 4 | 3.68 | 1.09 | 0.10 |
| Renal pelvis, other urinary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.79 | 0.00 | -0.24 |
| Ureter | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.25 | 0.00 | -0.08 |
| **Bone, joints** | 1 | 23.71 | 5 | 40.55* | 3 | 37.30* | 1 | 11.98 | 10 | 0.33 | 30.36* | 3.00 |
| **Soft tissue including heart** | 0 | 0.00 | 1 | 3.34 | 4 | 17.29* | 4 | 13.18* | 9 | 0.93 | 9.70* | 2.50 |
| **Kaposi sarcoma** | 1 | 13.11 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.98 | 1.02 | 0.01 |
| **Melanoma of skin** | 1 | 1.98 | 3 | 1.74 | 2 | 1.39 | 0 | 0.00 | 6 | 5.80 | 1.03 | 0.06 |
| **Eye, orbit** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.29 | 0.00 | -0.09 |
| **Brain, central nervous system** | 0 | 0.00 | 1 | 1.24 | 0 | 0.00 | 0 | 0.00 | 1 | 2.44 | 0.41 | -0.45 |
| **Thyroid** | 0 | 0.00 | 1 | 1.63 | 2 | 3.90 | 2 | 2.82 | 5 | 2.01 | 2.48 | 0.93 |
| **Lymphatic, hematopoietic** | 3 | 2.01 | 14 | 2.98* | 4 | 1.09 | 6 | 1.21 | 27 | 14.79 | 1.83* | 3.79 |
| Hodgkin lymphoma | 0 | 0.00 | 0 | 0.00 | 1 | 3.12 | 0 | 0.00 | 1 | 1.19 | 0.84 | -0.06 |
| Non-Hodgkin lymphoma | 2 | 3.10 | 3 | 1.45 | 0 | 0.00 | 2 | 0.84 | 7 | 6.76 | 1.04 | 0.08 |
| Myeloma | 0 | 0.00 | 1 | 1.49 | 0 | 0.00 | 0 | 0.00 | 1 | 2.11 | 0.47 | -0.35 |
| Leukemia | 1 | 1.96 | 10 | 6.48* | 3 | 2.59 | 4 | 2.63 | 18 | 4.73 | 3.80* | 4.12 |
| Acute lymphocytic | 0 | 0.00 | 1 | 9.01 | 0 | 0.00 | 1 | 14.54 | 2 | 0.29 | 6.93 | 0.53 |
| Chronic lymphocytic | 0 | 0.00 | 1 | 1.84 | 0 | 0.00 | 1 | 1.81 | 2 | 1.69 | 1.18 | 0.10 |
| Acute non-lymphocytic | 1 | 5.81 | 6 | 11.35* | 2 | 4.99 | 1 | 1.87 | 10 | 1.64 | 6.11* | 2.60 |
| Chronic myeloid | 0 | 0.00 | 1 | 4.67 | 1 | 6.05 | 1 | 4.46 | 3 | 0.67 | 4.46 | 0.72 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000. EAR for female cancers is based on 14,569 PYR and for male cancers on 17,664 PYR.

**Table 12.1.3:** Risk of subsequent primary cancers after cancer of the bones or joints, females, SEER 1973-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 2,058 | | 1,715 | | 973 | | 584 | | 2,058 | | | |
| Person-years in interval | 1,552 | | 5,044 | | 3,809 | | 4,164 | | 14,569 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 6 | 0.86 | 22 | 0.99 | 26 | 1.48 | 32 | 1.40 | 86 | 69.58 | 1.24 | 11.27 |
| All excluding same site | 6 | 0.86 | 20 | 0.90 | 24 | 1.37 | 31 | 1.36 | 81 | 69.46 | 1.17 | 7.92 |
| **Buccal cavity, pharynx** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.21 | 0.00 | -0.83 |
| Lip | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.08 | 0.00 | -0.05 |
| Tongue | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.27 | 0.00 | -0.18 |
| Salivary gland | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.16 | 0.00 | -0.11 |
| Mouth | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.40 | 0.00 | -0.27 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.06 | 0.00 | -0.04 |
| Tonsil | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.11 | 0.00 | -0.07 |
| Oropharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.02 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.08 | 0.00 | -0.05 |
| **Digestive system** | 3 | 1.99 | 1 | 0.22 | 5 | 1.46 | 9 | 2.08 | 18 | 13.75 | 1.31 | 2.92 |
| Esophagus | 0 | 0.00 | 0 | 0.00 | 1 | 10.31 | 0 | 0.00 | 1 | 0.39 | 2.59 | 0.42 |
| Stomach | 0 | 0.00 | 0 | 0.00 | 1 | 3.92 | 2 | 6.38 | 3 | 1.04 | 2.90 | 1.35 |
| Small intestine | 1 | 47.53 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.22 | 4.51 | 0.53 |
| Colon | 1 | 1.34 | 1 | 0.45 | 1 | 0.59 | 5 | 2.35 | 8 | 6.79 | 1.18 | 0.83 |
| Rectum, rectosigmoid junction | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.49 | 1 | 2.21 | 0.45 | -0.83 |
| Rectum | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.23 | 1 | 1.45 | 0.69 | -0.31 |
| Anus, anal canal | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.21 | 0.00 | -0.14 |
| Liver | 0 | 0.00 | 0 | 0.00 | 2 | 25.50* | 0 | 0.00 | 2 | 0.32 | 6.34 | 1.16 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.29 | 0.00 | -0.20 |
| Bile ducts, other biliary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.30 | 0.00 | -0.21 |
| Pancreas | 1 | 5.24 | 0 | 0.00 | 0 | 0.00 | 1 | 1.74 | 2 | 1.78 | 1.12 | 0.15 |
| **Respiratory system** | 0 | 0.00 | 6 | 2.25 | 2 | 0.91 | 2 | 0.68 | 10 | 8.63 | 1.16 | 0.94 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.09 | 0.00 | -0.06 |
| Larynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.29 | 0.00 | -0.20 |
| Lung, bronchus | 0 | 0.00 | 6 | 2.37 | 2 | 0.96 | 2 | 0.71 | 10 | 8.22 | 1.22 | 1.22 |
| **Female breast** | 1 | 0.49 | 4 | 0.60 | 3 | 0.56 | 14 | 1.99* | 22 | 21.09 | 1.04 | 0.62 |
| **Female genital system** | 0 | 0.00 | 4 | 1.31 | 2 | 0.85 | 1 | 0.34 | 7 | 9.38 | 0.75 | -1.63 |
| Cervix uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.53 | 0.00 | -1.05 |
| Corpus uteri | 0 | 0.00 | 4 | 2.80 | 2 | 1.85 | 0 | 0.00 | 6 | 4.29 | 1.40 | 1.17 |
| Ovary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.08 | 1 | 2.83 | 0.35 | -1.26 |
| Vagina | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.13 | 0.00 | -0.09 |
| Vulva | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.39 | 0.00 | -0.27 |
| **Urinary system** | 1 | 3.22 | 1 | 1.04 | 2 | 2.64 | 1 | 1.00 | 5 | 3.03 | 1.65 | 1.35 |
| Urinary bladder | 0 | 0.00 | 1 | 1.81 | 2 | 4.66 | 0 | 0.00 | 3 | 1.72 | 1.74 | 0.88 |
| Kidney parenchyma | 1 | 9.69 | 0 | 0.00 | 0 | 0.00 | 1 | 2.70 | 2 | 1.08 | 1.85 | 0.63 |
| Renal pelvis, other urinary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.23 | 0.00 | -0.16 |
| Ureter | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.07 | 0.00 | -0.05 |
| **Bone, joints** | 0 | 0.00 | 2 | 45.52* | 2 | 65.20* | 1 | 30.13 | 5 | 0.12 | 40.81* | 3.35 |
| **Soft tissue including heart** | 0 | 0.00 | 1 | 8.91 | 1 | 11.12 | 1 | 8.74 | 3 | 0.35 | 8.54* | 1.82 |
| **Kaposi sarcoma** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.02 |
| **Melanoma of skin** | 0 | 0.00 | 0 | 0.00 | 2 | 3.68 | 0 | 0.00 | 2 | 2.13 | 0.94 | -0.09 |
| **Eye, orbit** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.11 | 0.00 | -0.07 |
| **Brain, central nervous system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.88 | 0.00 | -0.61 |
| **Thyroid** | 0 | 0.00 | 1 | 2.45 | 2 | 5.72 | 1 | 2.05 | 4 | 1.36 | 2.94 | 1.81 |
| **Lymphatic, hematopoietic** | 1 | 1.82 | 2 | 1.16 | 3 | 2.19 | 2 | 1.13 | 8 | 5.42 | 1.48 | 1.77 |
| Hodgkin lymphoma | 0 | 0.00 | 0 | 0.00 | 1 | 7.68 | 0 | 0.00 | 1 | 0.47 | 2.13 | 0.36 |
| Non-Hodgkin lymphoma | 0 | 0.00 | 1 | 1.27 | 0 | 0.00 | 0 | 0.00 | 1 | 2.53 | 0.40 | -1.05 |
| Myeloma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.80 | 0.00 | -0.55 |
| Leukemia | 1 | 5.67 | 1 | 1.88 | 2 | 4.94 | 2 | 3.94 | 6 | 1.62 | 3.70* | 3.01 |
| Acute lymphocytic | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 39.95 | 1 | 0.10 | 9.86 | 0.62 |
| Chronic lymphocytic | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.54 | 0.00 | -0.37 |
| Acute non-lymphocytic | 1 | 15.76 | 0 | 0.00 | 1 | 6.58 | 1 | 5.12 | 3 | 0.61 | 4.95 | 1.64 |
| Chronic myeloid | 0 | 0.00 | 0 | 0.00 | 1 | 17.12 | 0 | 0.00 | 1 | 0.23 | 4.31 | 0.53 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000.

# Bone
## Males

**Table 12.1.4:** Risk of subsequent primary cancers after cancer of the bones or joints, males, SEER 1973-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 2,749 | | 2,284 | | 1,183 | | 666 | | 2,749 | | | |
| Person-years in interval | 2,083 | | 6,374 | | 4,474 | | 4,733 | | 17,664 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 15 | 1.33 | 48 | 1.37* | 29 | 1.09 | 45 | 1.19 | 137 | 110.64 | 1.24* | 14.92 |
| All excluding same site | 14 | 1.25 | 45 | 1.29 | 28 | 1.05 | 45 | 1.20 | 132 | 110.43 | 1.20* | 12.21 |
| **Buccal cavity, pharynx** | 0 | 0.00 | 0 | 0.00 | 1 | 1.13 | 0 | 0.00 | 1 | 3.59 | 0.28 | -1.47 |
| Lip | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.59 | 0.00 | -0.33 |
| Tongue | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.73 | 0.00 | -0.41 |
| Salivary gland | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.29 | 0.00 | -0.16 |
| Mouth | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.83 | 0.00 | -0.47 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.17 | 0.00 | -0.10 |
| Tonsil | 0 | 0.00 | 0 | 0.00 | 1 | 10.72 | 0 | 0.00 | 1 | 0.38 | 2.62 | 0.35 |
| Oropharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.10 | 0.00 | -0.06 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.38 | 0.00 | -0.21 |
| **Digestive system** | 3 | 1.25 | 8 | 1.11 | 5 | 0.92 | 11 | 1.50 | 27 | 22.36 | 1.21 | 2.63 |
| Esophagus | 0 | 0.00 | 3 | 6.36* | 0 | 0.00 | 1 | 2.04 | 4 | 1.46 | 2.73 | 1.44 |
| Stomach | 0 | 0.00 | 1 | 1.20 | 1 | 1.64 | 2 | 2.58 | 4 | 2.50 | 1.60 | 0.85 |
| Small intestine | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 8.02 | 1 | 0.35 | 2.84 | 0.37 |
| Colon | 1 | 1.02 | 3 | 1.01 | 2 | 0.89 | 1 | 0.32 | 7 | 9.31 | 0.75 | -1.31 |
| Rectum, rectosigmoid junction | 1 | 2.19 | 1 | 0.73 | 1 | 0.99 | 3 | 2.26 | 6 | 4.16 | 1.44 | 1.04 |
| Anus, anal canal | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.20 | 0.00 | -0.11 |
| Liver | 1 | 9.99 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.00 | 1.00 | 0.00 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 18.66 | 1 | 0.17 | 5.86 | 0.47 |
| Bile ducts, other biliary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.48 | 0.00 | -0.27 |
| Pancreas | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 2.43 | 2 | 2.53 | 0.79 | -0.30 |
| **Respiratory system** | 4 | 1.79 | 13 | 1.90* | 7 | 1.39 | 9 | 1.37 | 33 | 20.69 | 1.60* | 6.97 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.18 | 0.00 | -0.10 |
| Larynx | 0 | 0.00 | 2 | 3.39 | 1 | 2.32 | 0 | 0.00 | 3 | 1.75 | 1.72 | 0.71 |
| Lung, bronchus | 4 | 1.99 | 11 | 1.79 | 6 | 1.32 | 8 | 1.34 | 29 | 18.68 | 1.55* | 5.84 |
| **Male breast** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.21 | 0.00 | -0.12 |
| **Male genital system** | 1 | 0.32 | 5 | 0.50 | 8 | 1.03 | 14 | 1.17 | 28 | 32.94 | 0.85 | -2.79 |
| Prostate | 0 | 0.00 | 4 | 0.42 | 8 | 1.08 | 14 | 1.21 | 26 | 31.58 | 0.82 | -3.16 |
| Testis | 0 | 0.00 | 1 | 2.76 | 0 | 0.00 | 0 | 0.00 | 1 | 1.13 | 0.88 | -0.08 |
| **Urinary system** | 2 | 1.87 | 2 | 0.60 | 1 | 0.39 | 2 | 0.55 | 7 | 10.53 | 0.66 | -2.00 |
| Urinary bladder | 1 | 1.33 | 1 | 0.43 | 1 | 0.56 | 2 | 0.79 | 5 | 7.38 | 0.68 | -1.35 |
| Kidney parenchyma | 1 | 3.93 | 1 | 1.23 | 0 | 0.00 | 0 | 0.00 | 2 | 2.60 | 0.77 | -0.34 |
| Renal pelvis, other urinary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.56 | 0.00 | -0.32 |
| Ureter | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.19 | 0.00 | -0.10 |
| **Bone, joints** | 1 | 36.39 | 3 | 37.80* | 1 | 20.10 | 0 | 0.00 | 5 | 0.21 | 24.17* | 2.71 |
| **Soft tissue including heart** | 0 | 0.00 | 0 | 0.00 | 3 | 21.21* | 3 | 15.88* | 6 | 0.58 | 10.41* | 3.07 |
| **Kaposi sarcoma** | 1 | 13.58 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.96 | 1.05 | 0.02 |
| **Melanoma of skin** | 1 | 3.10 | 3 | 2.76 | 0 | 0.00 | 0 | 0.00 | 4 | 3.67 | 1.09 | 0.19 |
| **Eye, orbit** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.18 | 0.00 | -0.10 |
| **Brain, central nervous system** | 0 | 0.00 | 1 | 1.94 | 0 | 0.00 | 0 | 0.00 | 1 | 1.55 | 0.64 | -0.31 |
| **Thyroid** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 4.50 | 1 | 0.65 | 1.53 | 0.20 |
| **Lymphatic, hematopoietic** | 2 | 2.12 | 12 | 4.05* | 1 | 0.44 | 4 | 1.26 | 19 | 9.37 | 2.03* | 5.45 |
| Hodgkin lymphoma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.72 | 0.00 | -0.41 |
| Non-Hodgkin lymphoma | 2 | 5.02 | 2 | 1.56 | 0 | 0.00 | 2 | 1.32 | 6 | 4.23 | 1.42 | 1.00 |
| Myeloma | 0 | 0.00 | 1 | 2.41 | 0 | 0.00 | 0 | 0.00 | 1 | 1.31 | 0.76 | -0.18 |
| Leukemia | 0 | 0.00 | 9 | 8.90* | 1 | 1.33 | 2 | 1.97 | 12 | 3.11 | 3.86* | 5.03 |
| Acute lymphocytic | 0 | 0.00 | 1 | 13.74 | 0 | 0.00 | 0 | 0.00 | 1 | 0.19 | 5.34 | 0.46 |
| Chronic lymphocytic | 0 | 0.00 | 1 | 2.73 | 0 | 0.00 | 1 | 2.61 | 2 | 1.15 | 1.74 | 0.48 |
| Acute non-lymphocytic | 0 | 0.00 | 6 | 18.02* | 1 | 4.02 | 0 | 0.00 | 7 | 1.03 | 6.80* | 3.38 |
| Chronic myeloid | 0 | 0.00 | 1 | 7.16 | 0 | 0.00 | 1 | 6.68 | 2 | 0.44 | 4.53 | 0.88 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000.

**Table 12.2.1:** Characteristics of patients with an initial cancer of the soft tissues including heart, both sexes, SEER 1973-2000.

| Characteristics | Males | | Females | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| **Number of patients with 1st primary cancer** | | | | | | |
| **Total** | 6,787 | 100.0 | 5,661 | 100.0 | 12,448 | 100.0 |
| **Initial treatment** | | | | | | |
| Any radiation | 2,786 | 41.0 | 2,289 | 40.4 | 5,075 | 40.8 |
| With surgery | 2,338 | 34.4 | 1,911 | 33.8 | 4,249 | 34.1 |
| Without surgery | 448 | 6.6 | 378 | 6.7 | 826 | 6.6 |
| No radiation | 4,001 | 59.0 | 3,372 | 59.6 | 7,373 | 59.2 |
| With surgery | 3,436 | 50.6 | 2,867 | 50.6 | 6,303 | 50.6 |
| Without surgery | 565 | 8.3 | 505 | 8.9 | 1,070 | 8.6 |
| **Race** | | | | | | |
| White | 5,617 | 82.8 | 4,652 | 82.2 | 10,269 | 82.5 |
| Black | 664 | 9.8 | 619 | 10.9 | 1,283 | 10.3 |
| Other | 449 | 6.6 | 349 | 6.2 | 798 | 6.4 |
| Unknown | 57 | 0.8 | 41 | 0.7 | 98 | 0.8 |
| **Age at 1st primary cancer diagnosis, years** | | | | | | |
| < 30 | 1,441 | 21.2 | 1,299 | 22.9 | 2,740 | 22.0 |
| 30–49 | 1,662 | 24.5 | 1,279 | 22.6 | 2,941 | 23.6 |
| 50–69 | 2,175 | 32.0 | 1,619 | 28.6 | 3,794 | 30.5 |
| 70–79 | 1,014 | 14.9 | 812 | 14.3 | 1,826 | 14.7 |
| ≥ 80 | 495 | 7.3 | 652 | 11.5 | 1,147 | 9.2 |
| **Number of patients with one or more primary cancers** | | | | | | |
| One primary cancer only | 6,217 | 91.6 | 5,330 | 94.2 | 11,547 | 92.8 |
| 1st and 2nd cancers | 501 | 7.4 | 301 | 5.3 | 802 | 6.4 |
| 1st, 2nd, and 3rd cancers | 65 | 1.0 | 29 | 0.5 | 94 | 0.8 |
| 1st, 2nd, 3rd, and additional cancers | 4 | 0.1 | 1 | 0.0 | 5 | 0.0 |
| **Other statistics** | | | | | | |
| Median age at 1st cancer diagnosis | 52.9 | — | 53.3 | — | 53.1 | — |
| Median year of 1st cancer diagnosis | 1989.2 | — | 1989.0 | — | 1989.1 | — |
| Median person-years at risk | 3.8 | — | 4.0 | — | 3.9 | — |
| Percent histologically confirmed* | | | | | | |
| Both 1st and 2nd cancers | — | 95.3 | — | 95.8 | — | 95.4 |
| 1st, 2nd, and additional cancers | — | 95.1 | — | 95.5 | — | 95.2 |
| 1st cancer only | — | 3.9 | — | 3.9 | — | 3.9 |

*Percent histologically confirmed among patients who developed a subsequent primary cancer.

# Soft Tissues
## Both Sexes

**Table 12.2.2:** Risk of subsequent primary cancers after cancer of the soft tissues including heart, both sexes, SEER 1973-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 12,448 | | 10,117 | | 5,565 | | 3,172 | | 12,448 | | | |
| Person-years in interval | 9,261 | | 29,365 | | 21,136 | | 21,149 | | 80,911 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 117 | 1.31* | 354 | 1.24* | 267 | 1.22* | 268 | 1.07 | 1,006 | 845.73 | 1.19* | 19.81 |
| All excluding same site | 111 | 1.25* | 338 | 1.19* | 260 | 1.19* | 263 | 1.05 | 972 | 842.07 | 1.15* | 16.06 |
| **Buccal cavity, pharynx** | 3 | 1.25 | 6 | 0.79 | 5 | 0.89 | 6 | 1.02 | 20 | 21.53 | 0.93 | -0.19 |
| Lip | 0 | 0.00 | 0 | 0.00 | 1 | 1.24 | 0 | 0.00 | 1 | 3.12 | 0.32 | -0.26 |
| Tongue | 0 | 0.00 | 2 | 1.32 | 2 | 1.75 | 2 | 1.63 | 6 | 4.35 | 1.38 | 0.20 |
| Salivary gland | 2 | 9.56* | 1 | 1.49 | 0 | 0.00 | 0 | 0.00 | 3 | 1.98 | 1.51 | 0.13 |
| Mouth | 0 | 0.00 | 1 | 0.50 | 1 | 0.68 | 2 | 1.34 | 4 | 5.59 | 0.72 | -0.20 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.93 | 0.00 | -0.11 |
| Tonsil | 0 | 0.00 | 1 | 1.38 | 0 | 0.00 | 1 | 1.76 | 2 | 2.06 | 0.97 | -0.01 |
| Oropharynx | 0 | 0.00 | 1 | 4.77 | 0 | 0.00 | 0 | 0.00 | 1 | 0.60 | 1.66 | 0.05 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.76 | 1 | 2.13 | 0.47 | -0.14 |
| **Digestive system** | 21 | 1.04 | 54 | 0.85 | 50 | 1.05 | 52 | 0.99 | 177 | 183.77 | 0.96 | -0.84 |
| Esophagus | 1 | 1.02 | 1 | 0.32 | 3 | 1.24 | 4 | 1.45 | 9 | 9.31 | 0.97 | -0.04 |
| Stomach | 4 | 1.86 | 9 | 1.35 | 10 | 2.05 | 11 | 2.12* | 34 | 18.88 | 1.80* | 1.87 |
| Small intestine | 1 | 3.67 | 0 | 0.00 | 1 | 1.44 | 1 | 1.19 | 3 | 2.69 | 1.12 | 0.04 |
| Colon | 8 | 0.88 | 26 | 0.91 | 19 | 0.88 | 15 | 0.63 | 68 | 83.09 | 0.82 | -1.87 |
| Rectum, rectosigmoid junction | 4 | 1.16 | 10 | 0.92 | 5 | 0.62 | 6 | 0.70 | 25 | 31.02 | 0.81 | -0.74 |
| Anus, anal canal | 0 | 0.00 | 0 | 0.00 | 1 | 2.18 | 0 | 0.00 | 1 | 1.76 | 0.57 | -0.09 |
| Liver | 1 | 1.46 | 1 | 0.46 | 1 | 0.59 | 1 | 0.50 | 4 | 6.57 | 0.61 | -0.32 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 2.45 | 0.00 | -0.30 |
| Bile ducts, other biliary | 1 | 2.33 | 0 | 0.00 | 1 | 0.95 | 3 | 2.40 | 5 | 4.09 | 1.22 | 0.11 |
| Pancreas | 0 | 0.00 | 6 | 0.79 | 6 | 1.05 | 11 | 1.74 | 23 | 22.08 | 1.04 | 0.11 |
| **Respiratory system** | 18 | 1.20 | 52 | 1.08 | 37 | 1.00 | 44 | 1.06 | 151 | 141.78 | 1.07 | 1.14 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.25 | 0.00 | -0.15 |
| Larynx | 0 | 0.00 | 5 | 1.52 | 2 | 0.81 | 3 | 1.16 | 10 | 9.39 | 1.06 | 0.08 |
| Lung, bronchus | 18 | 1.31 | 47 | 1.06 | 35 | 1.02 | 40 | 1.04 | 140 | 130.74 | 1.07 | 1.14 |
| **Female breast** | 13 | 1.41 | 26 | 0.88 | 38 | 1.66* | 23 | 0.90 | 100 | 87.36 | 1.14 | 3.39 |
| **Female genital system** | 3 | 0.71 | 16 | 1.20 | 15 | 1.53 | 11 | 1.05 | 45 | 37.81 | 1.19 | 1.93 |
| Cervix uteri | 0 | 0.00 | 0 | 0.00 | 1 | 0.75 | 1 | 0.76 | 2 | 5.12 | 0.39 | -0.84 |
| Corpus uteri | 2 | 0.97 | 8 | 1.25 | 8 | 1.71 | 6 | 1.20 | 24 | 18.13 | 1.32 | 1.57 |
| Ovary | 0 | 0.00 | 6 | 1.54 | 6 | 2.03 | 2 | 0.62 | 14 | 11.31 | 1.24 | 0.72 |
| Vagina | 1 | 15.10 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.59 | 1.69 | 0.11 |
| Vulva | 0 | 0.00 | 1 | 1.64 | 0 | 0.00 | 2 | 3.90 | 3 | 1.78 | 1.68 | 0.33 |
| **Male genital system** | 27 | 1.61* | 70 | 1.28 | 51 | 1.18 | 47 | 0.85 | 195 | 169.84 | 1.15 | 5.77 |
| Prostate | 26 | 1.58* | 70 | 1.30* | 49 | 1.15 | 45 | 0.83 | 190 | 166.88 | 1.14 | 5.30 |
| Testis | 0 | 0.00 | 0 | 0.00 | 2 | 4.17 | 0 | 0.00 | 2 | 1.86 | 1.08 | 0.03 |
| **Urinary system** | 10 | 1.42 | 28 | 1.24 | 18 | 1.04 | 25 | 1.26 | 81 | 66.60 | 1.22 | 1.78 |
| Urinary bladder | 4 | 0.82 | 21 | 1.35 | 15 | 1.27 | 19 | 1.40 | 59 | 45.80 | 1.29 | 1.63 |
| Kidney parenchyma | 5 | 2.91 | 5 | 0.89 | 3 | 0.69 | 2 | 0.39 | 15 | 16.79 | 0.89 | -0.22 |
| Renal pelvis, other urinary | 1 | 2.25 | 2 | 1.42 | 0 | 0.00 | 4 | 3.56 | 7 | 4.01 | 1.74 | 0.37 |
| Ureter | 0 | 0.00 | 1 | 2.18 | 0 | 0.00 | 0 | 0.00 | 1 | 1.31 | 0.76 | -0.04 |
| **Bone, joints** | 0 | 0.00 | 7 | 21.96* | 2 | 8.56 | 3 | 12.04* | 12 | 0.90 | 13.30* | 1.37 |
| **Soft tissue including heart** | 6 | 15.03* | 16 | 12.80* | 7 | 7.53* | 5 | 4.65* | 34 | 3.65 | 9.30* | 3.75 |
| **Kaposi sarcoma** | 3 | 13.23* | 2 | 2.63 | 0 | 0.00 | 0 | 0.00 | 5 | 2.22 | 2.26 | 0.34 |
| **Melanoma of skin** | 1 | 0.48 | 12 | 1.74 | 10 | 1.82 | 15 | 2.25* | 38 | 21.12 | 1.80* | 2.09 |
| **Eye, orbit** | 0 | 0.00 | 1 | 2.31 | 0 | 0.00 | 0 | 0.00 | 1 | 1.22 | 0.82 | -0.03 |
| **Brain, central nervous system** | 0 | 0.00 | 7 | 2.22 | 3 | 1.26 | 2 | 0.78 | 12 | 9.09 | 1.32 | 0.36 |
| **Thyroid** | 2 | 3.24 | 6 | 2.98* | 3 | 1.97 | 3 | 1.75 | 14 | 5.87 | 2.39* | 1.00 |
| **Lymphatic, hematopoietic** | 7 | 1.01 | 42 | 1.90* | 20 | 1.19 | 23 | 1.20 | 92 | 65.12 | 1.41* | 3.32 |
| Hodgkin lymphoma | 0 | 0.00 | 2 | 1.98 | 0 | 0.00 | 1 | 1.35 | 3 | 2.80 | 1.07 | 0.02 |
| Non-Hodgkin lymphoma | 0 | 0.00 | 7 | 0.72 | 9 | 1.18 | 12 | 1.34 | 28 | 29.37 | 0.95 | -0.17 |
| Myeloma | 2 | 1.76 | 10 | 2.76* | 1 | 0.36 | 2 | 0.62 | 15 | 10.76 | 1.39 | 0.52 |
| Leukemia | 5 | 2.05 | 23 | 2.99* | 10 | 1.75 | 8 | 1.26 | 46 | 22.19 | 2.07* | 2.94 |
| Acute lymphocytic | 0 | 0.00 | 2 | 5.81 | 0 | 0.00 | 0 | 0.00 | 2 | 0.90 | 2.21 | 0.14 |
| Chronic lymphocytic | 3 | 3.25 | 6 | 2.05 | 4 | 1.82 | 2 | 0.83 | 15 | 8.47 | 1.77 | 0.81 |
| Acute non-lymphocytic | 2 | 2.45 | 9 | 3.47* | 4 | 2.06 | 5 | 2.28 | 20 | 7.54 | 2.65* | 1.54 |
| Chronic myeloid | 0 | 0.00 | 5 | 4.71* | 1 | 1.27 | 1 | 1.12 | 7 | 3.08 | 2.27 | 0.48 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000. EAR for female cancers is based on 37,323 PYR and for male cancers on 43,588 PYR.

**Table 12.2.3:** Risk of subsequent primary cancers after cancer of the soft tissues including heart, females, SEER 1973-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 5,661 | | 4,619 | | 2,560 | | 1,475 | | 5,661 | | | |
| Person-years in interval | 4,217 | | 13,474 | | 9,815 | | 9,818 | | 37,323 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 45 | 1.39* | 118 | 1.15 | 105 | 1.33* | 94 | 1.08 | 362 | 300.92 | 1.20* | 16.37 |
| All excluding same site | 42 | 1.30 | 110 | 1.07 | 100 | 1.28* | 92 | 1.06 | 344 | 299.58 | 1.15* | 11.90 |
| **Buccal cavity, pharynx** | 1 | 1.73 | 1 | 0.55 | 3 | 2.20 | 1 | 0.70 | 6 | 5.20 | 1.15 | 0.22 |
| Lip | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.35 | 0.00 | -0.09 |
| Tongue | 0 | 0.00 | 0 | 0.00 | 1 | 3.31 | 1 | 3.11 | 2 | 1.15 | 1.74 | 0.23 |
| Salivary gland | 1 | 14.80 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.62 | 1.61 | 0.10 |
| Mouth | 0 | 0.00 | 0 | 0.00 | 1 | 2.16 | 0 | 0.00 | 1 | 1.77 | 0.57 | -0.21 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.23 | 0.00 | -0.06 |
| Tonsil | 0 | 0.00 | 1 | 6.30 | 0 | 0.00 | 0 | 0.00 | 1 | 0.44 | 2.26 | 0.15 |
| Oropharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.13 | 0.00 | -0.03 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.33 | 0.00 | -0.09 |
| **Digestive system** | 8 | 1.05 | 14 | 0.59* | 11 | 0.62 | 15 | 0.79 | 48 | 67.92 | 0.71* | -5.34 |
| Esophagus | 0 | 0.00 | 0 | 0.00 | 1 | 2.04 | 0 | 0.00 | 1 | 1.88 | 0.53 | -0.24 |
| Stomach | 1 | 1.58 | 3 | 1.56 | 3 | 2.13 | 2 | 1.36 | 9 | 5.43 | 1.66 | 0.96 |
| Small intestine | 0 | 0.00 | 0 | 0.00 | 1 | 3.78 | 1 | 3.19 | 2 | 1.02 | 1.97 | 0.26 |
| Colon | 3 | 0.79 | 9 | 0.76 | 4 | 0.45 | 6 | 0.64 | 22 | 33.84 | 0.65* | -3.17 |
| Rectum, rectosigmoid junction | 2 | 1.68 | 1 | 0.27 | 0 | 0.00 | 1 | 0.36 | 4 | 10.37 | 0.39* | -1.71 |
| Rectum | 2 | 2.56 | 0 | 0.00 | 0 | 0.00 | 1 | 0.54 | 3 | 6.83 | 0.44 | -1.03 |
| Anus, anal canal | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.92 | 0.00 | -0.25 |
| Liver | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.14 | 1 | 1.55 | 0.65 | -0.15 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.48 | 0.00 | -0.40 |
| Bile ducts, other biliary | 1 | 6.09 | 0 | 0.00 | 0 | 0.00 | 1 | 2.21 | 2 | 1.53 | 1.31 | 0.13 |
| Pancreas | 0 | 0.00 | 1 | 0.33 | 1 | 0.43 | 3 | 1.17 | 5 | 8.97 | 0.56 | -1.06 |
| **Respiratory system** | 8 | 2.04 | 15 | 1.17 | 9 | 0.89 | 12 | 1.01 | 44 | 38.66 | 1.14 | 1.43 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.41 | 0.00 | -0.11 |
| Larynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.23 | 0.00 | -0.33 |
| Lung, bronchus | 8 | 2.14 | 15 | 1.23 | 9 | 0.93 | 11 | 0.97 | 43 | 36.91 | 1.17 | 1.63 |
| **Female breast** | 13 | 1.41 | 26 | 0.88 | 38 | 1.66* | 23 | 0.90 | 100 | 87.36 | 1.14 | 3.39 |
| **Female genital system** | 3 | 0.71 | 16 | 1.20 | 15 | 1.53 | 11 | 1.05 | 45 | 37.81 | 1.19 | 1.93 |
| Cervix uteri | 0 | 0.00 | 0 | 0.00 | 1 | 0.75 | 1 | 0.76 | 2 | 5.12 | 0.39 | -0.84 |
| Corpus uteri | 2 | 0.97 | 8 | 1.25 | 8 | 1.71 | 6 | 1.20 | 24 | 18.13 | 1.32 | 1.57 |
| Ovary | 0 | 0.00 | 6 | 1.54 | 6 | 2.03 | 2 | 0.62 | 14 | 11.31 | 1.24 | 0.72 |
| Vagina | 1 | 15.10 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.59 | 1.69 | 0.11 |
| Vulva | 0 | 0.00 | 1 | 1.64 | 0 | 0.00 | 2 | 3.90 | 3 | 1.78 | 1.68 | 0.33 |
| **Urinary system** | 2 | 1.32 | 7 | 1.46 | 3 | 0.81 | 10 | 2.44* | 22 | 14.11 | 1.56 | 2.11 |
| Urinary bladder | 0 | 0.00 | 5 | 1.77 | 3 | 1.39 | 8 | 3.39* | 16 | 8.24 | 1.94* | 2.08 |
| Kidney parenchyma | 2 | 4.07 | 2 | 1.26 | 0 | 0.00 | 1 | 0.70 | 5 | 4.75 | 1.05 | 0.07 |
| Renal pelvis, other urinary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 3.22 | 1 | 1.12 | 0.89 | -0.03 |
| Ureter | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.34 | 0.00 | -0.09 |
| **Bone, joints** | 0 | 0.00 | 3 | 24.98* | 2 | 22.41* | 1 | 10.50 | 6 | 0.34 | 17.51* | 1.52 |
| **Soft tissue including heart** | 3 | 20.45* | 8 | 17.42* | 5 | 14.52* | 2 | 5.19 | 18 | 1.34 | 13.48* | 4.46 |
| **Kaposi sarcoma** | 1 | 73.88 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.12 | 8.07 | 0.23 |
| **Melanoma of skin** | 0 | 0.00 | 2 | 0.87 | 3 | 1.64 | 1 | 0.48 | 6 | 6.91 | 0.87 | -0.24 |
| **Eye, orbit** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.43 | 0.00 | -0.12 |
| **Brain, central nervous system** | 0 | 0.00 | 3 | 2.67 | 1 | 1.18 | 0 | 0.00 | 4 | 3.23 | 1.24 | 0.21 |
| **Thyroid** | 1 | 2.60 | 2 | 1.58 | 1 | 1.04 | 2 | 1.85 | 6 | 3.69 | 1.63 | 0.62 |
| **Lymphatic, hematopoietic** | 3 | 1.19 | 17 | 2.13* | 9 | 1.47 | 12 | 1.78 | 41 | 23.34 | 1.76* | 4.73 |
| Hodgkin lymphoma | 0 | 0.00 | 1 | 2.74 | 0 | 0.00 | 0 | 0.00 | 1 | 1.02 | 0.98 | -0.01 |
| Non-Hodgkin lymphoma | 0 | 0.00 | 5 | 1.35 | 6 | 2.08 | 8 | 2.44* | 19 | 11.02 | 1.72* | 2.14 |
| Myeloma | 1 | 2.34 | 5 | 3.71* | 0 | 0.00 | 1 | 0.87 | 7 | 3.96 | 1.77 | 0.81 |
| Leukemia | 2 | 2.43 | 6 | 2.34 | 3 | 1.56 | 3 | 1.47 | 14 | 7.34 | 1.91* | 1.78 |
| Acute lymphocytic | 0 | 0.00 | 1 | 7.60 | 0 | 0.00 | 0 | 0.00 | 1 | 0.34 | 2.94 | 0.18 |
| Chronic lymphocytic | 0 | 0.00 | 2 | 2.15 | 1 | 1.43 | 1 | 1.36 | 4 | 2.67 | 1.50 | 0.36 |
| Acute non-lymphocytic | 2 | 6.91 | 2 | 2.20 | 1 | 1.46 | 2 | 2.66 | 7 | 2.63 | 2.66* | 1.17 |
| Chronic myeloid | 0 | 0.00 | 1 | 2.79 | 0 | 0.00 | 0 | 0.00 | 1 | 1.03 | 0.97 | -0.01 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000.

# Soft Tissues
## Males

**Table 12.2.4:** Risk of subsequent primary cancers after cancer of the soft tissues including heart, males, SEER 1973-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 6,787 | | 5,498 | | 3,005 | | 1,697 | | 6,787 | | | |
| Person-years in interval | 5,044 | | 15,891 | | 11,321 | | 11,331 | | 43,588 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 72 | 1.27 | 236 | 1.29* | 162 | 1.15 | 174 | 1.06 | 644 | 544.81 | 1.18* | 22.76 |
| All excluding same site | 69 | 1.22 | 228 | 1.25* | 160 | 1.14 | 171 | 1.05 | 628 | 542.49 | 1.16* | 19.62 |
| **Buccal cavity, pharynx** | 2 | 1.10 | 5 | 0.86 | 2 | 0.47 | 5 | 1.12 | 14 | 16.33 | 0.86 | -0.53 |
| Lip | 0 | 0.00 | 0 | 0.00 | 1 | 1.40 | 0 | 0.00 | 1 | 2.77 | 0.36 | -0.41 |
| Tongue | 0 | 0.00 | 2 | 1.80 | 1 | 1.19 | 1 | 1.10 | 4 | 3.20 | 1.25 | 0.18 |
| Salivary gland | 1 | 7.06 | 1 | 2.18 | 0 | 0.00 | 0 | 0.00 | 2 | 1.36 | 1.47 | 0.15 |
| Mouth | 0 | 0.00 | 1 | 0.73 | 0 | 0.00 | 2 | 1.99 | 3 | 3.82 | 0.79 | -0.19 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.70 | 0.00 | -0.16 |
| Tonsil | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.21 | 1 | 1.62 | 0.62 | -0.14 |
| Oropharynx | 0 | 0.00 | 1 | 6.05 | 0 | 0.00 | 0 | 0.00 | 1 | 0.48 | 2.10 | 0.12 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.09 | 1 | 1.79 | 0.56 | -0.18 |
| **Digestive system** | 13 | 1.04 | 40 | 1.00 | 39 | 1.30 | 37 | 1.11 | 129 | 115.85 | 1.11 | 3.02 |
| Esophagus | 1 | 1.29 | 1 | 0.40 | 2 | 1.04 | 4 | 1.80 | 8 | 7.42 | 1.08 | 0.13 |
| Stomach | 3 | 1.98 | 6 | 1.26 | 7 | 2.02 | 9 | 2.42* | 25 | 13.45 | 1.86* | 2.65 |
| Small intestine | 1 | 5.94 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.67 | 0.60 | -0.15 |
| Colon | 5 | 0.95 | 17 | 1.01 | 15 | 1.18 | 9 | 0.63 | 46 | 49.25 | 0.93 | -0.75 |
| Rectum, rectosigmoid junction | 2 | 0.88 | 9 | 1.25 | 5 | 0.93 | 5 | 0.87 | 21 | 20.65 | 1.02 | 0.08 |
| Anus, anal canal | 0 | 0.00 | 0 | 0.00 | 1 | 4.62 | 0 | 0.00 | 1 | 0.84 | 1.19 | 0.04 |
| Liver | 1 | 1.94 | 1 | 0.60 | 1 | 0.78 | 0 | 0.00 | 3 | 5.02 | 0.60 | -0.46 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.96 | 0.00 | -0.22 |
| Bile ducts, other biliary | 0 | 0.00 | 0 | 0.00 | 1 | 1.54 | 2 | 2.52 | 3 | 2.57 | 1.17 | 0.10 |
| Pancreas | 0 | 0.00 | 5 | 1.10 | 5 | 1.48 | 8 | 2.12 | 18 | 13.11 | 1.37 | 1.12 |
| **Respiratory system** | 10 | 0.91 | 37 | 1.04 | 28 | 1.04 | 32 | 1.08 | 107 | 103.12 | 1.04 | 0.89 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.84 | 0.00 | -0.19 |
| Larynx | 0 | 0.00 | 5 | 1.74 | 2 | 0.93 | 3 | 1.34 | 10 | 8.16 | 1.23 | 0.42 |
| Lung, bronchus | 10 | 1.00 | 32 | 0.99 | 26 | 1.06 | 29 | 1.07 | 97 | 93.83 | 1.03 | 0.73 |
| **Male breast** | 0 | 0.00 | 0 | 0.00 | 1 | 3.79 | 1 | 3.20 | 2 | 1.03 | 1.94 | 0.22 |
| **Male genital system** | 27 | 1.61* | 70 | 1.28 | 51 | 1.18 | 47 | 0.85 | 195 | 169.84 | 1.15 | 5.77 |
| Prostate | 26 | 1.58* | 70 | 1.30* | 49 | 1.15 | 45 | 0.83 | 190 | 166.88 | 1.14 | 5.30 |
| Testis | 0 | 0.00 | 0 | 0.00 | 2 | 4.17 | 0 | 0.00 | 2 | 1.86 | 1.08 | 0.03 |
| **Urinary system** | 8 | 1.45 | 21 | 1.18 | 15 | 1.11 | 15 | 0.95 | 59 | 52.49 | 1.12 | 1.49 |
| Urinary bladder | 4 | 1.01 | 16 | 1.26 | 12 | 1.24 | 11 | 0.98 | 43 | 37.56 | 1.14 | 1.25 |
| Kidney parenchyma | 3 | 2.44 | 3 | 0.75 | 3 | 0.96 | 1 | 0.27 | 10 | 12.04 | 0.83 | -0.47 |
| Renal pelvis, other urinary | 1 | 3.14 | 2 | 1.97 | 0 | 0.00 | 3 | 3.69 | 6 | 2.89 | 2.08 | 0.71 |
| Ureter | 0 | 0.00 | 1 | 2.94 | 0 | 0.00 | 0 | 0.00 | 1 | 0.97 | 1.03 | 0.01 |
| **Bone, joints** | 0 | 0.00 | 4 | 20.14* | 0 | 0.00 | 2 | 12.99* | 6 | 0.56 | 10.72* | 1.25 |
| **Soft tissue including heart** | 3 | 11.87* | 8 | 10.11* | 2 | 3.42 | 3 | 4.35 | 16 | 2.32 | 6.90* | 3.14 |
| **Kaposi sarcoma** | 2 | 9.38* | 2 | 2.79 | 0 | 0.00 | 0 | 0.00 | 4 | 2.09 | 1.91 | 0.44 |
| **Melanoma of skin** | 1 | 0.73 | 10 | 2.17* | 7 | 1.91 | 14 | 3.06* | 32 | 14.21 | 2.25* | 4.08 |
| **Eye, orbit** | 0 | 0.00 | 1 | 3.63 | 0 | 0.00 | 0 | 0.00 | 1 | 0.78 | 1.27 | 0.05 |
| **Brain, central nervous system** | 0 | 0.00 | 4 | 1.97 | 2 | 1.31 | 2 | 1.20 | 8 | 5.86 | 1.37 | 0.49 |
| **Thyroid** | 1 | 4.29 | 4 | 5.32* | 2 | 3.56 | 1 | 1.57 | 8 | 2.18 | 3.66* | 1.33 |
| **Lymphatic, hematopoietic** | 4 | 0.91 | 25 | 1.77* | 11 | 1.02 | 11 | 0.88 | 51 | 41.77 | 1.22 | 2.12 |
| Hodgkin lymphoma | 0 | 0.00 | 1 | 1.55 | 0 | 0.00 | 1 | 2.15 | 2 | 1.78 | 1.13 | 0.05 |
| Non-Hodgkin lymphoma | 0 | 0.00 | 2 | 0.33 | 3 | 0.63 | 4 | 0.70 | 9 | 18.35 | 0.49* | -2.15 |
| Myeloma | 1 | 1.41 | 5 | 2.19 | 1 | 0.57 | 1 | 0.49 | 8 | 6.80 | 1.18 | 0.28 |
| Leukemia | 3 | 1.86 | 17 | 3.31* | 7 | 1.84 | 5 | 1.16 | 32 | 14.85 | 2.16* | 3.93 |
| Acute lymphocytic | 0 | 0.00 | 1 | 4.70 | 0 | 0.00 | 0 | 0.00 | 1 | 0.56 | 1.77 | 0.10 |
| Chronic lymphocytic | 3 | 4.80 | 4 | 2.00 | 3 | 2.00 | 1 | 0.59 | 11 | 5.80 | 1.90 | 1.19 |
| Acute non-lymphocytic | 0 | 0.00 | 7 | 4.16* | 3 | 2.38 | 3 | 2.08 | 13 | 4.91 | 2.65* | 1.86 |
| Chronic myeloid | 0 | 0.00 | 4 | 5.69* | 1 | 1.92 | 1 | 1.66 | 6 | 2.05 | 2.93* | 0.91 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000.

**Table 12.2.5:** Risk of subsequent primary cancers after cancer of the soft tissues including heart, both sexes, <18 years of age, SEER 1973-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 1,448 | | 1,238 | | 753 | | 501 | | 1,448 | | | |
| Person-years in interval | 1,117 | | 3,729 | | 3,073 | | 3,778 | | 11,697 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 0 | 0.00 | 5 | 7.85* | 4 | 6.32* | 11 | 5.98* | 20 | 3.29 | 6.07* | 14.28 |
| All excluding same site | 0 | 0.00 | 5 | 8.32* | 3 | 4.94 | 11 | 6.13* | 19 | 3.17 | 5.99* | 13.53 |
| **Buccal cavity, pharynx** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 3 | 81.37* | 3 | 0.06 | 49.72* | 2.51 |
| Lip | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Tongue | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 133.20* | 1 | 0.01 | 99.97* | 0.85 |
| Salivary gland | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.02 | 0.00 | -0.02 |
| Mouth | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 171.24* | 1 | 0.01 | 100.34* | 0.85 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -0.01 |
| Tonsil | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | † | 1 | 0.00 | 475.45* | 0.85 |
| Oropharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| **Digestive system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.15 | 0.00 | -0.12 |
| Esophagus | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Stomach | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -0.01 |
| Small intestine | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | 0.00 |
| Colon | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.04 | 0.00 | -0.04 |
| Rectum, rectosigmoid junction | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.02 | 0.00 | -0.02 |
| Anus, anal canal | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Liver | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.02 | 0.00 | -0.02 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Bile ducts, other biliary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Pancreas | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -0.01 |
| **Respiratory system** | 0 | 0.00 | 0 | 0.00 | 1 | 108.74* | 0 | 0.00 | 1 | 0.06 | 15.51 | 0.80 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -0.01 |
| Larynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Lung, bronchus | 0 | 0.00 | 0 | 0.00 | 1 | 280.75* | 0 | 0.00 | 1 | 0.04 | 28.41 | 0.82 |
| **Female breast** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 4 | 19.24* | 4 | 0.22 | 18.08* | 6.47 |
| **Female genital system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 5.16 | 1 | 0.26 | 3.82 | 1.26 |
| Cervix uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.11 | 0.00 | -0.19 |
| Corpus uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 47.90 | 1 | 0.02 | 43.47 | 1.67 |
| Ovary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.11 | 0.00 | -0.19 |
| Vagina | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Vulva | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -0.01 |
| **Male genital system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.26 | 0.00 | -0.44 |
| Prostate | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | -0.01 |
| Testis | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.25 | 0.00 | -0.43 |
| **Urinary system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.10 | 0.00 | -0.09 |
| Urinary bladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.02 |
| Kidney parenchyma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.07 | 0.00 | -0.06 |
| Renal pelvis, other urinary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Ureter | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| **Bone, joints** | 0 | 0.00 | 2 | 64.32* | 1 | 34.32 | 2 | 54.36* | 5 | 0.11 | 47.38* | 4.18 |
| **Soft tissue including heart** | 0 | 0.00 | 0 | 0.00 | 1 | 38.03 | 0 | 0.00 | 1 | 0.12 | 8.34 | 0.75 |
| **Kaposi sarcoma** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.09 | 0.00 | -0.08 |
| **Melanoma of skin** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 4.76 | 1 | 0.29 | 3.44 | 0.61 |
| **Eye, orbit** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.02 |
| **Brain, central nervous system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.32 | 0.00 | -0.28 |
| **Thyroid** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.24 | 0.00 | -0.21 |
| **Lymphatic, hematopoietic** | 0 | 0.00 | 3 | 12.30* | 0 | 0.00 | 0 | 0.00 | 3 | 0.90 | 3.32 | 1.79 |
| Hodgkin lymphoma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.30 | 0.00 | -0.26 |
| Non-Hodgkin lymphoma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.23 | 0.00 | -0.20 |
| Myeloma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Leukemia | 0 | 0.00 | 3 | 20.83* | 0 | 0.00 | 0 | 0.00 | 3 | 0.37 | 8.14* | 2.25 |
| Acute lymphocytic | 0 | 0.00 | 1 | 9.43 | 0 | 0.00 | 0 | 0.00 | 1 | 0.23 | 4.38 | 0.66 |
| Chronic lymphocytic | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Acute non-lymphocytic | 0 | 0.00 | 2 | 66.03* | 0 | 0.00 | 0 | 0.00 | 2 | 0.10 | 19.63* | 1.62 |
| Chronic myeloid | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.02 |

*P < 0.05. †O/E > 500. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000. EAR for female cancers is based on 5,839 PYR and for male cancers on 5,858 PYR.

# Soft Tissues
## Both Sexes, 18-29 Years of Age

**Table 12.2.6:** Risk of subsequent primary cancers after cancer of the soft tissues including heart, both sexes, 18-29 years of age, SEER 1973-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 1,292 | | 1,087 | | 665 | | 431 | | 1,292 | | | |
| Person-years in interval | 990 | | 3,343 | | 2,700 | | 3,151 | | 10,183 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 2 | 4.71 | 8 | 4.30* | 7 | 3.02* | 10 | 1.68 | 27 | 10.57 | 2.56* | 16.14 |
| All excluding same site | 1 | 2.42 | 6 | 3.30* | 6 | 2.63 | 9 | 1.52 | 22 | 10.41 | 2.11* | 11.38 |
| **Buccal cavity, pharynx** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.28 | 0.00 | -0.27 |
| Lip | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.03 |
| Tongue | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.06 | 0.00 | -0.06 |
| Salivary gland | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.05 | 0.00 | -0.05 |
| Mouth | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.05 | 0.00 | -0.05 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.04 | 0.00 | -0.04 |
| Tonsil | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.03 |
| Oropharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -0.01 |
| **Digestive system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 3 | 4.41 | 3 | 0.95 | 3.15 | 2.01 |
| Esophagus | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.04 | 0.00 | -0.04 |
| Stomach | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 14.25 | 1 | 0.10 | 9.59 | 0.88 |
| Small intestine | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 44.66 | 1 | 0.03 | 30.78 | 0.95 |
| Colon | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 4.27 | 1 | 0.34 | 2.95 | 0.65 |
| Rectum, rectosigmoid junction | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.19 | 0.00 | -0.19 |
| Anus, anal canal | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.04 | 0.00 | -0.04 |
| Liver | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.07 | 0.00 | -0.07 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -0.01 |
| Bile ducts, other biliary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.02 | 0.00 | -0.02 |
| Pancreas | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.09 | 0.00 | -0.08 |
| **Respiratory system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 4.67 | 2 | 0.54 | 3.71 | 1.43 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.02 | 0.00 | -0.02 |
| Larynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 23.55 | 1 | 0.05 | 19.19 | 0.93 |
| Lung, bronchus | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.71 | 1 | 0.45 | 2.23 | 0.54 |
| **Female breast** | 0 | 0.00 | 1 | 5.49 | 3 | 7.93* | 1 | 0.69 | 5 | 2.04 | 2.45 | 6.21 |
| **Female genital system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.73 | 1 | 1.11 | 0.90 | -0.24 |
| Cervix uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 4.86 | 1 | 0.50 | 2.02 | 1.06 |
| Corpus uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.22 | 0.00 | -0.46 |
| Ovary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.33 | 0.00 | -0.70 |
| Vagina | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -0.02 |
| Vulva | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.07 |
| **Male genital system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.76 | 0.00 | -1.41 |
| Prostate | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.17 | 0.00 | -0.31 |
| Testis | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.59 | 0.00 | -1.09 |
| **Urinary system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.40 | 0.00 | -0.39 |
| Urinary bladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.20 | 0.00 | -0.19 |
| Kidney parenchyma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.19 | 0.00 | -0.18 |
| Renal pelvis, other urinary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -0.01 |
| Ureter | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| **Bone, joints** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.07 | 0.00 | -0.07 |
| **Soft tissue including heart** | 1 | 85.87* | 2 | 48.84* | 1 | 27.04 | 1 | 16.28 | 5 | 0.15 | 33.11* | 4.76 |
| **Kaposi sarcoma** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.52 | 0.00 | -0.51 |
| **Melanoma of skin** | 0 | 0.00 | 1 | 4.38 | 1 | 3.72 | 1 | 1.93 | 3 | 1.07 | 2.81 | 1.90 |
| **Eye, orbit** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.03 |
| **Brain, central nervous system** | 0 | 0.00 | 1 | 10.77 | 1 | 10.98 | 0 | 0.00 | 2 | 0.36 | 5.60 | 1.61 |
| **Thyroid** | 0 | 0.00 | 1 | 5.69 | 0 | 0.00 | 1 | 3.87 | 2 | 0.65 | 3.07 | 1.32 |
| **Lymphatic, hematopoietic** | 1 | 10.23 | 2 | 5.51 | 0 | 0.00 | 0 | 0.00 | 3 | 1.47 | 2.04 | 1.50 |
| Hodgkin lymphoma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.42 | 0.00 | -0.41 |
| Non-Hodgkin lymphoma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.68 | 0.00 | -0.66 |
| Myeloma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.05 | 0.00 | -0.05 |
| Leukemia | 1 | 45.22 | 2 | 25.78* | 0 | 0.00 | 0 | 0.00 | 3 | 0.32 | 9.37* | 2.63 |
| Acute lymphocytic | 0 | 0.00 | 1 | 55.96 | 0 | 0.00 | 0 | 0.00 | 1 | 0.05 | 18.86 | 0.93 |
| Chronic lymphocytic | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.03 |
| Acute non-lymphocytic | 1 | 94.35* | 1 | 27.00 | 0 | 0.00 | 0 | 0.00 | 2 | 0.14 | 14.44* | 1.83 |
| Chronic myeloid | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.07 | 0.00 | -0.07 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000. EAR for female cancers is based on 4,769 PYR and for male cancers on 5,415 PYR.

**Table 12.2.7:** Risk of subsequent primary cancers after cancer of the soft tissues including heart, both sexes, ≥30 years of age, SEER 1973-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 9,708 | | 7,792 | | 4,147 | | 2,240 | | 9,708 | | | |
| Person-years in interval | 7,154 | | 22,293 | | 15,363 | | 14,221 | | 59,031 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 115 | 1.30* | 341 | 1.20* | 256 | 1.18* | 247 | 1.02 | 959 | 831.87 | 1.15* | 21.54 |
| All excluding same site | 110 | 1.25* | 327 | 1.16* | 251 | 1.17* | 243 | 1.00 | 931 | 828.49 | 1.12* | 17.37 |
| **Buccal cavity, pharynx** | 3 | 1.26 | 6 | 0.79 | 5 | 0.90 | 3 | 0.53 | 17 | 21.19 | 0.80 | -0.71 |
| Lip | 0 | 0.00 | 0 | 0.00 | 1 | 1.26 | 0 | 0.00 | 1 | 3.08 | 0.32 | -0.35 |
| Tongue | 0 | 0.00 | 2 | 1.33 | 2 | 1.77 | 1 | 0.85 | 5 | 4.28 | 1.17 | 0.12 |
| Salivary gland | 2 | 9.72* | 1 | 1.52 | 0 | 0.00 | 0 | 0.00 | 3 | 1.92 | 1.57 | 0.18 |
| Mouth | 0 | 0.00 | 1 | 0.50 | 1 | 0.69 | 1 | 0.69 | 3 | 5.53 | 0.54 | -0.43 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.88 | 0.00 | -0.15 |
| Tonsil | 0 | 0.00 | 1 | 1.38 | 0 | 0.00 | 0 | 0.00 | 1 | 2.03 | 0.49 | -0.17 |
| Oropharynx | 0 | 0.00 | 1 | 4.77 | 0 | 0.00 | 0 | 0.00 | 1 | 0.60 | 1.67 | 0.07 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.79 | 1 | 2.11 | 0.47 | -0.19 |
| **Digestive system** | 21 | 1.05 | 54 | 0.85 | 50 | 1.05 | 49 | 0.95 | 174 | 182.67 | 0.95 | -1.47 |
| Esophagus | 1 | 1.02 | 1 | 0.32 | 3 | 1.24 | 4 | 1.47 | 9 | 9.27 | 0.97 | -0.04 |
| Stomach | 4 | 1.87 | 9 | 1.35 | 10 | 2.06 | 10 | 1.96 | 33 | 18.76 | 1.76* | 2.41 |
| Small intestine | 1 | 3.68 | 0 | 0.00 | 1 | 1.45 | 0 | 0.00 | 2 | 2.65 | 0.75 | -0.11 |
| Colon | 8 | 0.88 | 26 | 0.91 | 19 | 0.88 | 14 | 0.60 | 67 | 82.71 | 0.81 | -2.66 |
| Rectum, rectosigmoid junction | 4 | 1.16 | 10 | 0.92 | 5 | 0.62 | 6 | 0.71 | 25 | 30.80 | 0.81 | -0.98 |
| Anus, anal canal | 0 | 0.00 | 0 | 0.00 | 1 | 2.21 | 0 | 0.00 | 1 | 1.72 | 0.58 | -0.12 |
| Liver | 1 | 1.47 | 1 | 0.46 | 1 | 0.60 | 1 | 0.51 | 4 | 6.48 | 0.62 | -0.42 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 2.44 | 0.00 | -0.41 |
| Bile ducts, other biliary | 1 | 2.33 | 0 | 0.00 | 1 | 0.96 | 3 | 2.44 | 5 | 4.07 | 1.23 | 0.16 |
| Pancreas | 0 | 0.00 | 6 | 0.79 | 6 | 1.05 | 11 | 1.76 | 23 | 21.98 | 1.05 | 0.17 |
| **Respiratory system** | 18 | 1.20 | 52 | 1.08 | 36 | 0.97 | 42 | 1.03 | 148 | 141.17 | 1.05 | 1.16 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.23 | 0.00 | -0.21 |
| Larynx | 0 | 0.00 | 5 | 1.52 | 2 | 0.81 | 2 | 0.79 | 9 | 9.33 | 0.96 | -0.06 |
| Lung, bronchus | 18 | 1.31 | 47 | 1.06 | 34 | 1.00 | 39 | 1.03 | 138 | 130.26 | 1.06 | 1.31 |
| **Female breast** | 13 | 1.42 | 25 | 0.85 | 35 | 1.56* | 18 | 0.75 | 91 | 85.10 | 1.07 | 2.21 |
| **Female genital system** | 3 | 0.72 | 16 | 1.23 | 15 | 1.58 | 9 | 0.93 | 43 | 36.44 | 1.18 | 2.46 |
| Cervix uteri | 0 | 0.00 | 0 | 0.00 | 1 | 0.86 | 0 | 0.00 | 1 | 4.51 | 0.22 | -1.31 |
| Corpus uteri | 2 | 0.98 | 8 | 1.25 | 8 | 1.73 | 5 | 1.04 | 23 | 17.89 | 1.29 | 1.91 |
| Ovary | 0 | 0.00 | 6 | 1.57 | 6 | 2.10 | 2 | 0.67 | 14 | 10.87 | 1.29 | 1.17 |
| Vagina | 1 | 15.25 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.58 | 1.73 | 0.16 |
| Vulva | 0 | 0.00 | 1 | 1.66 | 0 | 0.00 | 2 | 4.10 | 3 | 1.74 | 1.72 | 0.47 |
| **Male genital system** | 27 | 1.61* | 70 | 1.28* | 51 | 1.18 | 47 | 0.86 | 195 | 168.82 | 1.16 | 8.10 |
| Prostate | 26 | 1.58* | 70 | 1.30* | 49 | 1.15 | 45 | 0.83 | 190 | 166.71 | 1.14 | 7.21 |
| Testis | 0 | 0.00 | 0 | 0.00 | 2 | 7.90 | 0 | 0.00 | 2 | 1.02 | 1.96 | 0.30 |
| **Urinary system** | 10 | 1.43 | 28 | 1.25 | 18 | 1.05 | 25 | 1.28 | 81 | 66.11 | 1.23 | 2.52 |
| Urinary bladder | 4 | 0.82 | 21 | 1.35 | 15 | 1.27 | 19 | 1.41 | 59 | 45.58 | 1.29 | 2.27 |
| Kidney parenchyma | 5 | 2.93 | 5 | 0.90 | 3 | 0.69 | 2 | 0.40 | 15 | 16.53 | 0.91 | -0.26 |
| Renal pelvis, other urinary | 1 | 2.25 | 2 | 1.43 | 0 | 0.00 | 4 | 3.59 | 7 | 4.00 | 1.75 | 0.51 |
| Ureter | 0 | 0.00 | 1 | 2.18 | 0 | 0.00 | 0 | 0.00 | 1 | 1.31 | 0.77 | -0.05 |
| **Bone, joints** | 0 | 0.00 | 5 | 18.86* | 1 | 5.33 | 1 | 5.22 | 7 | 0.73 | 9.61* | 1.06 |
| **Soft tissue including heart** | 5 | 13.30* | 14 | 11.94* | 5 | 5.77* | 4 | 4.13* | 28 | 3.38 | 8.28* | 4.17 |
| **Kaposi sarcoma** | 3 | 14.21* | 2 | 3.05 | 0 | 0.00 | 0 | 0.00 | 5 | 1.60 | 3.12* | 0.58 |
| **Melanoma of skin** | 1 | 0.50 | 11 | 1.65 | 9 | 1.74 | 13 | 2.19* | 34 | 19.76 | 1.72* | 2.41 |
| **Eye, orbit** | 0 | 0.00 | 1 | 2.43 | 0 | 0.00 | 0 | 0.00 | 1 | 1.16 | 0.86 | -0.03 |
| **Brain, central nervous system** | 0 | 0.00 | 6 | 2.03 | 2 | 0.91 | 2 | 0.86 | 10 | 8.41 | 1.19 | 0.27 |
| **Thyroid** | 2 | 3.50 | 5 | 2.76 | 3 | 2.31 | 2 | 1.54 | 12 | 4.98 | 2.41* | 1.19 |
| **Lymphatic, hematopoietic** | 6 | 0.89 | 37 | 1.72* | 20 | 1.23 | 23 | 1.26 | 86 | 62.74 | 1.37* | 3.94 |
| Hodgkin lymphoma | 0 | 0.00 | 2 | 2.53 | 0 | 0.00 | 1 | 2.03 | 3 | 2.08 | 1.44 | 0.16 |
| Non-Hodgkin lymphoma | 0 | 0.00 | 7 | 0.73 | 9 | 1.21 | 12 | 1.42 | 28 | 28.46 | 0.98 | -0.08 |
| Myeloma | 2 | 1.76 | 10 | 2.76* | 1 | 0.36 | 2 | 0.63 | 15 | 10.70 | 1.40 | 0.73 |
| Leukemia | 4 | 1.69 | 18 | 2.41* | 10 | 1.79 | 8 | 1.31 | 40 | 21.50 | 1.86* | 3.13 |
| Acute lymphocytic | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.62 | 0.00 | -0.11 |
| Chronic lymphocytic | 3 | 3.25 | 6 | 2.05 | 4 | 1.82 | 2 | 0.84 | 15 | 8.44 | 1.78 | 1.11 |
| Acute non-lymphocytic | 1 | 1.26 | 6 | 2.38 | 4 | 2.12 | 5 | 2.39 | 16 | 7.30 | 2.19* | 1.47 |
| Chronic myeloid | 0 | 0.00 | 5 | 4.81* | 1 | 1.31 | 1 | 1.19 | 7 | 2.98 | 2.35 | 0.68 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000. EAR for female cancers is based on 26,715 PYR and for male cancers on 32,315 PYR.

# Soft Tissues
## Both Sexes, Radiotherapy

**Table 12.2.8:** Risk of subsequent primary cancers after cancer of the soft tissues including heart, both sexes, with initial radiotherapy, SEER 1973-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 5,075 | | 4,053 | | 1,971 | | 1,027 | | 5,075 | | | |
| Person-years in interval | 3,767 | | 11,106 | | 7,241 | | 6,075 | | 28,189 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 49 | 1.33 | 149 | 1.33* | 93 | 1.21 | 82 | 1.20 | 373 | 294.37 | 1.27* | 27.89 |
| All excluding same site | 46 | 1.25 | 142 | 1.27* | 91 | 1.19 | 80 | 1.17 | 359 | 293.10 | 1.22* | 23.38 |
| **Buccal cavity, pharynx** | 1 | 1.03 | 2 | 0.70 | 1 | 0.53 | 2 | 1.28 | 6 | 7.31 | 0.82 | -0.46 |
| Lip | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.03 | 0.00 | -0.36 |
| Tongue | 0 | 0.00 | 1 | 1.72 | 0 | 0.00 | 1 | 3.00 | 2 | 1.50 | 1.33 | 0.18 |
| Salivary gland | 1 | 11.69 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.68 | 1.46 | 0.11 |
| Mouth | 0 | 0.00 | 0 | 0.00 | 1 | 2.03 | 1 | 2.51 | 2 | 1.90 | 1.06 | 0.04 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.32 | 0.00 | -0.11 |
| Tonsil | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.70 | 0.00 | -0.25 |
| Oropharynx | 0 | 0.00 | 1 | 12.67 | 0 | 0.00 | 0 | 0.00 | 1 | 0.20 | 4.94 | 0.28 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.72 | 0.00 | -0.26 |
| **Digestive system** | 8 | 0.98 | 24 | 0.98 | 15 | 0.91 | 14 | 0.99 | 61 | 63.19 | 0.97 | -0.78 |
| Esophagus | 1 | 2.48 | 0 | 0.00 | 2 | 2.39 | 1 | 1.34 | 4 | 3.21 | 1.25 | 0.28 |
| Stomach | 2 | 2.32 | 3 | 1.19 | 3 | 1.83 | 3 | 2.17 | 11 | 6.39 | 1.72 | 1.63 |
| Small intestine | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.94 | 0.00 | -0.33 |
| Colon | 3 | 0.81 | 14 | 1.27 | 5 | 0.67 | 3 | 0.46 | 25 | 28.61 | 0.87 | -1.28 |
| Rectum, rectosigmoid junction | 2 | 1.42 | 5 | 1.20 | 1 | 0.36 | 2 | 0.87 | 10 | 10.61 | 0.94 | -0.21 |
| Anus, anal canal | 0 | 0.00 | 0 | 0.00 | 1 | 6.18 | 0 | 0.00 | 1 | 0.62 | 1.62 | 0.14 |
| Liver | 0 | 0.00 | 1 | 1.15 | 0 | 0.00 | 0 | 0.00 | 1 | 2.30 | 0.43 | -0.46 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.83 | 0.00 | -0.30 |
| Bile ducts, other biliary | 0 | 0.00 | 0 | 0.00 | 1 | 2.67 | 1 | 2.89 | 2 | 1.44 | 1.39 | 0.20 |
| Pancreas | 0 | 0.00 | 0 | 0.00 | 1 | 0.51 | 4 | 2.32 | 5 | 7.60 | 0.66 | -0.92 |
| **Respiratory system** | 6 | 0.96 | 20 | 1.06 | 12 | 0.94 | 14 | 1.26 | 52 | 49.05 | 1.06 | 1.05 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.43 | 0.00 | -0.15 |
| Larynx | 0 | 0.00 | 3 | 2.40 | 1 | 1.21 | 1 | 1.47 | 5 | 3.18 | 1.57 | 0.65 |
| Lung, bronchus | 6 | 1.05 | 17 | 0.98 | 11 | 0.93 | 13 | 1.26 | 47 | 45.31 | 1.04 | 0.60 |
| **Female breast** | 7 | 1.79 | 10 | 0.85 | 11 | 1.34 | 7 | 0.97 | 35 | 31.07 | 1.13 | 3.01 |
| **Female genital system** | 1 | 0.57 | 8 | 1.55 | 3 | 0.87 | 2 | 0.69 | 14 | 13.27 | 1.05 | 0.56 |
| Cervix uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.70 | 0.00 | -1.30 |
| Corpus uteri | 1 | 1.17 | 5 | 2.00 | 1 | 0.60 | 2 | 1.44 | 9 | 6.41 | 1.40 | 1.98 |
| Ovary | 0 | 0.00 | 2 | 1.30 | 2 | 1.90 | 0 | 0.00 | 4 | 4.02 | 1.00 | -0.01 |
| Vagina | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.20 | 0.00 | -0.15 |
| Vulva | 0 | 0.00 | 1 | 4.17 | 0 | 0.00 | 0 | 0.00 | 1 | 0.64 | 1.56 | 0.28 |
| **Male genital system** | 10 | 1.42 | 27 | 1.23 | 17 | 1.09 | 18 | 1.19 | 72 | 59.59 | 1.21 | 8.21 |
| Prostate | 9 | 1.31 | 27 | 1.25 | 16 | 1.05 | 18 | 1.21 | 70 | 58.52 | 1.20 | 7.59 |
| Testis | 0 | 0.00 | 0 | 0.00 | 1 | 5.83 | 0 | 0.00 | 1 | 0.69 | 1.44 | 0.20 |
| **Urinary system** | 3 | 1.04 | 14 | 1.60 | 7 | 1.17 | 5 | 0.93 | 29 | 23.03 | 1.26 | 2.12 |
| Urinary bladder | 0 | 0.00 | 12 | 1.99* | 7 | 1.71 | 3 | 0.82 | 22 | 15.80 | 1.39 | 2.20 |
| Kidney parenchyma | 3 | 4.16 | 1 | 0.45 | 0 | 0.00 | 0 | 0.00 | 4 | 5.86 | 0.68 | -0.66 |
| Renal pelvis, other urinary | 0 | 0.00 | 1 | 1.87 | 0 | 0.00 | 2 | 6.57 | 3 | 1.37 | 2.18 | 0.58 |
| Ureter | 0 | 0.00 | 1 | 5.70 | 0 | 0.00 | 0 | 0.00 | 1 | 0.45 | 2.23 | 0.20 |
| **Bone, joints** | 0 | 0.00 | 4 | 32.69* | 2 | 24.56* | 2 | 27.71* | 8 | 0.32 | 25.19* | 2.73 |
| **Soft tissue including heart** | 3 | 18.34* | 7 | 14.47* | 2 | 6.09 | 2 | 6.73 | 14 | 1.27 | 11.00* | 4.51 |
| **Kaposi sarcoma** | 2 | 20.36* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 0.78 | 2.57 | 0.43 |
| **Melanoma of skin** | 1 | 1.13 | 6 | 2.14 | 2 | 1.00 | 7 | 3.74* | 16 | 7.57 | 2.11* | 2.99 |
| **Eye, orbit** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.42 | 0.00 | -0.15 |
| **Brain, central nervous system** | 0 | 0.00 | 3 | 2.44 | 1 | 1.21 | 0 | 0.00 | 4 | 3.18 | 1.26 | 0.29 |
| **Thyroid** | 1 | 3.87 | 1 | 1.26 | 2 | 3.68 | 1 | 2.07 | 5 | 2.08 | 2.41 | 1.04 |
| **Lymphatic, hematopoietic** | 5 | 1.75 | 19 | 2.20* | 12 | 2.03* | 6 | 1.13 | 42 | 22.73 | 1.85* | 6.84 |
| Hodgkin lymphoma | 0 | 0.00 | 1 | 2.59 | 0 | 0.00 | 0 | 0.00 | 1 | 0.98 | 1.02 | 0.01 |
| Non-Hodgkin lymphoma | 0 | 0.00 | 3 | 0.77 | 6 | 2.19 | 4 | 1.61 | 13 | 10.40 | 1.25 | 0.92 |
| Myeloma | 2 | 4.29 | 5 | 3.56* | 1 | 1.04 | 0 | 0.00 | 8 | 3.70 | 2.16 | 1.52 |
| Leukemia | 3 | 3.04 | 10 | 3.39* | 5 | 2.53 | 2 | 1.16 | 20 | 7.64 | 2.62* | 4.39 |
| Acute lymphocytic | 0 | 0.00 | 1 | 7.89 | 0 | 0.00 | 0 | 0.00 | 1 | 0.31 | 3.21 | 0.24 |
| Chronic lymphocytic | 2 | 5.35 | 1 | 0.89 | 1 | 1.33 | 0 | 0.00 | 4 | 2.90 | 1.38 | 0.39 |
| Acute non-lymphocytic | 1 | 2.99 | 5 | 4.99* | 3 | 4.43 | 2 | 3.30 | 11 | 2.62 | 4.20* | 2.97 |
| Chronic myeloid | 0 | 0.00 | 2 | 4.92 | 1 | 3.65 | 0 | 0.00 | 3 | 1.06 | 2.83 | 0.69 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000. EAR for female cancers is based on 13,070 PYR and for male cancers on 15,119 PYR.

**Table 12.2.9:** Risk of subsequent primary cancers after cancer of the soft tissues including heart, both sexes, without initial radiotherapy, SEER 1973-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 7,373 | | 6,064 | | 3,594 | | 2,145 | | 7,373 | | | |
| Person-years in interval | 5,493 | | 18,259 | | 13,895 | | 15,074 | | 52,722 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 68 | 1.30* | 205 | 1.18* | 174 | 1.22* | 186 | 1.02 | 633 | 551.36 | 1.15* | 15.49 |
| All excluding same site | 65 | 1.25 | 196 | 1.13 | 169 | 1.19* | 183 | 1.01 | 613 | 548.97 | 1.12* | 12.14 |
| **Buccal cavity, pharynx** | 2 | 1.41 | 4 | 0.84 | 4 | 1.07 | 4 | 0.92 | 14 | 14.22 | 0.98 | -0.04 |
| Lip | 0 | 0.00 | 0 | 0.00 | 1 | 1.85 | 0 | 0.00 | 1 | 2.09 | 0.48 | -0.21 |
| Tongue | 0 | 0.00 | 1 | 1.08 | 2 | 2.67 | 1 | 1.11 | 4 | 2.85 | 1.40 | 0.22 |
| Salivary gland | 1 | 8.08 | 1 | 2.42 | 0 | 0.00 | 0 | 0.00 | 2 | 1.30 | 1.54 | 0.13 |
| Mouth | 0 | 0.00 | 1 | 0.80 | 0 | 0.00 | 1 | 0.91 | 2 | 3.69 | 0.54 | -0.32 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.61 | 0.00 | -0.12 |
| Tonsil | 0 | 0.00 | 1 | 2.22 | 0 | 0.00 | 1 | 2.39 | 2 | 1.36 | 1.47 | 0.12 |
| Oropharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.40 | 0.00 | -0.08 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.38 | 1 | 1.41 | 0.71 | -0.08 |
| **Digestive system** | 13 | 1.09 | 30 | 0.77 | 35 | 1.12 | 38 | 0.99 | 116 | 120.57 | 0.96 | -0.87 |
| Esophagus | 0 | 0.00 | 1 | 0.52 | 1 | 0.63 | 3 | 1.49 | 5 | 6.10 | 0.82 | -0.21 |
| Stomach | 2 | 1.56 | 6 | 1.45 | 7 | 2.16 | 8 | 2.10 | 23 | 12.48 | 1.84* | 2.00 |
| Small intestine | 1 | 6.32 | 0 | 0.00 | 1 | 2.23 | 1 | 1.64 | 3 | 1.75 | 1.72 | 0.24 |
| Colon | 5 | 0.93 | 12 | 0.68 | 14 | 0.99 | 12 | 0.70 | 43 | 54.49 | 0.79 | -2.18 |
| Rectum, rectosigmoid junction | 2 | 0.97 | 5 | 0.74 | 4 | 0.75 | 4 | 0.64 | 15 | 20.41 | 0.73 | -1.03 |
| Anus, anal canal | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.14 | 0.00 | -0.22 |
| Liver | 1 | 2.54 | 0 | 0.00 | 1 | 0.93 | 1 | 0.68 | 3 | 4.27 | 0.70 | -0.24 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.61 | 0.00 | -0.31 |
| Bile ducts, other biliary | 1 | 3.97 | 0 | 0.00 | 0 | 0.00 | 2 | 2.22 | 3 | 2.65 | 1.13 | 0.07 |
| Pancreas | 0 | 0.00 | 6 | 1.28 | 5 | 1.33 | 7 | 1.52 | 18 | 14.47 | 1.24 | 0.67 |
| **Respiratory system** | 12 | 1.37 | 32 | 1.09 | 25 | 1.03 | 30 | 0.99 | 99 | 92.73 | 1.07 | 1.19 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.82 | 0.00 | -0.16 |
| Larynx | 0 | 0.00 | 2 | 0.98 | 1 | 0.60 | 2 | 1.05 | 5 | 6.22 | 0.80 | -0.23 |
| Lung, bronchus | 12 | 1.50 | 30 | 1.11 | 24 | 1.07 | 27 | 0.97 | 93 | 85.43 | 1.09 | 1.44 |
| **Female breast** | 6 | 1.13 | 16 | 0.90 | 27 | 1.84* | 16 | 0.87 | 65 | 56.29 | 1.15 | 3.59 |
| **Female genital system** | 2 | 0.80 | 8 | 0.98 | 12 | 1.89 | 9 | 1.19 | 31 | 24.54 | 1.26 | 2.66 |
| Cervix uteri | 0 | 0.00 | 0 | 0.00 | 1 | 1.12 | 1 | 1.03 | 2 | 3.42 | 0.58 | -0.59 |
| Corpus uteri | 1 | 0.83 | 3 | 0.77 | 7 | 2.32 | 4 | 1.11 | 15 | 11.72 | 1.28 | 1.35 |
| Ovary | 0 | 0.00 | 4 | 1.69 | 4 | 2.10 | 2 | 0.86 | 10 | 7.29 | 1.37 | 1.12 |
| Vagina | 1 | 25.70 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.39 | 2.57 | 0.25 |
| Vulva | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 5.52 | 2 | 1.14 | 1.75 | 0.35 |
| **Male genital system** | 17 | 1.74* | 43 | 1.31 | 34 | 1.22 | 29 | 0.73 | 123 | 110.26 | 1.12 | 4.48 |
| Prostate | 17 | 1.77* | 43 | 1.34 | 33 | 1.21 | 27 | 0.69* | 120 | 108.37 | 1.11 | 4.09 |
| Testis | 0 | 0.00 | 0 | 0.00 | 1 | 3.24 | 0 | 0.00 | 1 | 1.16 | 0.86 | -0.06 |
| **Urinary system** | 7 | 1.69 | 14 | 1.02 | 11 | 0.98 | 20 | 1.38 | 52 | 43.58 | 1.19 | 1.60 |
| Urinary bladder | 4 | 1.39 | 9 | 0.95 | 8 | 1.04 | 16 | 1.61 | 37 | 30.01 | 1.23 | 1.33 |
| Kidney parenchyma | 2 | 2.00 | 4 | 1.18 | 3 | 1.06 | 2 | 0.54 | 11 | 10.93 | 1.01 | 0.01 |
| Renal pelvis, other urinary | 1 | 3.79 | 1 | 1.15 | 0 | 0.00 | 2 | 2.44 | 4 | 2.64 | 1.52 | 0.26 |
| Ureter | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.86 | 0.00 | -0.16 |
| **Bone, joints** | 0 | 0.00 | 3 | 15.28* | 0 | 0.00 | 1 | 5.65 | 4 | 0.58 | 6.84* | 0.65 |
| **Soft tissue including heart** | 3 | 12.72* | 9 | 11.74* | 5 | 8.31* | 3 | 3.86 | 20 | 2.38 | 8.40* | 3.34 |
| **Kaposi sarcoma** | 1 | 7.78 | 2 | 4.39 | 0 | 0.00 | 0 | 0.00 | 3 | 1.44 | 2.08 | 0.30 |
| **Melanoma of skin** | 0 | 0.00 | 6 | 1.46 | 8 | 2.30 | 8 | 1.67 | 22 | 13.55 | 1.62* | 1.60 |
| **Eye, orbit** | 0 | 0.00 | 1 | 3.74 | 0 | 0.00 | 0 | 0.00 | 1 | 0.80 | 1.26 | 0.04 |
| **Brain, central nervous system** | 0 | 0.00 | 4 | 2.07 | 2 | 1.29 | 2 | 1.07 | 8 | 5.91 | 1.35 | 0.40 |
| **Thyroid** | 1 | 2.78 | 5 | 4.10* | 1 | 1.02 | 2 | 1.62 | 9 | 3.79 | 2.37* | 0.99 |
| **Lymphatic, hematopoietic** | 2 | 0.49 | 23 | 1.71* | 8 | 0.73 | 17 | 1.22 | 50 | 42.39 | 1.18 | 1.44 |
| Hodgkin lymphoma | 0 | 0.00 | 1 | 1.60 | 0 | 0.00 | 1 | 1.90 | 2 | 1.82 | 1.10 | 0.03 |
| Non-Hodgkin lymphoma | 0 | 0.00 | 4 | 0.68 | 3 | 0.61 | 8 | 1.24 | 15 | 18.97 | 0.79 | -0.75 |
| Myeloma | 0 | 0.00 | 5 | 2.25 | 0 | 0.00 | 2 | 0.85 | 7 | 7.05 | 0.99 | -0.01 |
| Leukemia | 2 | 1.38 | 13 | 2.74* | 5 | 1.33 | 6 | 1.30 | 26 | 14.55 | 1.79* | 2.17 |
| Acute lymphocytic | 0 | 0.00 | 1 | 4.60 | 0 | 0.00 | 0 | 0.00 | 1 | 0.59 | 1.69 | 0.08 |
| Chronic lymphocytic | 1 | 1.82 | 5 | 2.77 | 3 | 2.07 | 2 | 1.13 | 11 | 5.57 | 1.98 | 1.03 |
| Acute non-lymphocytic | 1 | 2.08 | 4 | 2.52 | 1 | 0.79 | 3 | 1.89 | 9 | 4.92 | 1.83 | 0.77 |
| Chronic myeloid | 0 | 0.00 | 3 | 4.58 | 0 | 0.00 | 1 | 1.54 | 4 | 2.02 | 1.98 | 0.38 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000. EAR for female cancers is based on 24,253 PYR and for male cancers on 28,469 PYR.

# Kaposi Sarcoma
## Both Sexes, Diagnosis Years 1973-1979

**Table 12.3.1:** Characteristics of patients with an initial Kaposi sarcoma, both sexes, SEER 1973-1979, with follow-up through 2000.

| Characteristics | Males | | Females | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| **Number of patients with 1st primary cancer** | | | | | | |
| **Total** | 155 | 100.0 | 55 | 100.0 | 210 | 100.0 |
| **Initial treatment** | | | | | | |
| Any radiation | 52 | 33.5 | 13 | 23.6 | 65 | 31.0 |
| With surgery | 13 | 8.4 | 4 | 7.3 | 17 | 8.1 |
| Without surgery | 39 | 25.2 | 9 | 16.4 | 48 | 22.9 |
| No radiation | 103 | 66.5 | 42 | 76.4 | 145 | 69.0 |
| With surgery | 66 | 42.6 | 32 | 58.2 | 98 | 46.7 |
| Without surgery | 37 | 23.9 | 10 | 18.2 | 47 | 22.4 |
| **Race** | | | | | | |
| White | 138 | 89.0 | 51 | 92.7 | 189 | 90.0 |
| Black | 10 | 6.5 | 3 | 5.5 | 13 | 6.2 |
| Other | 7 | 4.5 | 0 | 0.0 | 7 | 3.3 |
| Unknown | 0 | 0.0 | 1 | 1.8 | 1 | 0.5 |
| **Age at 1st primary cancer diagnosis, years** | | | | | | |
| < 30 | 0 | 0.0 | 1 | 1.8 | 1 | 0.5 |
| 30–49 | 11 | 7.1 | 3 | 5.5 | 14 | 6.7 |
| 50–69 | 50 | 32.3 | 15 | 27.3 | 65 | 31.0 |
| 70–79 | 55 | 35.5 | 22 | 40.0 | 77 | 36.7 |
| ≥ 80 | 39 | 25.2 | 14 | 25.5 | 53 | 25.2 |
| **Number of patients with one or more primary cancers** | | | | | | |
| One primary cancer only | 124 | 80.0 | 49 | 89.1 | 173 | 82.4 |
| 1st and 2nd cancers | 25 | 16.1 | 6 | 10.9 | 31 | 14.8 |
| 1st, 2nd, and 3rd cancers | 4 | 2.6 | 0 | 0.0 | 4 | 1.9 |
| 1st, 2nd, 3rd, and additional cancers | 2 | 1.3 | 0 | 0.0 | 2 | 1.0 |
| **Other statistics** | | | | | | |
| Median age at 1st cancer diagnosis | 72.2 | — | 74.6 | — | 73.3 | — |
| Median year of 1st cancer diagnosis | 1976.5 | — | 1977.6 | — | 1977.0 | — |
| Median person-years at risk | 6.9 | — | 12.3 | — | 8.3 | — |
| Percent histologically confirmed* | | | | | | |
| Both 1st and 2nd cancers | — | 90.3 | — | 83.3 | — | 89.2 |
| 1st, 2nd, and additional cancers | — | 90.3 | — | 83.3 | — | 89.2 |
| 1st cancer only | — | 6.5 | — | 16.7 | — | 8.1 |

*Percent histologically confirmed among patients who developed a subsequent primary cancer.

# Kaposi Sarcoma
## Both Sexes, Diagnosis Years 1973-1979

**Table 12.3.2:** Risk of subsequent primary cancers after Kaposi sarcoma, both sexes, SEER 1973-1979, with follow-up through 2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 210 | | 191 | | 138 | | 98 | | 210 | | | |
| Person-years in interval | 165 | | 644 | | 556 | | 818 | | 2,183 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 4 | 1.25 | 16 | 1.25 | 8 | 0.65 | 17 | 0.84 | 45 | 48.57 | 0.93 | -16.36 |
| All excluding same site | 4 | 1.25 | 15 | 1.17 | 7 | 0.57 | 17 | 0.84 | 43 | 48.51 | 0.89 | -25.23 |
| **Buccal cavity, pharynx** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 4.68 | 2 | 1.23 | 1.63 | 3.53 |
| Lip | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.28 | 0.00 | -1.27 |
| Tongue | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.21 | 0.00 | -0.95 |
| Salivary gland | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 19.39 | 1 | 0.12 | 8.54 | 4.04 |
| Mouth | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.31 | 0.00 | -1.41 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 77.56* | 1 | 0.04 | 26.20 | 4.41 |
| Tonsil | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.09 | 0.00 | -0.43 |
| Oropharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.13 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.11 | 0.00 | -0.53 |
| **Digestive system** | 1 | 1.14 | 3 | 0.86 | 1 | 0.31 | 5 | 1.03 | 10 | 12.42 | 0.81 | -11.08 |
| Esophagus | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.52 | 0.00 | -2.39 |
| Stomach | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.49 | 0.00 | -6.80 |
| Small intestine | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.13 | 0.00 | -0.60 |
| Colon | 1 | 2.61 | 1 | 0.64 | 1 | 0.66 | 4 | 1.72 | 7 | 5.80 | 1.21 | 5.50 |
| Rectum, rectosigmoid junction | 0 | 0.00 | 2 | 3.21 | 0 | 0.00 | 1 | 1.35 | 3 | 2.08 | 1.45 | 4.23 |
| Anus, anal canal | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.08 | 0.00 | -0.36 |
| Liver | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.34 | 0.00 | -1.58 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.17 | 0.00 | -0.79 |
| Bile ducts, other biliary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.26 | 0.00 | -1.18 |
| Pancreas | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.44 | 0.00 | -6.61 |
| **Respiratory system** | 0 | 0.00 | 2 | 0.90 | 2 | 0.96 | 1 | 0.32 | 5 | 7.99 | 0.63 | -13.71 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.07 | 0.00 | -0.34 |
| Larynx | 0 | 0.00 | 0 | 0.00 | 1 | 7.17 | 0 | 0.00 | 1 | 0.53 | 1.90 | 2.17 |
| Lung, bronchus | 0 | 0.00 | 2 | 0.98 | 1 | 0.52 | 1 | 0.34 | 4 | 7.37 | 0.54 | -15.43 |
| **Female breast** | 0 | 0.00 | 1 | 1.78 | 1 | 1.61 | 1 | 0.83 | 3 | 2.52 | 1.19 | 7.10 |
| **Female genital system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.18 | 0.00 | -17.42 |
| Cervix uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.13 | 0.00 | -1.94 |
| Corpus uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.58 | 0.00 | -8.49 |
| Ovary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.34 | 0.00 | -5.05 |
| Vagina | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.02 | 0.00 | -0.36 |
| Vulva | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.07 | 0.00 | -1.07 |
| **Male genital system** | 0 | 0.00 | 6 | 2.12 | 1 | 0.36 | 3 | 0.58 | 10 | 11.52 | 0.87 | -10.11 |
| Prostate | 0 | 0.00 | 6 | 2.15 | 1 | 0.36 | 3 | 0.58 | 10 | 11.40 | 0.88 | -9.31 |
| Testis | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.18 |
| **Urinary system** | 1 | 3.40 | 0 | 0.00 | 1 | 0.91 | 1 | 0.55 | 3 | 4.37 | 0.69 | -6.25 |
| Urinary bladder | 1 | 4.45 | 0 | 0.00 | 1 | 1.21 | 0 | 0.00 | 2 | 3.27 | 0.61 | -5.82 |
| Kidney parenchyma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.81 | 1 | 0.81 | 1.24 | 0.89 |
| Renal pelvis, other urinary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.29 | 0.00 | -1.33 |
| Ureter | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.10 | 0.00 | -0.44 |
| **Bone, joints** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.04 | 0.00 | -0.17 |
| **Soft tissue including heart** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.18 | 0.00 | -0.84 |
| **Kaposi sarcoma** | 0 | 0.00 | 1 | 66.50 | 1 | 61.45 | 0 | 0.00 | 2 | 0.06 | 32.07* | 8.88 |
| **Melanoma of skin** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.77 | 0.00 | -3.51 |
| **Eye, orbit** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.06 | 0.00 | -0.30 |
| **Brain, central nervous system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.38 | 0.00 | -1.76 |
| **Thyroid** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.15 | 0.00 | -0.71 |
| **Lymphatic, hematopoietic** | 2 | 8.31 | 2 | 2.07 | 1 | 1.08 | 3 | 1.89 | 8 | 3.72 | 2.15 | 19.60 |
| Hodgkin lymphoma | 1 | 105.92* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.10 | 9.61 | 4.10 |
| Non-Hodgkin lymphoma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 3.01 | 2 | 1.42 | 1.41 | 2.65 |
| Myeloma | 1 | 23.37 | 0 | 0.00 | 1 | 6.07 | 1 | 3.56 | 3 | 0.66 | 4.53 | 10.71 |
| Leukemia | 0 | 0.00 | 2 | 4.67 | 0 | 0.00 | 0 | 0.00 | 2 | 1.53 | 1.30 | 2.14 |
| Acute lymphocytic | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.04 | 0.00 | -0.17 |
| Chronic lymphocytic | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.62 | 0.00 | -2.83 |
| Acute non-lymphocytic | 0 | 0.00 | 1 | 7.40 | 0 | 0.00 | 0 | 0.00 | 1 | 0.49 | 2.03 | 2.32 |
| Chronic myeloid | 0 | 0.00 | 1 | 17.66 | 0 | 0.00 | 0 | 0.00 | 1 | 0.21 | 4.86 | 3.64 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000. EAR for female cancers is based on 678 PYR and for male cancers on 1,505 PYR.

# Kaposi Sarcoma
## Both Sexes, Diagnosis Years 1980-2000

**Table 12.3.3:** Characteristics of patients with an initial Kaposi sarcoma, both sexes, SEER 1980-2000.

| Characteristics | Males | | Females | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| **Number of patients with 1st primary cancer** | | | | | | |
| **Total** | 11,175 | 100.0 | 294 | 100.0 | 11,469 | 100.0 |
| **Initial treatment** | | | | | | |
| Any radiation | 2,798 | 25.0 | 91 | 31.0 | 2,889 | 25.2 |
| With surgery | 302 | 2.7 | 27 | 9.2 | 329 | 2.9 |
| Without surgery | 2,496 | 22.3 | 64 | 21.8 | 2,560 | 22.3 |
| No radiation | 8,377 | 75.0 | 203 | 69.0 | 8,580 | 74.8 |
| With surgery | 1,236 | 11.1 | 101 | 34.4 | 1,337 | 11.7 |
| Without surgery | 7,141 | 63.9 | 102 | 34.7 | 7,243 | 63.2 |
| **Race** | | | | | | |
| White | 9,567 | 85.6 | 228 | 77.6 | 9,795 | 85.4 |
| Black | 1,207 | 10.8 | 51 | 17.3 | 1,258 | 11.0 |
| Other | 304 | 2.7 | 9 | 3.1 | 313 | 2.7 |
| Unknown | 97 | 0.9 | 6 | 2.0 | 103 | 0.9 |
| **Age at 1st primary cancer diagnosis, years** | | | | | | |
| < 30 | 1,349 | 12.1 | 13 | 4.4 | 1,362 | 11.9 |
| 30–49 | 8,539 | 76.4 | 56 | 19.0 | 8,595 | 74.9 |
| 50–69 | 940 | 8.4 | 29 | 9.9 | 969 | 8.4 |
| 70–79 | 196 | 1.8 | 64 | 21.8 | 260 | 2.3 |
| ≥ 80 | 151 | 1.4 | 132 | 44.9 | 283 | 2.5 |
| **Number of patients with one or more primary cancers** | | | | | | |
| One primary cancer only | 10,487 | 93.8 | 272 | 92.5 | 10,759 | 93.8 |
| 1st and 2nd cancers | 678 | 6.1 | 20 | 6.8 | 698 | 6.1 |
| 1st, 2nd, and 3rd cancers | 9 | 0.1 | 2 | 0.7 | 11 | 0.1 |
| 1st, 2nd, 3rd, and additional cancers | 1 | 0.0 | 0 | 0.0 | 1 | 0.0 |
| **Other statistics** | | | | | | |
| Median age at 1st cancer diagnosis | 37.6 | — | 78.1 | — | 37.8 | — |
| Median year of 1st cancer diagnosis | 1991.0 | — | 1991.8 | — | 1991.0 | — |
| Median person-years at risk | 1.2 | — | 2.9 | — | 1.2 | — |
| Percent histologically confirmed* | | | | | | |
| Both 1st and 2nd cancers | — | 69.6 | — | 77.3 | — | 69.9 |
| 1st, 2nd, and additional cancers | — | 69.5 | — | 77.3 | — | 69.7 |
| 1st cancer only | — | 6.5 | — | 18.2 | — | 6.9 |

*Percent histologically confirmed among patients who developed a subsequent primary cancer.

**Table 12.3.4:** Risk of subsequent primary cancers after Kaposi sarcoma, both sexes, SEER 1980-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 11,469 | | 7,342 | | 1,365 | | 318 | | 11,469 | | | |
| Person-years in interval | 7,668 | | 12,571 | | 3,407 | | 994 | | 24,641 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 260 | 9.60* | 370 | 5.22* | 73 | 1.95* | 20 | 1.12 | 723 | 153.23 | 4.72* | 231.23 |
| All excluding same site | 259 | 10.01* | 366 | 5.28* | 71 | 1.91* | 20 | 1.12 | 716 | 150.12 | 4.77* | 229.65 |
| **Buccal cavity, pharynx** | 0 | 0.00 | 3 | 1.38 | 0 | 0.00 | 0 | 0.00 | 3 | 4.52 | 0.66 | -0.62 |
| Lip | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.70 | 0.00 | -0.28 |
| Tongue | 0 | 0.00 | 2 | 4.34 | 0 | 0.00 | 0 | 0.00 | 2 | 0.95 | 2.10 | 0.43 |
| Salivary gland | 0 | 0.00 | 1 | 4.83 | 0 | 0.00 | 0 | 0.00 | 1 | 0.44 | 2.26 | 0.23 |
| Mouth | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.05 | 0.00 | -0.43 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.21 | 0.00 | -0.08 |
| Tonsil | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.52 | 0.00 | -0.21 |
| Oropharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.12 | 0.00 | -0.05 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.39 | 0.00 | -0.16 |
| **Digestive system** | 8 | 1.48 | 24 | 1.57* | 14 | 1.68 | 7 | 1.78 | 53 | 32.91 | 1.61* | 8.15 |
| Esophagus | 0 | 0.00 | 1 | 1.19 | 0 | 0.00 | 1 | 4.45 | 2 | 1.83 | 1.10 | 0.07 |
| Stomach | 2 | 3.32 | 2 | 1.22 | 1 | 1.14 | 1 | 2.46 | 6 | 3.53 | 1.70 | 1.00 |
| Small intestine | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.54 | 0.00 | -0.22 |
| Colon | 1 | 0.43 | 7 | 1.04 | 4 | 1.06 | 2 | 1.12 | 14 | 14.60 | 0.96 | -0.24 |
| Rectum, rectosigmoid junction | 1 | 1.07 | 1 | 0.39 | 3 | 2.23 | 2 | 3.24 | 7 | 5.46 | 1.28 | 0.62 |
| Anus, anal canal | 3 | 41.27* | 6 | 34.68* | 3 | 39.38* | 1 | 31.97 | 13 | 0.35 | 36.81* | 5.13 |
| Liver | 0 | 0.00 | 5 | 7.96* | 2 | 5.91 | 0 | 0.00 | 7 | 1.36 | 5.16* | 2.29 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.35 | 0.00 | -0.14 |
| Bile ducts, other biliary | 1 | 8.52 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.78 | 1.29 | 0.09 |
| Pancreas | 0 | 0.00 | 1 | 0.57 | 1 | 1.04 | 0 | 0.00 | 2 | 3.80 | 0.53 | -0.73 |
| **Respiratory system** | 6 | 1.47 | 9 | 0.82 | 6 | 1.01 | 1 | 0.34 | 22 | 23.89 | 0.92 | -0.77 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.26 | 0.00 | -0.11 |
| Larynx | 0 | 0.00 | 1 | 1.17 | 2 | 4.79 | 0 | 0.00 | 3 | 1.81 | 1.65 | 0.48 |
| Lung, bronchus | 6 | 1.65 | 7 | 0.71 | 4 | 0.73 | 1 | 0.37 | 18 | 21.71 | 0.83 | -1.51 |
| **Female breast** | 1 | 1.31 | 2 | 0.82 | 0 | 0.00 | 0 | 0.00 | 3 | 4.98 | 0.60 | -15.58 |
| **Female genital system** | 1 | 3.13 | 1 | 1.00 | 0 | 0.00 | 0 | 0.00 | 2 | 2.04 | 0.98 | -0.29 |
| Cervix uteri | 1 | 28.35 | 1 | 9.74 | 0 | 0.00 | 0 | 0.00 | 2 | 0.20 | 9.95* | 14.13 |
| Corpus uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.91 | 0.00 | -7.17 |
| Ovary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.64 | 0.00 | -5.06 |
| Vagina | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.05 | 0.00 | -0.36 |
| Vulva | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.17 | 0.00 | -1.30 |
| **Male genital system** | 6 | 1.06 | 16 | 0.95 | 10 | 0.99 | 4 | 0.77 | 36 | 37.71 | 0.95 | -0.73 |
| Prostate | 4 | 0.82 | 15 | 0.96 | 9 | 0.92 | 4 | 0.78 | 32 | 35.38 | 0.90 | -1.44 |
| Testis | 2 | 2.70 | 1 | 0.93 | 1 | 4.86 | 0 | 0.00 | 4 | 2.06 | 1.94 | 0.83 |
| **Urinary system** | 0 | 0.00 | 6 | 0.96 | 5 | 1.46 | 2 | 1.15 | 13 | 13.69 | 0.95 | -0.28 |
| Urinary bladder | 0 | 0.00 | 6 | 1.41 | 4 | 1.65 | 0 | 0.00 | 10 | 9.47 | 1.06 | 0.22 |
| Kidney parenchyma | 0 | 0.00 | 0 | 0.00 | 1 | 1.22 | 2 | 5.23 | 3 | 3.50 | 0.86 | -0.20 |
| Renal pelvis, other urinary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.72 | 0.00 | -0.29 |
| Ureter | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.23 | 0.00 | -0.09 |
| **Bone, joints** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.23 | 0.00 | -0.10 |
| **Soft tissue including heart** | 0 | 0.00 | 1 | 2.33 | 0 | 0.00 | 0 | 0.00 | 1 | 0.89 | 1.12 | 0.04 |
| **Kaposi sarcoma** | 1 | 0.83 | 4 | 2.50 | 2 | 7.56 | 0 | 0.00 | 7 | 3.11 | 2.25 | 1.58 |
| **Melanoma of skin** | 4 | 2.94 | 1 | 0.35 | 4 | 3.43 | 2 | 3.80 | 11 | 5.88 | 1.87 | 2.08 |
| **Eye, orbit** | 1 | 19.09 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.25 | 3.98 | 0.30 |
| **Brain, central nervous system** | 2 | 3.77 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 2.16 | 0.93 | -0.06 |
| **Thyroid** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 1.13 | 0.00 | -0.46 |
| **Lymphatic, hematopoietic** | 227 | 75.25* | 297 | 43.11* | 30 | 9.41* | 4 | 2.74 | 558 | 14.55 | 38.35* | 220.55 |
| Hodgkin lymphoma | 2 | 6.29 | 5 | 9.89* | 2 | 14.80* | 0 | 0.00 | 9 | 1.00 | 9.01* | 3.25 |
| Non-Hodgkin lymphoma | 222 | 143.61* | 287 | 84.87* | 28 | 18.72* | 2 | 2.99 | 539 | 7.09 | 75.99* | 215.87 |
| Myeloma | 1 | 3.16 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.93 | 0.52 | -0.38 |
| Leukemia | 2 | 2.39 | 5 | 2.36 | 0 | 0.00 | 2 | 3.92 | 9 | 4.53 | 1.99 | 1.81 |
| Acute lymphocytic | 0 | 0.00 | 1 | 9.96 | 0 | 0.00 | 0 | 0.00 | 1 | 0.20 | 4.95 | 0.32 |
| Chronic lymphocytic | 1 | 3.75 | 1 | 1.34 | 0 | 0.00 | 0 | 0.00 | 2 | 1.61 | 1.24 | 0.16 |
| Acute non-lymphocytic | 1 | 3.61 | 3 | 4.30 | 0 | 0.00 | 1 | 5.76 | 5 | 1.50 | 3.33* | 1.42 |
| Chronic myeloid | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 13.70 | 1 | 0.71 | 1.40 | 0.12 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000. EAR for female cancers is based on 1,273 PYR and for male cancers on 23,367 PYR.

# Kaposi Sarcoma
## Both Sexes, <40 Years of Age, Diagnosis Years 1980-2000

**Table 12.3.5:** Risk of subsequent primary cancers after Kaposi sarcoma, both sexes, <40 years of age, SEER 1980-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 6,931 | | 4,302 | | 656 | | 120 | | 6,931 | | | |
| Person-years in interval | 4,581 | | 6,856 | | 1,508 | | 317 | | 13,262 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 144 | 32.99* | 194 | 26.44* | 24 | 11.41* | 3 | 4.29 | 365 | 14.50 | 25.17* | 264.28 |
| All excluding same site | 144 | 41.04* | 191 | 30.91* | 24 | 12.57* | 3 | 4.45 | 362 | 12.27 | 29.50* | 263.70 |
| **Buccal cavity, pharynx** | 0 | 0.00 | 1 | 3.79 | 0 | 0.00 | 0 | 0.00 | 1 | 0.53 | 1.88 | 0.35 |
| Lip | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.08 | 0.00 | -0.06 |
| Tongue | 0 | 0.00 | 1 | 15.63 | 0 | 0.00 | 0 | 0.00 | 1 | 0.13 | 7.58 | 0.65 |
| Salivary gland | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.06 | 0.00 | -0.05 |
| Mouth | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.09 | 0.00 | -0.07 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.05 | 0.00 | -0.04 |
| Tonsil | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.08 | 0.00 | -0.06 |
| Oropharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -0.01 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.02 | 0.00 | -0.01 |
| **Digestive system** | 1 | 2.51 | 6 | 7.27* | 1 | 3.16 | 0 | 0.00 | 8 | 1.67 | 4.80* | 4.77 |
| Esophagus | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.10 | 0.00 | -0.07 |
| Stomach | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.20 | 0.00 | -0.15 |
| Small intestine | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.06 | 0.00 | -0.05 |
| Colon | 0 | 0.00 | 2 | 7.14 | 0 | 0.00 | 0 | 0.00 | 2 | 0.56 | 3.56 | 1.08 |
| Rectum, rectosigmoid junction | 0 | 0.00 | 1 | 6.53 | 0 | 0.00 | 0 | 0.00 | 1 | 0.31 | 3.21 | 0.52 |
| Anus, anal canal | 1 | 53.48 | 2 | 50.87* | 1 | 75.05 | 0 | 0.00 | 4 | 0.08 | 53.15* | 2.96 |
| Liver | 0 | 0.00 | 1 | 19.02 | 0 | 0.00 | 0 | 0.00 | 1 | 0.11 | 8.87 | 0.67 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -0.01 |
| Bile ducts, other biliary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.04 | 0.00 | -0.03 |
| Pancreas | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.16 | 0.00 | -0.12 |
| **Respiratory system** | 2 | 9.57* | 3 | 6.61* | 0 | 0.00 | 0 | 0.00 | 5 | 0.94 | 5.32* | 3.06 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.04 | 0.00 | -0.03 |
| Larynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.12 | 0.00 | -0.09 |
| Lung, bronchus | 2 | 12.45* | 2 | 5.54 | 0 | 0.00 | 0 | 0.00 | 4 | 0.75 | 5.33* | 2.45 |
| **Female breast** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.05 | 0.00 | -4.10 |
| **Female genital system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -2.25 |
| Cervix uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -1.19 |
| Corpus uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | -0.29 |
| Ovary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | -0.61 |
| Vagina | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | -0.02 |
| Vulva | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0.00 | -0.07 |
| **Male genital system** | 2 | 3.40 | 1 | 1.10 | 0 | 0.00 | 0 | 0.00 | 3 | 1.86 | 1.61 | 0.86 |
| Prostate | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.25 | 0.00 | -0.19 |
| Testis | 2 | 3.50 | 1 | 1.21 | 0 | 0.00 | 0 | 0.00 | 3 | 1.59 | 1.89 | 1.07 |
| **Urinary system** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 15.27 | 1 | 0.85 | 1.18 | 0.11 |
| Urinary bladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.45 | 0.00 | -0.34 |
| Kidney parenchyma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 33.72 | 1 | 0.38 | 2.67 | 0.47 |
| Renal pelvis, other urinary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.03 | 0.00 | -0.02 |
| Ureter | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.01 | 0.00 | 0.00 |
| **Bone, joints** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.10 | 0.00 | -0.07 |
| **Soft tissue including heart** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.24 | 0.00 | -0.18 |
| **Kaposi sarcoma** | 0 | 0.00 | 3 | 2.59 | 0 | 0.00 | 0 | 0.00 | 3 | 2.23 | 1.34 | 0.58 |
| **Melanoma of skin** | 2 | 4.01 | 1 | 1.16 | 0 | 0.00 | 0 | 0.00 | 3 | 1.68 | 1.79 | 1.00 |
| **Eye, orbit** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.04 | 0.00 | -0.03 |
| **Brain, central nervous system** | 1 | 4.85 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.64 | 1.57 | 0.27 |
| **Thyroid** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.45 | 0.00 | -0.34 |
| **Lymphatic, hematopoietic** | 136 | 149.35* | 178 | 119.28* | 23 | 59.53* | 2 | 19.88* | 339 | 2.89 | 117.31* | 253.44 |
| Hodgkin lymphoma | 2 | 9.84* | 1 | 3.45 | 0 | 0.00 | 0 | 0.00 | 3 | 0.56 | 5.32* | 1.84 |
| Non-Hodgkin lymphoma | 134 | 256.67* | 175 | 199.40* | 23 | 99.50* | 1 | 17.13 | 333 | 1.69 | 197.13* | 249.82 |
| Myeloma | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.10 | 0.00 | -0.08 |
| Leukemia | 0 | 0.00 | 2 | 7.26 | 0 | 0.00 | 1 | 44.47 | 3 | 0.54 | 5.59* | 1.86 |
| Acute lymphocytic | 0 | 0.00 | 1 | 25.94 | 0 | 0.00 | 0 | 0.00 | 1 | 0.07 | 13.38 | 0.70 |
| Chronic lymphocytic | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.06 | 0.00 | -0.05 |
| Acute non-lymphocytic | 0 | 0.00 | 1 | 9.90 | 0 | 0.00 | 1 | 135.18* | 2 | 0.20 | 10.15* | 1.36 |
| Chronic myeloid | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.14 | 0.00 | -0.11 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000. EAR for female cancers is based on 115 PYR and for male cancers on 13,147 PYR.

# Kaposi Sarcoma
## Both Sexes, ≥40 Years of Age, Diagnosis Years 1980-2000

**Table 12.3.6:** Risk of subsequent primary cancers after Kaposi sarcoma, both sexes, ≥40 years of age, SEER 1980-2000.

| | Years after first primary cancer diagnosis | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 year | | 1-4 years | | 5-9 years | | ≥10 years | | Total | | | |
| Number starting interval | 4,538 | | 3,040 | | 709 | | 198 | | 4,538 | | | |
| Person-years in interval | 3,087 | | 5,715 | | 1,899 | | 677 | | 11,378 | | | |
| Subsequent primary cancer | O | O/E | O | O/E | O | O/E | O | O/E | O | E | O/E | EAR |
| **All subsequent cancers** | 116 | 5.11* | 176 | 2.77* | 49 | 1.39* | 17 | 0.99 | 358 | 138.73 | 2.58* | 192.71 |
| All excluding same site | 115 | 5.14* | 175 | 2.77* | 47 | 1.33 | 17 | 0.99 | 354 | 137.85 | 2.57* | 189.96 |
| **Buccal cavity, pharynx** | 0 | 0.00 | 2 | 1.05 | 0 | 0.00 | 0 | 0.00 | 2 | 3.99 | 0.50 | -1.75 |
| Lip | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.62 | 0.00 | -0.54 |
| Tongue | 0 | 0.00 | 1 | 2.52 | 0 | 0.00 | 0 | 0.00 | 1 | 0.82 | 1.22 | 0.16 |
| Salivary gland | 0 | 0.00 | 1 | 5.73 | 0 | 0.00 | 0 | 0.00 | 1 | 0.38 | 2.63 | 0.54 |
| Mouth | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.96 | 0.00 | -0.84 |
| Nasopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.16 | 0.00 | -0.14 |
| Tonsil | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.44 | 0.00 | -0.39 |
| Oropharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.11 | 0.00 | -0.10 |
| Hypopharynx | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.37 | 0.00 | -0.33 |
| **Digestive system** | 7 | 1.39 | 18 | 1.25 | 13 | 1.63 | 7 | 1.84 | 45 | 31.24 | 1.44* | 12.09 |
| Esophagus | 0 | 0.00 | 1 | 1.26 | 0 | 0.00 | 1 | 4.67 | 2 | 1.73 | 1.16 | 0.24 |
| Stomach | 2 | 3.61 | 2 | 1.30 | 1 | 1.19 | 1 | 2.54 | 6 | 3.33 | 1.80 | 2.34 |
| Small intestine | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.48 | 0.00 | -0.42 |
| Colon | 1 | 0.46 | 5 | 0.78 | 4 | 1.09 | 2 | 1.14 | 12 | 14.04 | 0.85 | -1.79 |
| Rectum, rectosigmoid junction | 1 | 1.16 | 0 | 0.00 | 3 | 2.33 | 2 | 3.39 | 6 | 5.15 | 1.17 | 0.75 |
| Anus, anal canal | 2 | 37.04* | 4 | 29.92* | 2 | 31.81* | 1 | 36.56 | 9 | 0.28 | 32.39* | 7.67 |
| Liver | 0 | 0.00 | 4 | 6.95* | 2 | 6.39 | 0 | 0.00 | 6 | 1.24 | 4.83* | 4.18 |
| Gallbladder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.34 | 0.00 | -0.30 |
| Bile ducts, other biliary | 1 | 9.21 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.74 | 1.35 | 0.23 |
| Pancreas | 0 | 0.00 | 1 | 0.60 | 1 | 1.07 | 0 | 0.00 | 2 | 3.63 | 0.55 | -1.43 |
| **Respiratory system** | 4 | 1.04 | 6 | 0.57 | 6 | 1.04 | 1 | 0.35 | 17 | 22.95 | 0.74 | -5.23 |
| Nose, nasal cavity, ear | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.22 | 0.00 | -0.20 |
| Larynx | 0 | 0.00 | 1 | 1.25 | 2 | 5.10 | 0 | 0.00 | 3 | 1.70 | 1.77 | 1.15 |
| Lung, bronchus | 4 | 1.15 | 5 | 0.52 | 4 | 0.76 | 1 | 0.38 | 14 | 20.96 | 0.67 | -6.12 |
| **Female breast** | 1 | 1.33 | 2 | 0.83 | 0 | 0.00 | 0 | 0.00 | 3 | 4.94 | 0.61 | -16.72 |
| **Female genital system** | 1 | 3.20 | 1 | 1.01 | 0 | 0.00 | 0 | 0.00 | 2 | 2.01 | 0.99 | -0.09 |
| Cervix uteri | 1 | 31.68 | 1 | 10.50 | 0 | 0.00 | 0 | 0.00 | 2 | 0.19 | 10.68* | 15.65 |
| Corpus uteri | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.91 | 0.00 | -7.85 |
| Ovary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.64 | 0.00 | -5.50 |
| Vagina | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.05 | 0.00 | -0.39 |
| Vulva | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.17 | 0.00 | -1.43 |
| **Male genital system** | 4 | 0.79 | 15 | 0.94 | 10 | 1.02 | 4 | 0.79 | 33 | 35.85 | 0.92 | -2.78 |
| Prostate | 4 | 0.82 | 15 | 0.97 | 9 | 0.92 | 4 | 0.80 | 32 | 35.13 | 0.91 | -3.06 |
| Testis | 0 | 0.00 | 0 | 0.00 | 1 | 23.70 | 0 | 0.00 | 1 | 0.47 | 2.15 | 0.52 |
| **Urinary system** | 0 | 0.00 | 6 | 1.03 | 5 | 1.53 | 1 | 0.60 | 12 | 12.84 | 0.93 | -0.73 |
| Urinary bladder | 0 | 0.00 | 6 | 1.49 | 4 | 1.71 | 0 | 0.00 | 10 | 9.02 | 1.11 | 0.86 |
| Kidney parenchyma | 0 | 0.00 | 0 | 0.00 | 1 | 1.35 | 1 | 2.84 | 2 | 3.12 | 0.64 | -0.99 |
| Renal pelvis, other urinary | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.69 | 0.00 | -0.61 |
| Ureter | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.22 | 0.00 | -0.20 |
| **Bone, joints** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.14 | 0.00 | -0.12 |
| **Soft tissue including heart** | 0 | 0.00 | 1 | 3.30 | 0 | 0.00 | 0 | 0.00 | 1 | 0.65 | 1.54 | 0.31 |
| **Kaposi sarcoma** | 1 | 2.86 | 1 | 2.27 | 2 | 28.59* | 0 | 0.00 | 4 | 0.88 | 4.55* | 2.74 |
| **Melanoma of skin** | 2 | 2.32 | 0 | 0.00 | 4 | 4.34* | 2 | 4.40 | 8 | 4.20 | 1.90 | 3.34 |
| **Eye, orbit** | 1 | 24.75 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.21 | 4.81 | 0.70 |
| **Brain, central nervous system** | 1 | 3.08 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.52 | 0.66 | -0.46 |
| **Thyroid** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.69 | 0.00 | -0.60 |
| **Lymphatic, hematopoietic** | 91 | 43.21* | 119 | 22.05* | 7 | 2.50* | 2 | 1.47 | 219 | 11.66 | 18.78* | 182.22 |
| Hodgkin lymphoma | 0 | 0.00 | 4 | 18.53* | 2 | 26.46* | 0 | 0.00 | 6 | 0.43 | 13.81* | 4.89 |
| Non-Hodgkin lymphoma | 88 | 85.95* | 112 | 44.73* | 5 | 3.95* | 1 | 1.64 | 206 | 5.40 | 38.12* | 176.29 |
| Myeloma | 1 | 3.39 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.83 | 0.55 | -0.73 |
| Leukemia | 2 | 2.97 | 3 | 1.63 | 0 | 0.00 | 1 | 2.05 | 6 | 3.99 | 1.50 | 1.76 |
| Acute lymphocytic | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.13 | 0.00 | -0.11 |
| Chronic lymphocytic | 1 | 3.95 | 1 | 1.40 | 0 | 0.00 | 0 | 0.00 | 2 | 1.55 | 1.29 | 0.39 |
| Acute non-lymphocytic | 1 | 4.66 | 2 | 3.36 | 0 | 0.00 | 0 | 0.00 | 3 | 1.31 | 2.30 | 1.49 |
| Chronic myeloid | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 14.52 | 1 | 0.57 | 1.75 | 0.38 |

*P < 0.05. Notes: See Appendices for definitions of cancer sites and "all excluding same site." Abbreviations: O = observed number of subsequent (2nd, 3rd, etc.) primary cancers; E = expected number of subsequent primary cancers; O/E = ratio of observed to expected cancers; PYR = person-years at risk; EAR = excess absolute risk per 10,000 person-years = [(O-E)/PYR] × 10,000. EAR for female cancers is based on 1,158 PYR and for male cancers on 10,220 PYR.