

Chapter 16

New Malignancies Following Hodgkin Lymphoma, Non-Hodgkin Lymphoma, and Myeloma

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Synopsis

The risk of subsequent primary cancer was evaluated in more than 100,000 patients diagnosed with Hodgkin lymphoma (HL), non-Hodgkin lymphoma (NHL), or myeloma between 1973 and 2000. The overall risk of new cancer was significantly increased among 2-month survivors of HL (O/E=2.22,¹ O=1,336, EAR=49 per 10,000 person-years) and NHL (O/E=1.14,¹ O=5,490, EAR=19), but not among 2-month survivors of myeloma (O/E=0.98,¹ O=1,216). Subsequent cancer risk increased with time to reach 3-fold and 1.5-fold among 20-year survivors of HL and NHL, respectively. The relative risk of developing a new neoplasm was significantly increased among patients with HL in all age groups, whereas increased risk for a subsequent cancer was restricted to NHL patients diagnosed before age 70 years. Excluding sex-specific sites, lung cancer accounted for the largest excess of subsequent cancer after HL and NHL, likely reflecting the effects of radiotherapy, chemotherapy, and tobacco use. Women given radiotherapy for HL had a significantly increased 3-fold risk of breast cancer and risk remained significantly elevated in 20-year survivors. The increased risk of breast cancer was restricted to women treated for HL before age 40 years. Radiotherapy for HL contributed to the increased risk of subsequent primary cancers of the salivary gland, thyroid, stomach, uterine corpus, bone, and soft tissue. Radiotherapy as well as chemotherapy was associated with an elevated risk of bladder cancer following NHL. Excess acute non-lymphocytic leukemias following HL, NHL, and myeloma were most likely due to the effects of alkylating agent chemotherapy. Immune dysfunction may have played a role in the significantly elevated risks of malignant melanoma and lip cancer among both HL and NHL survivors. Increased reciprocal risks of HL and NHL may reflect the lymphoid etiology of both malignancies, misclassification, immune defects, or the role of

Epstein-Barr virus, an etiologic agent in subtypes of both lymphomas. The significantly elevated risk of Kaposi sarcoma following both HL and NHL suggested an effect of human immunodeficiency virus (HIV) infection or immune defects, which are shared risk factors for all three cancers. Human papillomavirus infection probably contributed to the excess anal cancers seen following HL and subgroups of NHL.

Hodgkin Lymphoma

Hodgkin lymphoma (HL) accounts for only 0.5% of estimated incident cancers in the U.S. (Jemal et al, 2005), but it is the third most common malignancy in persons younger than 20 years of age. In developed countries, the incidence rates for HL peak between the ages of 15 and 34 years and again after age 55 years, a bimodal distribution suggesting 2 distinct etiologic entities (Mueller, 1996). Incidence rates for HL are 25% higher in males than females and 21% higher in whites than blacks. Radiotherapy and chemotherapy, alone or in combination, constitute standard treatment, which is determined largely by disease stage (Yung and Linch, 2003). Radiotherapy most frequently consists of mantle, inverted-Y, or pelvic fields. Since the 1970s, the use of radiotherapy in HL has diminished, particularly in the treatment of early-stage disease, and radiation field size and dose have decreased (Yahalom, 2002). In the late 1970s, mechlorethamine-containing combination chemotherapy (e.g., mechlorethamine, vincristine, procarbazine, and prednisone) began to be replaced by chemotherapy regimens associated with fewer adverse sequelae (e.g., doxorubicin, bleomycin, vinblastine, and dacarbazine). Improvements in treatment over the past 30 years have resulted in a 13% increase in 5-year survival rates since the 1970s, with current 5- and 10-year relative survival rates of 85.3% and 78.4%, respectively. Death rates were 50% higher in males than females and similar in whites and blacks. Overall, HL accounts for an estimated 0.2% of cancer deaths in the U.S. (Jemal et al, 2005).

¹Observed-to-expected ratios for Hodgkin lymphoma, non-Hodgkin lymphoma, and myeloma exclude subsequent primary Hodgkin lymphoma, non-Hodgkin lymphoma, and myeloma, respectively.

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).

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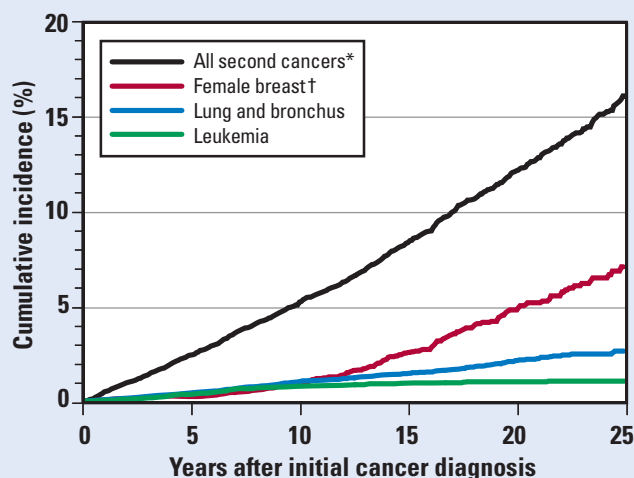
The etiology of HL is largely unknown, although reported risk factors include higher maternal educational or socioeconomic status, smaller sibship size, certain occupational exposures (e.g., woodworking), immunodeficiency, and possibly genetic influences (Mueller, 1996). Evidence linking Epstein-Barr virus (EBV) with HL appears most convincing for the mixed cellularity type, especially in children and the elderly (Yung and Linch, 2003).

Results and Discussion

Among 17,516 2-month survivors of HL, 1,336 subsequent cancers were observed (O/E=2.22 excluding subsequent HL, 95% CI=2.10-2.34, EAR=49 per 10,000 person-years). The cumulative incidence of second cancer following HL in the presence of the competing risk of death due to other causes was 16.1% at 25 years (95% CI=15.0%-17.3%) (Figure 16.1). The risk of developing a new malignancy did not differ by race. Overall relative risk of subsequent cancer was higher in females (O/E=2.60, EAR=56) than males (O/E=1.96, EAR=43); however, excluding sex-specific cancer sites, the excess absolute risk of subsequent cancer was lower for females (O/E=2.93, EAR=35) than males (O/E=2.42, EAR=46). The relative risk of developing a new malignant neoplasm was significantly increased among HL patients of all ages at diagnosis, with the highest relative risk seen among those diagnosed at younger ages, but with the largest excess absolute risk occurring among those diagnosed at ages 40-59 years (EAR=106) (Figure 16.2). Significantly elevated relative risks were observed in each time interval following HL diagnosis and increased in magnitude to 3-fold (O/E=3.24) among 20-year survivors (P trend <0.0001). Confirming previous studies, we found significant excesses of non-Hodgkin lymphoma (NHL), malignant melanoma, and leukemia, as well as cancers of the lip, tongue, salivary gland, stomach, colon, liver, lung, female breast, thyroid, bone, and soft tissue (Metayer et al, 2000; Dong and Hemminki, 2001; van Leeuwen and Travis, 2001; Dores et al, 2002). New findings included significant 2- to 7-fold excesses for Kaposi sarcoma (KS) as well as cancers of the anus, uterine corpus, and ureter. Risk of prostate cancer was significantly decreased.

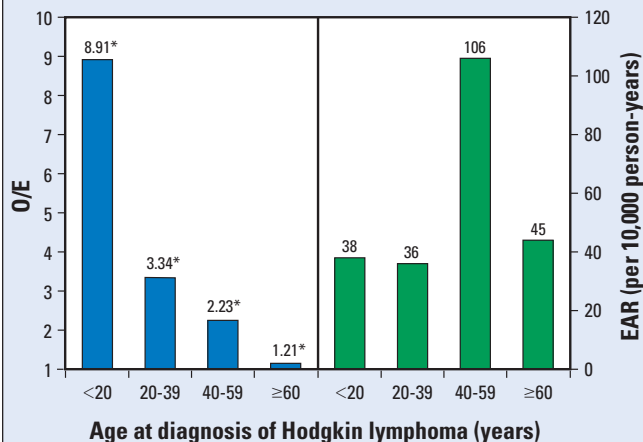
Excluding sex-specific sites, lung cancer accounted for the largest excess of subsequent neoplasms occurring after HL. Significantly elevated risks were observed in both sexes and among all age groups. Overall increased risks of lung cancer were apparent in both irradiated and nonirradiated patients, consistent with several analytic studies implicating either radiotherapy or chemotherapy (Swerdlow et al, 2001; Travis et al, 2002). In the largest investigation to date, alkylating agent chemotherapy used to treat HL was associated with a dose-dependent increase in lung cancer risk, with significant excesses beginning 1-4 years after treatment and continuing for up to 15 years (Travis et al, 2002). Risk also rose with increasing radiation dose to the lung, starting 5-9 years after treatment and persisting for more than 20 years.

Figure 16.1: Cumulative incidence of developing a second cancer among patients with Hodgkin lymphoma, both sexes, SEER 1973-2000.



* Cumulative incidence for all second cancers at 25 years is 14.1% for males and 18.9% for females.
 † Female breast cancer curve is based on female Hodgkin lymphoma patients only.

Figure 16.2: Observed-to-expected ratio (O/E) and excess absolute risk (EAR) of subsequent primary cancers after Hodgkin lymphoma, both sexes, SEER 1973-2000.



* P <0.05.
 Notes: All subsequent cancers excluding Hodgkin lymphoma. EAR = Excess number of subsequent cancers per 10,000 person-years. Observed number of subsequent cancers are 128, 435, 480 and 293, for age groups <20, 20-39, 40-59 and ≥60 years, respectively.

Smoking appeared to multiply all treatment-associated risks. Nearly all HL patients who developed lung cancer were smokers (Travis et al, 2002), although few studies have linked tobacco use with HL (Briggs et al, 2002).

Women treated with radiotherapy for HL experienced a significant 3-fold increase in the risk of breast cancer, which persisted among 20-year survivors (O/E=5.46). Significantly elevated risks were confined to females treated at ages younger than 20 years and 20-39 years, consistent with the increased sensitivity of the breast to ionizing radiation exposure at young ages (Preston et al, 2002). Our findings are consistent with the elevated breast cancer risk described in previous surveys of HL,

other medically irradiated populations, and atomic bomb survivors (Travis et al, 2003). In a large international study of young women treated for HL, breast cancer risk increased with increasing radiation dose to the breast, reaching an 8-fold increase in risk at a dose higher than 40 Gy; radiation-related risk persisted for more than 25 years (Travis et al, 2003). In contrast, the risk of breast cancer decreased with increasing number of cycles of alkylating agents, with corollary findings implicating treatment-induced ovarian failure (Travis et al, 2003; van Leeuwen et al, 2003).

Leukemias accounted for the third largest absolute number of subsequent primary cancers in our series, with acute non-lymphocytic leukemia (ANLL) constituting 80% of leukemia cases and associated with a significantly elevated 19-fold risk. The risk of subsequent ANLL was highest within the first 10 years after diagnosis of HL, and an elevated risk persisted in the 10-14 and 15-19 year time intervals. Previous studies of HL have attributed excess leukemias primarily to either initial or salvage treatment with alkylating agent chemotherapy (especially mechlorethamine and procarbazine) (van Leeuwen and Travis, 2001). Radiotherapy alone for HL appears associated with little or no increased risk of leukemia, and the risk following combination radiation and chemotherapy does not seem to exceed the risk after chemotherapy alone (van Leeuwen and Travis, 2001). Based on small numbers, the risks of acute lymphocytic leukemia and chronic myelogenous leukemia (CML) were also significantly elevated in our series. These types of leukemia have been linked previously to prior chemotherapy and radiation exposure (van Leeuwen and Travis, 2001).

The increased risks of cancers of the salivary gland, thyroid, stomach, uterine corpus, bone, and soft tissue appeared related to treatment. Radiation is an established risk factor for salivary gland cancer (Land et al, 1996), especially mucoepidermoid tumors, which constituted 67% of salivary neoplasms in our series, compared with 24% in the general population. The thyroid also is an established site for radiogenic cancer, particularly when exposure occurs prior to age 20 years (Ron et al, 1995). In our series, significantly increased risks of thyroid cancer were limited to patients younger than 40 years of age at HL diagnosis, although some studies have described elevated risks in older HL patients, albeit based on small numbers (van Leeuwen and Travis, 2001; Dores et al, 2002). Some surveys—but not all—have found significant excesses of stomach cancer following HL, with the largest risk following both chemotherapy and radiotherapy (van Leeuwen and Travis, 2001). Significant excesses of uterine corpus cancer in our series were evident among 10-year survivors of HL who initially received radiation, consistent with the location of the uterus in pelvic radiotherapy fields. Similar increases in the risk of uterine corpus cancer have been observed among long-term survivors of cervical cancer treated with radiotherapy (Boice et al, 1988). The excess we observed for bone cancer is consistent with the increased risks associ-

ated with radiotherapy and chemotherapy for childhood cancer (Hawkins et al, 1996; van Leeuwen and Travis, 2001). In previous studies of HL among children and adults, significantly increased risks of sarcomas of bone and soft tissue have been reported (Metayer et al, 2000; van Leeuwen and Travis, 2001; Dores et al, 2002).

The increased risk of NHL following HL may be due, at least in part, to the cellular immune dysfunction that is evident prior to the diagnosis of HL and that may persist for years (Poppema, 1996). In addition, misclassification of HL as NHL and the derivation of HL and NHL from common lymphoid precursors may contribute to the association. Immunologic susceptibility to human papillomavirus (HPV) infection may account for excess cancers of the tongue and anus in our series (Herrero et al, 2003). Defective immune mechanisms may underlie the elevated risks of malignant melanoma and lip cancer in our study, as well as in other immunosuppressed populations (Frisch et al, 2001), although heightened medical surveillance may play a role.

A significantly elevated risk of KS was restricted to the first 5 years after HL diagnosis. Because KS and NHL are acquired immune deficiency syndrome (AIDS)-defining cancers, the excess of both malignancies that we observed among HL survivors may be influenced by underlying human immunodeficiency virus (HIV) infection, which is also known to increase the risk of HL. In addition, although human herpesvirus-8 is the causal agent in KS, the risk of KS among HIV-infected individuals (Goedert, 2000), as well as organ transplant recipients (Schwartz, 2001), increases with the level of immune suppression.

The significantly increased 2-fold risk of liver cancer following HL in our study may reflect hepatitis C virus (HCV) infection acquired through transfusion of blood products before effective screening measures were available. Eighty-nine percent of hepatocellular carcinomas (O=9) were detected in patients diagnosed with HL prior to 1992, when second-generation testing for HCV was instituted.

Non-Hodgkin Lymphoma

NHL is the seventh most frequent cancer in the U.S., constituting an estimated 4.1% of new malignant neoplasms (Jemal et al, 2005). The incidence of NHL has increased significantly in the last few decades, but reasons for this increase remain unclear (Groves et al, 2000; Evans and Hancock, 2003). Between 1975 and 2000 the overall incidence rate of NHL in the SEER Program increased by more than 70%. Incidence rates for NHL are 48% higher in males than females and 38% higher in whites than blacks. Standard treatment options for NHL include radiotherapy and/or chemotherapy and are based largely on stage and histology (Evans and Hancock, 2003). Therapeutic regimens have recently been expanded to include monoclonal antibodies, biologic response modifiers, and antimicrobial agents (Evans and Hancock, 2003). The 5-year relative survival rate for patients with

NHL is 59.1%. Between 1996 and 2000 death rates were 52% higher in males than females and 53% higher in whites than blacks. Overall, NHL accounts for an estimated 3.4% of cancer deaths in the U.S. (Jemal et al, 2005).

Risk factors for NHL likely vary by histologic type and may include acquired and congenital immunodeficiency states, selected viral infections (HIV, EBV, HCV), pesticides and other agricultural exposures, lifestyle factors (diet, tobacco, hair dyes), and genetic susceptibility (Groves et al, 2000; Evans and Hancock, 2003).

Results and Discussion

Overall, 5,490 subsequent cancers were observed among 73,958 2-month survivors of NHL, reflecting an overall 14% elevated risk compared with the general population (O/E=1.14 excluding subsequent NHL, 95% CI=1.11-1.17, EAR=19). Second cancer incidence reached 12.3% within 25 years (95% CI=11.9%-12.7%) (Figure 16.3). The risk of developing a new malignancy did not differ significantly by race or gender. Subsequent cancer risk was significantly elevated in patients of ages less than 30, 30-49, and 50-69 years at NHL diagnosis, with the highest relative risk seen among those diagnosed under age 30 years, but with the largest excess absolute risk occurring among those ages 30-49 years (EAR=35) (Figure 16.4).

The relative risk of all new cancers increased with time since diagnosis to 1.47 among 20-year survivors of NHL (P trend <0.0001). Significantly increased risks of new malignancies were observed for malignant melanoma, KS, HL, and ANLL, as well as cancers of the buccal cavity, lip, salivary gland, mouth, lung, vagina, urinary bladder, kidney, and bone. Significant deficits were reported for cancers of the female breast and prostate, as well as for myeloma and chronic lymphocytic leukemia (CLL). (Patients diagnosed with myeloma or CLL following NHL are presumed not to have developed a new second primary, according to SEER rules.) An earlier survey of the SEER database reported a reciprocally elevated risk of cutaneous melanoma and NHL (Goggins et al, 2001). In addition, our results corroborate findings in other previous surveys of NHL, which have reported significant excesses of cutaneous melanoma, KS, HL, ANLL, and cancers of the buccal cavity, lip, lung, urinary bladder, and kidney, as well as significant deficits of breast and prostate cancers (Travis et al, 1991, 1992, 1993; Brennan et al, 2000, 2005; Cannon et al, 2000; Dong and Hemminki, 2001).

Lung cancer accounted for the largest excess of subsequent cancers after NHL in both sexes, with overall increased risks noted in some—but not all—prior surveys (Travis et al, 1991, 1993; Brennan et al, 2000, 2005; Dong and Hemminki, 2001). A general upswing in the risk of lung cancer with time since NHL diagnosis was observed in our study, with 70% excesses among 20-year survivors (P trend <0.01). Given the overlap in treatment used for NHL and HL, similar therapeutic agents, as well as smoking, are likely involved in the lung cancer excesses seen after both tumors (Travis et al, 2002). In addition, tobacco use probably contributes to the excess risks

Figure 16.3: Cumulative incidence of developing a second cancer among patients with non-Hodgkin lymphoma, both sexes, SEER 1973-2000.

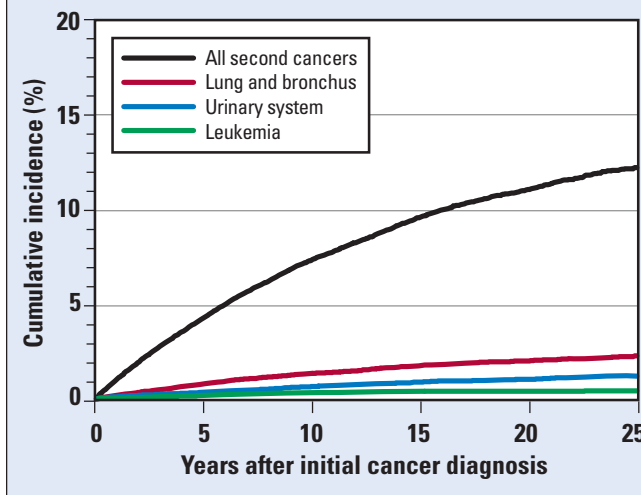
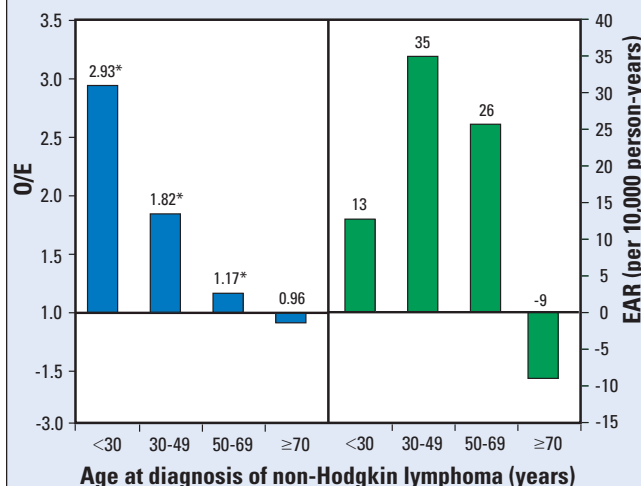


Figure 16.4: Observed-to-expected ratio (O/E) and excess absolute risk (EAR) of subsequent primary cancers after non-Hodgkin lymphoma, both sexes, SEER 1973-2000.



*P <0.05.
Notes: All subsequent cancers excluding non-Hodgkin lymphoma. EAR = Excess number of subsequent cancers per 10,000 person-years. Observed number of subsequent cancers are 59, 631, 2,956 and 1,844, for age groups <30, 30-49, 50-69 and ≥70 years, respectively.

observed for cancers of the lip, mouth, urinary bladder, and kidney, and may increase the risk of the follicular subtype of NHL (Stagnaro et al, 2001; Morton et al, 2005).

Significant excesses of ANLL were restricted to the first 15 years after NHL diagnosis, as reported in prior surveys (Travis et al, 1993). Previous studies have documented the leukemogenic effects of radiotherapy and alkylating agent chemotherapy for NHL, in particular, mechlorethamine, procarbazine, and chlorambucil (Travis et al, 1994, 1996). Radiotherapy for NHL appeared related to the increased risks for bladder cancers and bone sarcomas in our series. Among patients who initially received radiotherapy, significantly increased risks of bladder cancer were confined to 10-year survivors

(O/E=2.25), a pattern consistent with previous studies of NHL (Travis et al, 1995) and with other surveys of radiogenic bladder cancer (UNSCEAR, 2000). In patients treated with chemotherapy, elevated risks of bladder cancer were noted in the follow-up intervals 5-9 years and 10 or more years after diagnosis, possibly due to treatment with cyclophosphamide, a known bladder carcinogen (Travis et al, 1995). In a previous analytic study of NHL patients, cyclophosphamide increased the risk of bladder cancer in a dose-dependent manner and had an additional effect when combined with radiotherapy (Travis et al, 1995).

The immunosuppressive state associated with NHL (Evans and Hancock, 2003) may contribute to the increased risks observed for cutaneous melanoma, HL, and lip cancer (Frisch et al, 2001; Goggins et al, 2001). Although diagnostic misclassification of HL and NHL may affect risk estimates, one population-based study of NHL in which histopathological materials for all cases were independently reviewed revealed a significant 3-fold excess of HL (Travis et al, 1992). EBV infection, an established cofactor in several subtypes of NHL and HL, may contribute to the 5-fold increased risk of HL in our study. The elevated 13-fold risk of KS, based on 113 cases, probably reflects underlying HIV infection in some NHL patients, particularly because significant excesses were not evident prior to 1980 (the pre-HIV era). Individuals with AIDS have a 150- to 200-fold increased risk of NHL, which is associated with the degree of immune suppression (Goedert, 2000). In a reciprocal fashion, the significantly increased risks of NHL following HL, KS, and malignant melanoma in the SEER database point to the role of shared etiologic factors, possibly immune-related.

Based on small numbers, significantly increased risks of vaginal cancers were limited to women diagnosed with NHL at ages 50-69 years, and excesses of anal cancers were limited to males diagnosed at ages 30-49 years. Vaginal and anal cancers have been linked to HPV infection and occur excessively in persons with HIV infection.

A significant deficit of prostate cancer was restricted to the period from 2 to 12 months after NHL and likely reflects the residual effect of detecting cases with screening within 2 months of diagnosis of NHL. The significantly increased 4-fold risk of kidney cancer observed between 2 and 12 months after NHL diagnosis suggests a role for medical surveillance; the subsequent increase in risk 5-9 years after NHL diagnosis was unrelated to initial treatment and may reflect medical surveillance or chance observation.

Myeloma

Myeloma accounts for an estimated 1.2% of all cancers in the U.S. and 2% of all cancer deaths (Jemal et al, 2005). The incidence of myeloma rises sharply with age, with only 8% of cases reported to the SEER Program in patients younger than age 50 years. Males are approximately 50% more likely to be diagnosed with myeloma than females, and blacks have a 2-fold higher incidence compared with whites. For more than 30 years, the stan-

dard treatment for myeloma has consisted of intermittent courses of melphalan and prednisone, although chemotherapy that includes cyclophosphamide, vinca alkaloids, anthracyclines, and nitrosoureas has also been used (Barlogie et al, 2004). Radiation therapy may provide potentially curative treatment for patients with localized disease (solitary plasmacytoma), but radiation is otherwise generally reserved for palliation of skeletal lesions. Immunomodulatory agents, monoclonal antibodies, and autologous and allogeneic bone marrow transplantation are among the newer treatment options (Barlogie et al, 2004). The 5-year relative survival rate for patients with myeloma is 31.9%. Between 1996 and 2000, death rates were 47% higher in males than females and twice as high in blacks as in whites.

The etiology of myeloma remains largely unexplained. Studies in atomic bomb survivors and individuals exposed to therapeutic and diagnostic radiation have reported an effect of radiation, but the studies are inconsistent (Herrington et al, 1996). Occupational exposures, such as benzene, herbicides, and pesticides, have also been associated with myeloma (Herrington et al, 1996).

Results and Discussion

Among 23,838 patients who survived 2 months or more following a diagnosis of myeloma, the overall risk of developing a subsequent primary cancer was not increased (O/E=0.98 excluding subsequent myeloma, O=1,216, 95% CI=0.93-1.04). Approximately 6.1% (95% CI=5.8%-6.5%) of myeloma patients developed a second cancer within 20 years. The increased risk of developing a new malignancy was limited to individuals diagnosed with myeloma at ages younger than 70 years (O/E=1.09, EAR=12); subsequent cancer risk did not differ by gender, race, or initial therapy. Significantly elevated risks were noted for KS, ANLL, and CML, while significant deficits were observed for CLL as well as cancers of the buccal cavity and pharynx, esophagus, female breast, and prostate. The increased risks for KS and leukemia are consistent with earlier surveys, but we did not observe the significant excesses of NHL or bladder cancer reported previously (Cannon et al, 2000; Finnish Leukaemia Group, 2000; Dong and Hemminki, 2001).

Leukemias accounted for the largest cancer excesses following a diagnosis of myeloma, with ANLL constituting 80% of leukemia cases. Risks for ANLL were significantly elevated 1-4, 5-9, and 10-14 years after initial diagnosis, consistent with previous surveys (Finnish Leukaemia Group, 2000; Dong and Hemminki, 2001). Increased risks of ANLL likely reflect treatment for myeloma with alkylating agents, which are often given for 6 to 12 months or longer (Barlogie et al, 2004). The significantly increased 2.5-fold risk of CML that we observed is likely due to the antecedent chemotherapy and/or radiotherapy, in accord with prior studies (van Leeuwen and Travis, 2001).

A significantly increased risk of KS was observed, as was reported in another large survey (Cannon et al, 2000), although an excess of myeloma following KS was not

noted in the SEER data. Whether human herpesvirus-8, the etiologic agent of KS, may be associated with some cases of myeloma is not clear (Berenson and Vescio, 1999; Tarte et al, 1999). The significantly increased risk of kidney cancer was confined to the 1-year period following the diagnosis of myeloma, which suggests a surveillance effect.

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Hodgkin Lymphoma Both Sexes

Table 16.1.1: Characteristics of patients with an initial Hodgkin lymphoma, both sexes, SEER 1973-2000.

Characteristics	Males		Females		Total	
	No.	%	No.	%	No.	%
Number of patients with 1st primary cancer						
Total	9,769	100.0	7,747	100.0	17,516	100.0
Initial treatment						
Any radiation	4,825	49.4	4,376	56.5	9,201	52.5
With surgery	1,208	12.4	1,070	13.8	2,278	13.0
Without surgery	3,617	37.0	3,306	42.7	6,923	39.5
No radiation	4,944	50.6	3,371	43.5	8,315	47.5
With surgery	998	10.2	697	9.0	1,695	9.7
Without surgery	3,946	40.4	2,674	34.5	6,620	37.8
Race						
White	8,662	88.7	6,914	89.2	15,576	88.9
Black	801	8.2	593	7.7	1,394	8.0
Other	252	2.6	204	2.6	456	2.6
Unknown	54	0.6	36	0.5	90	0.5
Age at 1st primary cancer diagnosis, years						
< 30	4,019	41.1	3,713	47.9	7,732	44.1
30–49	3,243	33.2	2,165	27.9	5,408	30.9
50–69	1,801	18.4	1,099	14.2	2,900	16.6
70–79	529	5.4	516	6.7	1,045	6.0
≥ 80	177	1.8	254	3.3	431	2.5
Number of patients with one or more primary cancers						
One primary cancer only	9,101	93.2	7,188	92.8	16,289	93.0
1st and 2nd cancers	618	6.3	507	6.5	1,125	6.4
1st, 2nd, and 3rd cancers	49	0.5	46	0.6	95	0.5
1st, 2nd, 3rd, and additional cancers	1	0.0	6	0.1	7	0.0
Other statistics						
Median age at 1st cancer diagnosis	33.8	—	30.8	—	32.3	—
Median year of 1st cancer diagnosis	1987.5	—	1988.1	—	1987.8	—
Median person-years at risk	6.5	—	7.1	—	6.7	—
Percent histologically confirmed*						
Both 1st and 2nd cancers	—	97.8	—	97.3	—	97.6
1st, 2nd, and additional cancers	—	97.6	—	96.6	—	97.1
1st cancer only	—	1.9	—	2.1	—	2.0

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

Table 16.1.2: Risk of subsequent primary cancers after Hodgkin lymphoma, both sexes, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	Number starting interval	Person-years in interval	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
	17,516	13,638	15,494		10,454		6,496		17,516			
			50,563		41,692		43,953		149,847			
All subsequent cancers	76	1.40*	325	1.74*	338	2.11*	598	2.88*	1,337	608.94	2.20*	48.59
All excluding same site	76	1.41*	324	1.75*	338	2.13*	598	2.90*	1,336	603.01	2.22*	48.92
Buccal cavity, pharynx	1	0.61	15	2.70*	19	4.15*	21	3.70*	56	17.44	3.21*	2.57
Lip	1	4.14	3	3.89	4	6.82*	1	1.59	9	2.23	4.04*	0.45
Tongue	0	0.00	3	2.61	4	4.03*	7	5.32*	14	3.78	3.70*	0.68
Salivary gland	0	0.00	3	5.78*	5	11.25*	10	17.58*	18	1.68	10.72*	1.09
Mouth	0	0.00	3	2.11	3	2.63	1	0.74	7	4.34	1.61	0.18
Nasopharynx	0	0.00	0	0.00	1	4.57	0	0.00	1	0.83	1.21	0.01
Tonsil	0	0.00	1	1.72	0	0.00	1	1.38	2	1.97	1.01	0.00
Oropharynx	0	0.00	0	0.00	2	16.13*	0	0.00	2	0.48	4.21	0.10
Hypopharynx	0	0.00	1	1.91	0	0.00	1	2.05	2	1.59	1.26	0.03
Digestive system	10	0.91	34	0.95	40	1.37	92	2.61*	176	111.19	1.58*	4.33
Esophagus	0	0.00	1	0.52	3	1.86	5	2.40	9	6.18	1.46	0.19
Stomach	2	1.75	6	1.65	4	1.39	22	6.64*	34	10.97	3.10*	1.54
Small intestine	0	0.00	3	5.18*	0	0.00	2	2.77	5	1.98	2.52	0.20
Colon	5	1.03	13	0.83	20	1.59	33	2.23*	71	47.89	1.48*	1.54
Rectum, rectosigmoid junction	1	0.50	7	1.07	4	0.76	2	0.31	14	20.22	0.69	-0.41
Anus, anal canal	0	0.00	0	0.00	2	5.09	5	8.64*	7	1.52	4.59*	0.37
Liver	0	0.00	1	0.78	2	1.80	7	4.50*	10	4.31	2.32*	0.38
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	1.32	0.00	-0.09
Bile ducts, other biliary	1	4.55	0	0.00	0	0.00	2	2.55	3	2.33	1.29	0.04
Pancreas	1	0.76	3	0.71	5	1.46	11	2.64*	20	13.16	1.52	0.46
Respiratory system	10	1.13	62	2.08*	76	3.11*	103	3.47*	251	92.74	2.71*	10.56
Nose, nasal cavity, ear	0	0.00	1	3.28	0	0.00	1	3.11	2	0.97	2.05	0.07
Larynx	0	0.00	3	1.30	2	1.07	7	3.14*	12	7.09	1.69	0.33
Lung, bronchus	10	1.25	56	2.07*	72	3.25*	95	3.52*	233	84.27	2.76*	9.93
Female breast	5	0.82	16	0.74	33	1.65*	136	4.54*	190	77.61	2.45*	16.55
Female genital system	0	0.00	15	1.42	14	1.52	34	2.78*	63	35.08	1.80*	4.11
Cervix uteri	0	0.00	3	1.27	2	0.89	6	2.20	11	7.94	1.39	0.45
Corpus uteri	0	0.00	5	1.15	8	2.26	19	3.94*	32	14.03	2.28*	2.64
Ovary	0	0.00	6	1.93	3	1.07	8	2.09	17	10.62	1.60	0.94
Vagina	0	0.00	0	0.00	0	0.00	1	7.42	1	0.42	2.40	0.09
Vulva	0	0.00	0	0.00	1	2.89	0	0.00	1	1.33	0.75	-0.05
Male genital system	10	1.15	25	0.82	20	0.75	25	0.69	80	102.07	0.78*	-2.69
Prostate	10	1.23	21	0.75	19	0.78	23	0.68	73	94.47	0.77*	-2.62
Testis	0	0.00	4	1.78	1	0.49	1	0.49	6	6.87	0.87	-0.11
Urinary system	3	0.75	14	1.03	16	1.41	22	1.53	55	43.24	1.27	0.78
Urinary bladder	1	0.37	8	0.89	12	1.64	12	1.34	33	27.91	1.18	0.34
Kidney parenchyma	2	1.85	4	1.05	3	0.89	7	1.49	16	12.98	1.23	0.20
Renal pelvis, other urinary	0	0.00	2	2.52	1	1.62	3	4.34	6	2.35	2.55	0.24
Ureter	0	0.00	2	7.93	0	0.00	3	14.34*	5	0.73	6.81*	0.28
Bone, joints	0	0.00	3	6.80*	0	0.00	5	13.72*	8	1.27	6.28*	0.45
Soft tissue including heart	2	6.28	3	2.62	9	9.12*	17	13.94*	31	3.67	8.44*	1.82
Kaposi sarcoma	7	16.68*	6	3.26*	2	1.00	1	0.42	16	6.63	2.41*	0.63
Melanoma of skin	3	1.58	13	1.73	12	1.65	15	1.49	43	26.70	1.61*	1.09
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	1.08	0.00	-0.07
Brain, central nervous system	0	0.00	6	1.94	4	1.50	1	0.31	11	9.80	1.12	0.08
Thyroid	1	1.30	4	1.30	4	1.37	23	6.07*	32	10.55	3.03*	1.43
Lymphatic, hematopoietic	24	5.07*	97	5.87*	82	5.79*	79	4.51*	282	52.94	5.33*	15.29
Hodgkin lymphoma	0	0.00	1	0.48	0	0.00	0	0.00	1	5.93	0.17*	-0.33
Non-Hodgkin lymphoma	19	9.32*	41	5.60*	29	4.38*	55	6.23*	144	24.80	5.81*	7.95
Myeloma	1	1.62	3	1.46	1	0.58	3	1.36	8	6.59	1.21	0.09
Leukemia	4	2.65	52	10.29*	52	12.58*	21	4.27*	129	15.61	8.26*	7.57
Acute lymphocytic	0	0.00	2	5.56	2	7.24	3	10.49*	7	1.03	6.82*	0.40
Chronic lymphocytic	0	0.00	1	0.60	3	2.21	1	0.61	5	5.18	0.96	-0.01
Acute non-lymphocytic	2	3.83	43	24.27*	43	29.46*	14	8.07*	102	5.49	18.59*	6.44
Chronic myeloid	1	4.49	1	1.31	2	3.08	3	3.82	7	2.42	2.89*	0.31

*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 67,933 PYR and for male cancers on 81,914 PYR.

Hodgkin Lymphoma

Both Sexes, Long-term Follow-up

Table 16.1.3: Risk of subsequent primary cancers after Hodgkin lymphoma, both sexes, long-term follow-up, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<10 years		10-14 years		15-19 years		≥20 years		Total			
	Number starting interval	Person-years in interval	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
	17,516	105,894	6,496	25,015	3,704	13,081	1,716	5,856	17,516	149,847		
All subsequent cancers	739	1.84*	279	2.59*	206	3.19*	113	3.22*	1,337	608.94	2.20*	48.59
All excluding same site	738	1.86*	279	2.61*	206	3.21*	113	3.24*	1,336	603.01	2.22*	48.92
Buccal cavity, pharynx	35	2.97*	6	2.02	12	6.85*	3	3.13	56	17.44	3.21*	2.57
Lip	8	5.00*	1	2.86	0	0.00	0	0.00	9	2.23	4.04*	0.45
Tongue	7	2.84*	2	2.99	5	12.15*	0	0.00	14	3.78	3.70*	0.68
Salivary gland	8	7.21*	2	6.69	6	34.21*	2	21.09*	18	1.68	10.72*	1.09
Mouth	6	2.01	0	0.00	1	2.42	0	0.00	7	4.34	1.61	0.18
Nasopharynx	1	1.79	0	0.00	0	0.00	0	0.00	1	0.83	1.21	0.01
Tonsil	1	0.80	0	0.00	0	0.00	1	7.30	2	1.97	1.01	0.00
Oropharynx	2	6.30	0	0.00	0	0.00	0	0.00	2	0.48	4.21	0.10
Hypopharynx	1	0.91	1	3.83	0	0.00	0	0.00	2	1.59	1.26	0.03
Digestive system	84	1.11	38	2.04*	39	3.63*	15	2.55*	176	111.19	1.58*	4.33
Esophagus	4	0.98	2	1.86	2	3.09	1	2.76	9	6.18	1.46	0.19
Stomach	12	1.57	8	4.51*	9	8.96*	5	9.36*	34	10.97	3.10*	1.54
Small intestine	3	2.38	0	0.00	1	4.39	1	7.62	5	1.98	2.52	0.20
Colon	38	1.15	18	2.27*	11	2.46*	4	1.68	71	47.89	1.48*	1.54
Rectum, rectosigmoid junction	12	0.87	1	0.30	1	0.52	0	0.00	14	20.22	0.69	-0.41
Anus, anal canal	2	2.12	1	3.51	3	16.18*	1	9.22	7	1.52	4.59*	0.37
Liver	3	1.09	3	3.90	3	6.15*	1	3.35	10	4.31	2.32*	0.38
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	1.32	0.00	-0.09
Bile ducts, other biliary	1	0.65	0	0.00	2	8.23	0	0.00	3	2.33	1.29	0.04
Pancreas	9	1.00	4	1.82	6	4.69*	1	1.43	20	13.16	1.52	0.46
Respiratory system	148	2.35*	48	3.07*	34	3.74*	21	4.23*	251	92.74	2.71*	10.56
Nose, nasal cavity, ear	1	1.53	0	0.00	0	0.00	1	19.01	2	0.97	2.05	0.07
Larynx	5	1.03	6	5.07*	0	0.00	1	2.72	12	7.09	1.69	0.33
Lung, bronchus	138	2.41*	42	2.96*	34	4.11*	19	4.20*	233	84.27	2.76*	9.93
Female breast	54	1.13	59	3.99*	50	5.20*	27	4.88*	190	77.61	2.45*	16.55
Female genital system	29	1.27	17	2.70*	9	2.34*	8	3.83*	63	35.08	1.80*	4.11
Cervix uteri	5	0.96	3	1.98	1	1.20	2	5.29	11	7.94	1.39	0.45
Corpus uteri	13	1.41	10	4.20*	5	3.27*	4	4.39*	32	14.03	2.28*	2.64
Ovary	9	1.32	4	2.05	3	2.48	1	1.52	17	10.62	1.60	0.94
Vagina	0	0.00	0	0.00	0	0.00	1	46.17	1	0.42	2.40	0.09
Vulva	1	1.17	0	0.00	0	0.00	0	0.00	1	1.33	0.75	-0.05
Male genital system	55	0.84	13	0.71	7	0.61	5	0.79	80	102.07	0.78*	-2.69
Prostate	50	0.83	11	0.64	7	0.65	5	0.82	73	94.47	0.77*	-2.62
Testis	5	1.04	1	0.81	0	0.00	0	0.00	6	6.87	0.87	-0.11
Urinary system	33	1.14	8	1.07	7	1.58	7	2.84*	55	43.24	1.27	0.78
Urinary bladder	21	1.11	4	0.85	4	1.47	4	2.66	33	27.91	1.18	0.34
Kidney parenchyma	9	1.09	3	1.27	2	1.34	2	2.34	16	12.98	1.23	0.20
Renal pelvis, other urinary	3	1.81	1	2.67	1	4.84	1	9.10	6	2.35	2.55	0.24
Ureter	2	3.81	1	8.69	1	16.19	1	30.89	5	0.73	6.81*	0.28
Bone, joints	3	3.30	2	9.85*	1	9.13	2	38.56*	8	1.27	6.28*	0.45
Soft tissue including heart	14	5.71*	8	12.36*	5	13.25*	4	20.50*	31	3.67	8.44*	1.82
Kaposi sarcoma	15	3.52*	1	0.66	0	0.00	0	0.00	16	6.63	2.41*	0.63
Melanoma of skin	28	1.68*	7	1.35	5	1.59	3	1.78	43	26.70	1.61*	1.09
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	1.08	0.00	-0.07
Brain, central nervous system	10	1.51	1	0.58	0	0.00	0	0.00	11	9.80	1.12	0.08
Thyroid	9	1.33	10	4.97*	9	7.64*	4	6.68*	32	10.55	3.03*	1.43
Lymphatic, hematopoietic	203	5.73*	50	5.37*	18	3.34*	11	3.94*	282	52.94	5.33*	15.29
Hodgkin lymphoma	1	0.23	0	0.00	0	0.00	0	0.00	1	5.93	0.17*	-0.33
Non-Hodgkin lymphoma	89	5.57*	33	7.17*	12	4.33*	10	6.90*	144	24.80	5.81*	7.95
Myeloma	5	1.14	1	0.88	2	2.92	0	0.00	8	6.59	1.21	0.09
Leukemia	108	10.10*	16	6.06*	4	2.67	1	1.28	129	15.61	8.26*	7.57
Acute lymphocytic	4	5.40*	2	12.29*	0	0.00	1	25.58	7	1.03	6.82*	0.40
Chronic lymphocytic	4	1.13	1	1.15	0	0.00	0	0.00	5	5.18	0.96	-0.01
Acute non-lymphocytic	88	23.45*	11	11.83*	3	5.71*	0	0.00	102	5.49	18.59*	6.44
Chronic myeloid	4	2.44	2	4.70	1	4.15	0	0.00	7	2.42	2.89*	0.31

*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 67,933 PYR and for male cancers on 81,914 PYR.

Table 16.1.4: Risk of subsequent primary cancers after Hodgkin lymphoma, females, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	27	1.29	126	1.77*	145	2.30*	320	3.80*	618	239.29	2.58*	55.75
All excluding same site	27	1.31	125	1.78*	145	2.33*	320	3.82*	617	236.89	2.60*	55.95
Buccal cavity, pharynx	0	0.00	4	3.20	8	7.67*	10	7.70*	22	3.97	5.54*	2.65
Lip	0	0.00	0	0.00	1	15.60	0	0.00	1	0.24	4.17	0.11
Tongue	0	0.00	0	0.00	0	0.00	3	9.71*	3	0.90	3.34	0.31
Salivary gland	0	0.00	1	5.27	4	23.87*	6	28.55*	11	0.62	17.72*	1.53
Mouth	0	0.00	2	5.03	2	6.22	1	2.57	5	1.23	4.06*	0.55
Nasopharynx	0	0.00	0	0.00	1	20.17	0	0.00	1	0.19	5.29	0.12
Tonsil	0	0.00	0	0.00	0	0.00	0	0.00	0	0.35	0.00	-0.05
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.09	0.00	-0.01
Hypopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.23	0.00	-0.03
Digestive system	6	1.46	12	0.94	12	1.15	31	2.51*	61	39.58	1.54*	3.15
Esophagus	0	0.00	0	0.00	0	0.00	1	2.97	1	1.09	0.92	-0.01
Stomach	2	6.18	1	1.02	0	0.00	6	6.71*	9	2.98	3.02*	0.89
Small intestine	0	0.00	3	14.60*	0	0.00	0	0.00	3	0.71	4.20	0.34
Colon	3	1.48	5	0.80	8	1.58	14	2.39*	30	19.20	1.56*	1.59
Rectum, rectosigmoid junction	0	0.00	2	0.94	1	0.58	1	0.48	4	6.64	0.60	-0.39
Rectum	0	0.00	2	1.43	0	0.00	1	0.71	3	4.40	0.68	-0.21
Anus, anal canal	0	0.00	0	0.00	1	5.43	2	7.32	3	0.72	4.17	0.34
Liver	0	0.00	0	0.00	1	4.18	0	0.00	1	0.91	1.10	0.01
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.82	0.00	-0.12
Bile ducts, other biliary	0	0.00	0	0.00	0	0.00	1	3.53	1	0.85	1.17	0.02
Pancreas	1	1.93	1	0.62	1	0.76	4	2.57	7	5.00	1.40	0.30
Respiratory system	5	2.20	14	1.82	26	3.89*	31	3.49*	76	25.50	2.98*	7.43
Nose, nasal cavity, ear	0	0.00	0	0.00	0	0.00	0	0.00	0	0.31	0.00	-0.05
Larynx	0	0.00	1	3.50	0	0.00	1	3.16	2	0.93	2.15	0.16
Lung, bronchus	5	2.32	11	1.51	26	4.11*	30	3.56*	72	24.16	2.98*	7.04
Female breast	5	0.82	16	0.74	33	1.65*	136	4.54*	190	77.61	2.45*	16.55
Female genital system	0	0.00	15	1.42	14	1.52	34	2.78*	63	35.08	1.80*	4.11
Cervix uteri	0	0.00	3	1.27	2	0.89	6	2.20	11	7.94	1.39	0.45
Corpus uteri	0	0.00	5	1.15	8	2.26	19	3.94*	32	14.03	2.28*	2.64
Ovary	0	0.00	6	1.93	3	1.07	8	2.09	17	10.62	1.60	0.94
Vagina	0	0.00	0	0.00	0	0.00	1	7.42	1	0.42	2.40	0.09
Vulva	0	0.00	0	0.00	1	2.89	0	0.00	1	1.33	0.75	-0.05
Urinary system	0	0.00	4	1.42	3	1.25	5	1.61	12	9.18	1.31	0.42
Urinary bladder	0	0.00	2	1.26	2	1.52	4	2.46	8	5.02	1.59	0.44
Kidney parenchyma	0	0.00	1	0.99	1	1.10	0	0.00	2	3.51	0.57	-0.22
Renal pelvis, other urinary	0	0.00	1	4.69	0	0.00	1	5.29	2	0.64	3.12	0.20
Ureter	0	0.00	1	15.76	0	0.00	1	18.92	2	0.19	10.70*	0.27
Bone, joints	0	0.00	2	12.45*	0	0.00	4	27.84*	6	0.48	12.58*	0.81
Soft tissue including heart	0	0.00	2	4.73	6	16.18*	7	15.32*	15	1.37	10.96*	2.01
Kaposi sarcoma	0	0.00	1	37.17	0	0.00	1	36.05	2	0.09	22.99*	0.28
Melanoma of skin	0	0.00	3	1.00	6	1.99	4	0.97	13	10.89	1.19	0.31
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.39	0.00	-0.06
Brain, central nervous system	0	0.00	2	1.87	1	1.07	0	0.00	3	3.43	0.87	-0.06
Thyroid	1	1.90	3	1.40	3	1.45	21	7.86*	28	7.41	3.78*	3.03
Lymphatic, hematopoietic	10	5.91*	47	8.20*	28	5.74*	26	4.40*	111	18.21	6.09*	13.66
Hodgkin lymphoma	0	0.00	1	1.15	0	0.00	0	0.00	1	2.41	0.42	-0.21
Non-Hodgkin lymphoma	5	6.88*	19	7.66*	8	3.65*	16	5.49*	48	8.32	5.77*	5.84
Myeloma	1	4.38	1	1.38	1	1.63	3	3.99	6	2.32	2.59	0.54
Leukemia	4	7.88*	26	15.70*	19	13.85*	7	4.28*	56	5.17	10.83*	7.48
Acute lymphocytic	0	0.00	1	8.42	1	10.61	1	9.76	3	0.35	8.57*	0.39
Chronic lymphocytic	0	0.00	1	1.99	2	4.97	0	0.00	3	1.54	1.94	0.21
Acute non-lymphocytic	2	10.41*	23	35.51*	15	27.55*	5	7.61*	45	2.04	22.04*	6.32
Chronic myeloid	1	13.39	0	0.00	1	4.58	1	3.76	3	0.81	3.70	0.32

*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.

Hodgkin Lymphoma

Males

Table 16.1.5: Risk of subsequent primary cancers after Hodgkin lymphoma, males, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	49	1.47*	199	1.72*	193	1.98*	278	2.26*	719	369.65	1.95*	42.65
All excluding same site	49	1.48*	199	1.74*	193	2.00*	278	2.27*	719	366.13	1.96*	43.08
Buccal cavity, pharynx	1	0.80	11	2.55*	11	3.11*	11	2.51*	34	13.48	2.52*	2.51
Lip	1	4.58	3	4.31	3	5.75*	1	1.81	8	1.99	4.02*	0.73
Tongue	0	0.00	3	3.43	4	5.29*	4	3.97*	11	2.88	3.81*	0.99
Salivary gland	0	0.00	2	6.08	1	3.61	4	11.15*	7	1.06	6.61*	0.73
Mouth	0	0.00	1	0.98	1	1.22	0	0.00	2	3.11	0.64	-0.13
Nasopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.64	0.00	-0.08
Tonsil	0	0.00	1	2.13	0	0.00	1	1.65	2	1.62	1.23	0.05
Oropharynx	0	0.00	0	0.00	2	19.84*	0	0.00	2	0.39	5.17	0.20
Hypopharynx	0	0.00	1	2.23	0	0.00	1	2.39	2	1.36	1.47	0.08
Digestive system	4	0.58	22	0.95	28	1.50	61	2.67*	115	71.61	1.61*	5.30
Esophagus	0	0.00	1	0.64	3	2.27	4	2.29	8	5.09	1.57	0.36
Stomach	0	0.00	5	1.88	4	1.92	16	6.62*	25	7.98	3.13*	2.08
Small intestine	0	0.00	0	0.00	0	0.00	2	4.33	2	1.27	1.58	0.09
Colon	2	0.71	8	0.85	12	1.59	19	2.13*	41	28.69	1.43*	1.50
Rectum, rectosigmoid junction	1	0.75	5	1.13	3	0.84	1	0.23	10	13.58	0.74	-0.44
Anus, anal canal	0	0.00	0	0.00	1	4.78	3	9.83*	4	0.80	4.98*	0.39
Liver	0	0.00	1	1.01	1	1.15	7	5.60*	9	3.40	2.65*	0.68
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.50	0.00	-0.06
Bile ducts, other biliary	1	7.33	0	0.00	0	0.00	1	2.00	2	1.48	1.35	0.06
Pancreas	0	0.00	2	0.76	4	1.90	7	2.68*	13	8.16	1.59	0.59
Respiratory system	5	0.76	48	2.17*	50	2.82*	72	3.46*	175	67.25	2.60*	13.15
Nose, nasal cavity, ear	0	0.00	1	4.76	0	0.00	1	4.57	2	0.67	3.01	0.16
Larynx	0	0.00	2	0.99	2	1.23	6	3.13*	10	6.16	1.62	0.47
Lung, bronchus	5	0.85	45	2.27*	46	2.90*	65	3.50*	161	60.11	2.68*	12.32
Male breast	0	0.00	1	4.54	0	0.00	1	3.95	2	0.72	2.76	0.16
Male genital system	10	1.15	25	0.82	20	0.75	25	0.69	80	102.07	0.78*	-2.69
Prostate	10	1.23	21	0.75	19	0.78	23	0.68	73	94.47	0.77*	-2.62
Testis	0	0.00	4	1.78	1	0.49	1	0.49	6	6.87	0.87	-0.11
Urinary system	3	0.95	10	0.93	13	1.46	17	1.51	43	34.06	1.26	1.09
Urinary bladder	1	0.46	6	0.82	10	1.66	8	1.09	25	22.89	1.09	0.26
Kidney parenchyma	2	2.55	3	1.07	2	0.81	7	2.05	14	9.46	1.48	0.55
Renal pelvis, other urinary	0	0.00	1	1.72	1	2.23	2	3.98	4	1.71	2.34	0.28
Ureter	0	0.00	1	5.30	0	0.00	2	12.79*	3	0.55	5.48*	0.30
Bone, joints	0	0.00	1	3.56	0	0.00	1	4.53	2	0.80	2.51	0.15
Soft tissue including heart	2	9.98*	1	1.38	3	4.87	10	13.12*	16	2.30	6.95*	1.67
Kaposi sarcoma	7	17.00*	5	2.76	2	1.01	0	0.00	14	6.54	2.14*	0.91
Melanoma of skin	3	2.59	10	2.23*	6	1.41	11	1.86	30	15.81	1.90*	1.73
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.69	0.00	-0.08
Brain, central nervous system	0	0.00	4	1.97	3	1.74	1	0.49	8	6.37	1.26	0.20
Thyroid	0	0.00	1	1.07	1	1.18	2	1.79	4	3.14	1.27	0.10
Lymphatic, hematopoietic	14	4.61*	50	4.63*	54	5.82*	53	4.57*	171	34.72	4.92*	16.64
Hodgkin lymphoma	0	0.00	0	0.00	0	0.00	0	0.00	0	3.53	0.00	-0.43
Non-Hodgkin lymphoma	14	10.68*	22	4.54*	21	4.75*	39	6.60*	96	16.48	5.82*	9.71
Myeloma	0	0.00	2	1.50	0	0.00	0	0.00	2	4.27	0.47	-0.28
Leukemia	0	0.00	26	7.66*	33	11.95*	14	4.26*	73	10.44	6.99*	7.64
Acute lymphocytic	0	0.00	1	4.15	1	5.49	2	10.91*	4	0.68	5.92*	0.41
Chronic lymphocytic	0	0.00	0	0.00	1	1.05	1	0.86	2	3.64	0.55	-0.20
Acute non-lymphocytic	0	0.00	20	17.79*	28	30.60*	9	8.35*	57	3.45	16.54*	6.54
Chronic myeloid	0	0.00	1	1.94	1	2.32	2	3.85	4	1.61	2.48	0.29

*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 16.1.6: Risk of subsequent primary cancers after Hodgkin lymphoma, both sexes, <20 years of age, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	0	0.00	14	6.37*	22	6.77*	92	9.34*	128	15.70	8.15*	37.59
All excluding same site	0	0.00	14	7.64*	22	7.76*	92	9.84*	128	14.36	8.91*	38.04
Buccal cavity, pharynx	0	0.00	0	0.00	0	0.00	3	15.48*	3	0.30	9.98*	0.90
Lip	0	0.00	0	0.00	0	0.00	0	0.00	0	0.03	0.00	-0.01
Tongue	0	0.00	0	0.00	0	0.00	0	0.00	0	0.06	0.00	-0.02
Salivary gland	0	0.00	0	0.00	0	0.00	3	65.63*	3	0.08	35.81*	0.98
Mouth	0	0.00	0	0.00	0	0.00	0	0.00	0	0.05	0.00	-0.02
Nasopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.04	0.00	-0.01
Tonsil	0	0.00	0	0.00	0	0.00	0	0.00	0	0.02	0.00	-0.01
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	1	8.96	11	16.76*	12	0.84	14.34*	3.74
Esophagus	0	0.00	0	0.00	0	0.00	1	48.56	1	0.02	42.89	0.33
Stomach	0	0.00	0	0.00	0	0.00	4	56.94*	4	0.09	44.94*	1.31
Small intestine	0	0.00	0	0.00	0	0.00	0	0.00	0	0.03	0.00	-0.01
Colon	0	0.00	0	0.00	0	0.00	0	0.00	0	0.31	0.00	-0.10
Rectum, rectosigmoid junction	0	0.00	0	0.00	0	0.00	1	7.27	1	0.17	5.98	0.28
Anus, anal canal	0	0.00	0	0.00	0	0.00	1	31.64	1	0.03	28.80	0.32
Liver	0	0.00	0	0.00	0	0.00	1	28.30	1	0.06	17.28	0.32
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	0.02	0.00	-0.01
Pancreas	0	0.00	0	0.00	1	144.42*	2	39.21*	3	0.06	47.52*	0.98
Respiratory system	0	0.00	0	0.00	0	0.00	3	10.11*	3	0.39	7.74*	0.87
Nose, nasal cavity, ear	0	0.00	0	0.00	0	0.00	0	0.00	0	0.03	0.00	-0.01
Larynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.03	0.00	-0.01
Lung, bronchus	0	0.00	0	0.00	0	0.00	3	12.97*	3	0.28	10.90*	0.91
Female breast	0	0.00	0	0.00	3	21.10*	39	23.49*	42	1.83	22.94*	27.61
Female genital system	0	0.00	1	5.99	1	3.00	2	1.75	4	1.67	2.39	1.60
Cervix uteri	0	0.00	0	0.00	0	0.00	1	1.76	1	0.80	1.26	0.14
Corpus uteri	0	0.00	0	0.00	0	0.00	1	6.29	1	0.18	5.55	0.56
Ovary	0	0.00	0	0.00	0	0.00	0	0.00	0	0.58	0.00	-0.40
Vagina	0	0.00	0	0.00	0	0.00	0	0.00	0	0.01	0.00	-0.01
Vulva	0	0.00	0	0.00	1	132.36*	0	0.00	1	0.05	21.66	0.66
Male genital system	0	0.00	1	4.45	0	0.00	0	0.00	1	1.38	0.72	-0.25
Prostate	0	0.00	0	0.00	0	0.00	0	0.00	0	0.03	0.00	-0.02
Testis	0	0.00	1	4.53	0	0.00	0	0.00	1	1.34	0.75	-0.22
Urinary system	0	0.00	0	0.00	0	0.00	0	0.00	0	0.38	0.00	-0.13
Urinary bladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.19	0.00	-0.06
Kidney parenchyma	0	0.00	0	0.00	0	0.00	0	0.00	0	0.18	0.00	-0.06
Renal pelvis, other urinary	0	0.00	0	0.00	0	0.00	0	0.00	0	0.01	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	3	30.44*	0	0.00	2	26.00*	5	0.28	18.14*	1.58
Soft tissue including heart	0	0.00	1	11.89	3	33.37*	4	25.61*	8	0.35	22.92*	2.56
Kaposi sarcoma	0	0.00	0	0.00	0	0.00	0	0.00	0	0.68	0.00	-0.23
Melanoma of skin	0	0.00	0	0.00	3	7.07*	3	2.41	6	1.93	3.11*	1.36
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.04	0.00	-0.01
Brain, central nervous system	0	0.00	0	0.00	2	9.57*	0	0.00	2	0.84	2.39	0.39
Thyroid	0	0.00	1	4.53	1	2.88	12	15.00*	14	1.40	10.00*	4.22
Lymphatic, hematopoietic	0	0.00	7	9.78*	7	8.69*	9	5.99*	23	3.18	7.24*	6.64
Hodgkin lymphoma	0	0.00	0	0.00	0	0.00	0	0.00	0	1.35	0.00	-0.45
Non-Hodgkin lymphoma	0	0.00	2	13.52*	2	9.51*	6	8.86*	10	1.07	9.39*	2.99
Myeloma	0	0.00	0	0.00	0	0.00	0	0.00	0	0.03	0.00	-0.01
Leukemia	0	0.00	5	25.08*	5	27.98*	3	9.94*	13	0.73	17.78*	4.11
Acute lymphocytic	0	0.00	1	10.56	0	0.00	0	0.00	1	0.25	4.04	0.25
Chronic lymphocytic	0	0.00	0	0.00	0	0.00	0	0.00	0	0.02	0.00	-0.01
Acute non-lymphocytic	0	0.00	4	51.64*	5	62.54*	3	22.83*	12	0.31	39.22*	3.91
Chronic myeloid	0	0.00	0	0.00	0	0.00	0	0.00	0	0.12	0.00	-0.04

*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 14,548 PYR and for male cancers on 15,324 PYR.

Hodgkin Lymphoma

Both Sexes, 20-39 Years of Age

Table 16.1.7: Risk of subsequent primary cancers after Hodgkin lymphoma, both sexes, 20-39 years of age, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
Number starting interval	8,620		8,065		5,834		3,783		8,620			
Person-years in interval	6,958		27,369		23,804		25,775		83,906			
All subsequent cancers	16	3.23*	66	2.72*	78	2.46*	276	3.80*	436	133.60	3.26*	36.04
All excluding same site	16	3.46*	65	2.82*	78	2.54*	276	3.84*	435	130.28	3.34*	36.32
Buccal cavity, pharynx	1	9.33	3	5.34*	5	5.88*	14	5.95*	23	3.87	5.94*	2.28
Lip	1	61.83	1	12.37	1	9.52	0	0.00	3	0.41	7.29*	0.31
Tongue	0	0.00	0	0.00	0	0.00	6	10.06*	6	0.95	6.33*	0.60
Salivary gland	0	0.00	2	16.45*	3	22.20*	6	24.51*	11	0.53	20.83*	1.25
Mouth	0	0.00	0	0.00	1	5.81	0	0.00	1	0.81	1.24	0.02
Nasopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.26	0.00	-0.03
Tonsil	0	0.00	0	0.00	0	0.00	1	2.62	1	0.55	1.83	0.05
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.08	0.00	-0.01
Hypopharynx	0	0.00	0	0.00	0	0.00	1	6.27	1	0.21	4.78	0.09
Digestive system	1	3.14	2	1.13	5	1.74	29	3.12*	37	14.26	2.59*	2.71
Esophagus	0	0.00	0	0.00	0	0.00	1	1.69	1	0.80	1.25	0.02
Stomach	0	0.00	0	0.00	3	9.48*	11	12.71*	14	1.43	9.80*	1.50
Small intestine	0	0.00	0	0.00	0	0.00	1	3.63	1	0.45	2.20	0.07
Colon	1	7.95	1	1.46	1	0.94	7	2.10	10	5.20	1.92	0.57
Rectum, rectosigmoid junction	0	0.00	1	3.01	0	0.00	0	0.00	1	2.89	0.35	-0.22
Anus, anal canal	0	0.00	0	0.00	1	9.18	2	7.03	3	0.47	6.38*	0.30
Liver	0	0.00	0	0.00	0	0.00	2	3.72	2	0.79	2.53	0.14
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.11	0.00	-0.01
Bile ducts, other biliary	0	0.00	0	0.00	0	0.00	1	5.05	1	0.30	3.32	0.08
Pancreas	0	0.00	0	0.00	0	0.00	3	2.91	3	1.49	2.01	0.18
Respiratory system	0	0.00	0	0.00	11	5.77*	40	5.36*	51	10.54	4.84*	4.82
Nose, nasal cavity, ear	0	0.00	0	0.00	0	0.00	1	7.71	1	0.24	4.10	0.09
Larynx	0	0.00	0	0.00	1	5.11	1	1.37	2	1.04	1.92	0.11
Lung, bronchus	0	0.00	0	0.00	8	4.97*	38	5.80*	46	9.09	5.06*	4.40
Female breast	0	0.00	4	1.00	7	1.05	79	4.86*	90	27.59	3.26*	16.00
Female genital system	0	0.00	4	1.53	5	1.53	24	3.91*	33	12.56	2.63*	5.24
Cervix uteri	0	0.00	2	1.50	1	0.69	5	2.92	8	4.78	1.68	0.83
Corpus uteri	0	0.00	0	0.00	2	3.03	11	5.21*	13	3.22	4.04*	2.51
Ovary	0	0.00	2	2.66	2	2.06	7	3.59*	11	3.83	2.88*	1.84
Vagina	0	0.00	0	0.00	0	0.00	1	18.68	1	0.11	9.32	0.23
Vulva	0	0.00	0	0.00	0	0.00	0	0.00	0	0.39	0.00	-0.10
Male genital system	0	0.00	2	1.11	2	1.10	7	1.06	11	10.68	1.03	0.07
Prostate	0	0.00	0	0.00	1	3.29	6	1.14	7	5.66	1.24	0.30
Testis	0	0.00	2	1.16	1	0.67	1	0.80	4	4.90	0.82	-0.20
Urinary system	0	0.00	2	2.47	1	0.76	8	1.92	11	6.43	1.71	0.54
Urinary bladder	0	0.00	0	0.00	0	0.00	4	1.85	4	3.33	1.20	0.08
Kidney parenchyma	0	0.00	2	5.62	1	1.67	3	1.61	6	2.88	2.08	0.37
Renal pelvis, other urinary	0	0.00	0	0.00	0	0.00	1	7.10	1	0.22	4.49	0.09
Ureter	0	0.00	0	0.00	0	0.00	1	32.05	1	0.05	21.77	0.11
Bone, joints	0	0.00	0	0.00	0	0.00	2	10.69*	2	0.56	3.55	0.17
Soft tissue including heart	0	0.00	1	2.63	5	12.96*	11	18.79*	17	1.44	11.79*	1.85
Kaposi sarcoma	5	17.67*	3	2.14	2	1.22	1	0.59	11	5.03	2.19*	0.71
Melanoma of skin	0	0.00	5	1.72	4	1.17	6	1.08	15	12.52	1.20	0.30
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.33	0.00	-0.04
Brain, central nervous system	0	0.00	1	1.04	1	0.99	0	0.00	2	3.75	0.53	-0.21
Thyroid	1	2.56	3	1.75	3	1.71	10	4.29*	17	6.19	2.75*	1.29
Lymphatic, hematopoietic	8	9.40*	34	9.22*	27	6.82*	37	5.36*	106	15.40	6.88*	10.80
Hodgkin lymphoma	0	0.00	1	0.81	0	0.00	0	0.00	1	3.31	0.30	-0.28
Non-Hodgkin lymphoma	7	21.64*	15	9.50*	7	3.50*	26	6.78*	55	7.74	7.11*	5.63
Myeloma	0	0.00	0	0.00	0	0.00	2	3.35	2	0.86	2.32	0.14
Leukemia	1	5.47	18	22.74*	20	23.18*	9	5.46*	48	3.49	13.77*	5.31
Acute lymphocytic	0	0.00	0	0.00	0	0.00	3	21.30*	3	0.43	6.99*	0.31
Chronic lymphocytic	0	0.00	0	0.00	0	0.00	0	0.00	0	0.58	0.00	-0.07
Acute non-lymphocytic	1	11.99	16	45.35*	18	49.90*	6	10.08*	41	1.39	29.45*	4.72
Chronic myeloid	0	0.00	0	0.00	1	4.97	0	0.00	1	0.74	1.34	0.03

*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 39,010 PYR and for male cancers on 44,896 PYR.

Hodgkin Lymphoma Both Sexes, 40-59 Years of Age

Table 16.1.8: Risk of subsequent primary cancers after Hodgkin lymphoma, both sexes, 40-59 years of age, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	20	1.62	131	2.41*	143	2.39*	186	2.08*	480	216.25	2.22*	106.15
All excluding same site	20	1.63	131	2.42*	143	2.40*	186	2.08*	480	215.46	2.23*	106.47
Buccal cavity, pharynx	0	0.00	6	2.58	11	4.89*	4	1.63	21	7.60	2.76*	5.39
Lip	0	0.00	1	4.04	2	8.47	1	3.58	4	0.82	4.85*	1.28
Tongue	0	0.00	2	3.94	4	8.03*	1	1.84	7	1.67	4.20*	2.15
Salivary gland	0	0.00	0	0.00	1	6.63	1	5.04	2	0.54	3.68	0.59
Mouth	0	0.00	1	1.62	2	3.43	1	1.62	4	1.97	2.03	0.82
Nasopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.34	0.00	-0.14
Tonsil	0	0.00	1	3.29	0	0.00	0	0.00	1	0.94	1.06	0.02
Oropharynx	0	0.00	0	0.00	2	28.13*	0	0.00	2	0.24	8.39	0.71
Hypopharynx	0	0.00	1	4.21	0	0.00	0	0.00	1	0.81	1.24	0.08
Digestive system	1	0.46	13	1.33	22	2.01*	41	2.48*	77	39.39	1.95*	15.13
Esophagus	0	0.00	1	1.40	3	3.78	3	2.70	7	2.77	2.52*	1.70
Stomach	0	0.00	3	2.99	1	0.94	6	3.91*	10	3.84	2.61*	2.48
Small intestine	0	0.00	3	15.20*	0	0.00	1	3.35	4	0.75	5.34*	1.31
Colon	1	1.24	4	1.08	10	2.31*	18	2.60*	33	15.78	2.09*	6.93
Rectum, rectosigmoid junction	0	0.00	2	1.00	3	1.35	1	0.33	6	7.69	0.78	-0.68
Anus, anal canal	0	0.00	0	0.00	1	6.47	2	10.26*	3	0.55	5.48*	0.99
Liver	0	0.00	0	0.00	1	2.07	4	5.53*	5	1.73	2.90	1.32
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.37	0.00	-0.15
Bile ducts, other biliary	0	0.00	0	0.00	0	0.00	0	0.00	0	0.77	0.00	-0.31
Pancreas	0	0.00	0	0.00	3	2.31	5	2.50	8	4.72	1.69	1.32
Respiratory system	3	1.35	38	3.75*	40	3.50*	49	2.98*	130	40.23	3.23*	36.13
Nose, nasal cavity, ear	0	0.00	1	9.36	0	0.00	0	0.00	1	0.36	2.76	0.26
Larynx	0	0.00	1	0.99	1	0.96	4	3.30	6	3.50	1.72	1.01
Lung, bronchus	3	1.53	36	4.00*	39	3.81*	45	2.99*	123	36.27	3.39*	34.91
Female breast	2	1.05	4	0.53	11	1.60	14	1.67	31	24.67	1.26	7.18
Female genital system	0	0.00	3	0.94	7	2.43	8	2.31	18	10.37	1.74*	8.65
Cervix uteri	0	0.00	1	1.86	1	2.61	0	0.00	2	1.40	1.43	0.68
Corpus uteri	0	0.00	2	1.29	5	3.40*	7	3.75*	14	5.27	2.66*	9.89
Ovary	0	0.00	0	0.00	1	1.16	1	0.96	2	3.09	0.65	-1.24
Vagina	0	0.00	0	0.00	0	0.00	0	0.00	0	0.11	0.00	-0.12
Vulva	0	0.00	0	0.00	0	0.00	0	0.00	0	0.31	0.00	-0.35
Male genital system	0	0.00	9	1.33	6	0.57	11	0.50*	26	40.59	0.64*	-9.10
Prostate	0	0.00	9	1.40	6	0.58	10	0.46*	25	39.73	0.63*	-9.20
Testis	0	0.00	0	0.00	0	0.00	0	0.00	0	0.56	0.00	-0.35
Urinary system	2	2.20	6	1.46	7	1.50	12	1.72	27	16.68	1.62*	4.15
Urinary bladder	0	0.00	4	1.64	5	1.73	6	1.32	15	10.42	1.44	1.84
Kidney parenchyma	2	5.91	1	0.68	2	1.29	4	1.93	9	5.44	1.66	1.43
Renal pelvis, other urinary	0	0.00	1	5.07	0	0.00	2	5.59	3	0.82	3.65	0.88
Ureter	0	0.00	1	18.44	0	0.00	2	17.36*	3	0.25	12.07*	1.11
Bone, joints	0	0.00	0	0.00	0	0.00	1	12.96	1	0.25	4.00	0.30
Soft tissue including heart	1	12.82	0	0.00	1	3.65	2	5.91	4	0.99	4.03*	1.21
Kaposi sarcoma	2	18.17*	2	5.77	0	0.00	0	0.00	4	0.75	5.32*	1.31
Melanoma of skin	2	3.37	7	2.97*	3	1.39	5	1.99	17	7.63	2.23*	3.77
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.38	0.00	-0.15
Brain, central nervous system	0	0.00	2	2.18	1	1.18	1	1.03	4	2.97	1.35	0.41
Thyroid	0	0.00	0	0.00	0	0.00	1	1.86	1	2.02	0.50	-0.41
Lymphatic, hematopoietic	7	6.78*	35	8.09*	31	7.00*	28	4.49*	101	16.02	6.30*	34.20
Hodgkin lymphoma	0	0.00	0	0.00	0	0.00	0	0.00	0	0.79	0.00	-0.32
Non-Hodgkin lymphoma	6	11.46*	15	6.89*	12	5.47*	21	6.94*	54	7.92	6.82*	18.54
Myeloma	1	7.57	2	3.35	1	1.48	1	0.94	5	2.47	2.03	1.02
Leukemia	0	0.00	18	14.26*	18	13.44*	6	3.08*	42	4.84	8.67*	14.95
Acute lymphocytic	0	0.00	1	16.73	2	35.92*	0	0.00	3	0.19	15.59*	1.13
Chronic lymphocytic	0	0.00	0	0.00	1	1.81	1	1.24	2	1.94	1.03	0.02
Acute non-lymphocytic	0	0.00	14	34.91*	14	33.37*	3	4.59	31	1.57	19.75*	11.84
Chronic myeloid	0	0.00	1	5.30	0	0.00	2	7.70	3	0.68	4.40	0.93

*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 8,826 PYR and for male cancers on 16,021 PYR.

Hodgkin Lymphoma

Both Sexes, ≥60 Years of Age

Table 16.1.9: Risk of subsequent primary cancers after Hodgkin lymphoma, both sexes, ≥60 years of age, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	Number starting interval	Person-years in interval	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
	2,829	1,884										
			1,953	5,118	876	2,824	332	1,397		2,829	11,222	
All subsequent cancers	40	1.09	114	1.08	95	1.45*	44	1.24	293	243.39	1.20*	44.21
All excluding same site	40	1.10	114	1.08	95	1.45*	44	1.25	293	242.91	1.21*	44.64
Buccal cavity, pharynx	0	0.00	6	2.28	3	2.11	0	0.00	9	5.67	1.59	2.96
Lip	0	0.00	1	2.27	1	4.18	0	0.00	2	0.96	2.09	0.93
Tongue	0	0.00	1	1.96	0	0.00	0	0.00	1	1.10	0.91	-0.09
Salivary gland	0	0.00	1	4.42	1	7.21	0	0.00	2	0.52	3.82	1.32
Mouth	0	0.00	2	2.87	0	0.00	0	0.00	2	1.51	1.32	0.43
Nasopharynx	0	0.00	0	0.00	1	21.15	0	0.00	1	0.19	5.29	0.72
Tonsil	0	0.00	0	0.00	0	0.00	0	0.00	0	0.47	0.00	-0.42
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.15	0.00	-0.14
Hypopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.56	0.00	-0.50
Digestive system	8	0.94	19	0.78	12	0.79	11	1.26	50	56.70	0.88	-5.97
Esophagus	0	0.00	0	0.00	0	0.00	0	0.00	0	2.58	0.00	-2.30
Stomach	2	2.29	3	1.24	0	0.00	1	1.19	6	5.61	1.07	0.35
Small intestine	0	0.00	0	0.00	0	0.00	0	0.00	0	0.74	0.00	-0.66
Colon	3	0.77	8	0.71	9	1.25	8	1.86	28	26.60	1.05	1.24
Rectum, rectosigmoid junction	1	0.66	4	0.95	1	0.40	0	0.00	6	9.47	0.63	-3.09
Anus, anal canal	0	0.00	0	0.00	0	0.00	0	0.00	0	0.47	0.00	-0.42
Liver	0	0.00	1	1.33	1	2.13	0	0.00	2	1.74	1.15	0.23
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.83	0.00	-0.74
Bile ducts, other biliary	1	5.73	0	0.00	0	0.00	1	4.54	2	1.24	1.61	0.68
Pancreas	1	0.97	3	1.03	1	0.54	1	0.92	6	6.88	0.87	-0.78
Respiratory system	7	1.09	24	1.29	25	2.26*	11	2.01	67	41.59	1.61*	22.65
Nose, nasal cavity, ear	0	0.00	0	0.00	0	0.00	0	0.00	0	0.34	0.00	-0.30
Larynx	0	0.00	2	1.68	0	0.00	2	7.68	4	2.51	1.59	1.33
Lung, bronchus	7	1.18	20	1.16	25	2.43*	9	1.74	61	38.64	1.58*	19.93
Female breast	3	0.85	8	0.80	12	1.88	4	1.10	27	23.52	1.15	6.27
Female genital system	0	0.00	7	1.53	1	0.36	0	0.00	8	10.48	0.76	-4.47
Cervix uteri	0	0.00	0	0.00	0	0.00	0	0.00	0	0.97	0.00	-1.75
Corpus uteri	0	0.00	3	1.25	1	0.72	0	0.00	4	5.37	0.75	-2.47
Ovary	0	0.00	4	3.01	0	0.00	0	0.00	4	3.11	1.28	1.60
Vagina	0	0.00	0	0.00	0	0.00	0	0.00	0	0.19	0.00	-0.33
Vulva	0	0.00	0	0.00	0	0.00	0	0.00	0	0.58	0.00	-1.05
Male genital system	10	1.41	13	0.60	12	0.87	7	1.02	42	49.42	0.85	-13.08
Prostate	10	1.42	12	0.56*	12	0.88	7	1.03	41	49.04	0.84	-14.18
Testis	0	0.00	1	27.77	0	0.00	0	0.00	1	0.07	13.99	1.64
Urinary system	1	0.34	6	0.70	8	1.51	2	0.69	17	19.74	0.86	-2.45
Urinary bladder	1	0.48	4	0.66	7	1.87	2	0.95	14	13.97	1.00	0.03
Kidney parenchyma	0	0.00	1	0.51	0	0.00	0	0.00	1	4.48	0.22	-3.10
Renal pelvis, other urinary	0	0.00	1	1.77	1	2.90	0	0.00	2	1.30	1.54	0.63
Ureter	0	0.00	1	5.18	0	0.00	0	0.00	1	0.44	2.28	0.50
Bone, joints	0	0.00	0	0.00	0	0.00	0	0.00	0	0.19	0.00	-0.17
Soft tissue including heart	1	7.60	1	2.64	0	0.00	0	0.00	2	0.89	2.25	0.99
Kaposi sarcoma	0	0.00	1	13.87	0	0.00	0	0.00	1	0.17	5.89	0.74
Melanoma of skin	1	1.49	1	0.50	2	1.60	1	1.42	5	4.63	1.08	0.33
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.33	0.00	-0.30
Brain, central nervous system	0	0.00	3	2.96	0	0.00	0	0.00	3	2.25	1.33	0.67
Thyroid	0	0.00	0	0.00	0	0.00	0	0.00	0	0.94	0.00	-0.84
Lymphatic, hematopoietic	9	3.34*	21	2.69*	17	3.43*	5	1.74	52	18.34	2.84*	30.00
Hodgkin lymphoma	0	0.00	0	0.00	0	0.00	0	0.00	0	0.48	0.00	-0.43
Non-Hodgkin lymphoma	6	5.17*	9	2.63*	8	3.62*	2	1.56	25	8.08	3.09*	15.08
Myeloma	0	0.00	1	0.73	0	0.00	0	0.00	1	3.23	0.31	-1.99
Leukemia	3	3.06	11	3.93*	9	5.13*	3	2.95	26	6.55	3.97*	17.33
Acute lymphocytic	0	0.00	0	0.00	0	0.00	0	0.00	0	0.16	0.00	-0.14
Chronic lymphocytic	0	0.00	1	0.88	2	2.83	0	0.00	3	2.65	1.13	0.32
Acute non-lymphocytic	1	3.07	9	9.57*	6	10.01*	2	5.65	18	2.22	8.11*	14.06
Chronic myeloid	1	7.76	0	0.00	1	4.28	1	7.08	3	0.87	3.44	1.90

*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 5,549 PYR and for male cancers on 5,672 PYR.

Table 16.1.10: Risk of subsequent primary cancers after Hodgkin lymphoma, both sexes, with initial radiotherapy, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	Number starting interval	Person-years in interval	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
	9,201	7,390	8,561	29,180	6,269	26,048	4,227	30,391	9,201	93,009		
All subsequent cancers	25	1.13	140	1.65*	190	2.37*	419	3.45*	774	308.38	2.51*	50.06
All excluding same site	25	1.15	139	1.66*	190	2.41*	419	3.48*	773	304.71	2.54*	50.35
Buccal cavity, pharynx	1	1.51	6	2.39	15	6.59*	15	4.49*	37	8.79	4.21*	3.03
Lip	1	10.11	0	0.00	2	6.89	0	0.00	3	1.09	2.74	0.20
Tongue	0	0.00	1	1.93	4	8.08*	4	5.07*	9	1.93	4.65*	0.76
Salivary gland	0	0.00	2	7.97	4	17.00*	10	28.79*	16	0.90	17.82*	1.62
Mouth	0	0.00	2	3.13	2	3.54	0	0.00	4	2.16	1.85	0.20
Nasopharynx	0	0.00	0	0.00	1	8.74	0	0.00	1	0.44	2.28	0.06
Tonsil	0	0.00	0	0.00	0	0.00	1	2.28	1	1.01	0.99	0.00
Oropharynx	0	0.00	0	0.00	2	33.58*	0	0.00	2	0.23	8.62	0.19
Hypopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.75	0.00	-0.08
Digestive system	1	0.23	14	0.90	18	1.33	58	3.02*	91	52.61	1.73*	4.13
Esophagus	0	0.00	1	1.25	1	1.38	4	3.56	6	2.86	2.09	0.34
Stomach	0	0.00	3	1.90	3	2.27	17	9.62*	23	5.12	4.50*	1.92
Small intestine	0	0.00	2	7.81	0	0.00	0	0.00	2	0.99	2.02	0.11
Colon	1	0.53	5	0.74	9	1.53	20	2.52*	35	22.44	1.56*	1.35
Rectum, rectosigmoid junction	0	0.00	3	1.05	2	0.80	2	0.56	7	9.75	0.72	-0.30
Anus, anal canal	0	0.00	0	0.00	0	0.00	3	8.32*	3	0.81	3.71	0.24
Liver	0	0.00	0	0.00	2	3.91	3	3.44	5	2.07	2.42	0.32
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.62	0.00	-0.07
Bile ducts, other biliary	0	0.00	0	0.00	0	0.00	1	2.35	1	1.10	0.91	-0.01
Pancreas	0	0.00	0	0.00	1	0.63	6	2.66	7	6.17	1.13	0.09
Respiratory system	5	1.46	19	1.49	46	4.05*	73	4.49*	143	43.83	3.26*	10.66
Nose, nasal cavity, ear	0	0.00	0	0.00	0	0.00	1	5.26	1	0.50	2.01	0.05
Larynx	0	0.00	0	0.00	0	0.00	3	2.41	3	3.40	0.88	-0.04
Lung, bronchus	5	1.62	17	1.47	45	4.37*	69	4.67*	136	39.70	3.43*	10.35
Female breast	3	1.11	10	0.93	17	1.50	110	5.42*	140	45.13	3.10*	21.09
Female genital system	0	0.00	7	1.29	10	1.87	25	3.01*	42	20.49	2.05*	4.78
Cervix uteri	0	0.00	2	1.44	1	0.69	5	2.52	8	5.15	1.55	0.63
Corpus uteri	0	0.00	2	0.96	5	2.62	14	4.42*	21	7.72	2.72*	2.95
Ovary	0	0.00	3	1.87	3	1.86	5	1.92	11	6.23	1.77	1.06
Vagina	0	0.00	0	0.00	0	0.00	1	11.79	1	0.23	4.41	0.17
Vulva	0	0.00	0	0.00	1	5.30	0	0.00	1	0.73	1.37	0.06
Male genital system	5	1.55	15	1.20	5	0.43*	13	0.70	38	45.97	0.83	-1.66
Prostate	5	1.73	12	1.08	5	0.48	12	0.71	34	41.42	0.82	-1.54
Testis	0	0.00	3	2.38	0	0.00	1	0.71	4	4.20	0.95	-0.04
Urinary system	0	0.00	5	0.85	7	1.31	16	2.01*	28	20.73	1.35	0.78
Urinary bladder	0	0.00	3	0.78	4	1.18	7	1.45	14	13.12	1.07	0.09
Kidney parenchyma	0	0.00	1	0.59	2	1.21	6	2.18	9	6.52	1.38	0.27
Renal pelvis, other urinary	0	0.00	1	2.93	1	3.51	3	8.20*	5	1.09	4.59*	0.42
Ureter	0	0.00	1	9.38	0	0.00	3	27.79*	4	0.33	12.04*	0.39
Bone, joints	0	0.00	2	8.18	0	0.00	3	12.35*	5	0.76	6.61*	0.46
Soft tissue including heart	1	6.79	1	1.72	8	14.68*	13	16.93*	23	2.04	11.28*	2.25
Kaposi sarcoma	0	0.00	2	2.07	1	0.82	1	0.61	4	4.00	1.00	0.00
Melanoma of skin	0	0.00	7	1.80	8	1.92	11	1.67	26	15.55	1.67*	1.12
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.58	0.00	-0.06
Brain, central nervous system	0	0.00	4	2.56	2	1.35	1	0.49	7	5.47	1.28	0.16
Thyroid	0	0.00	2	1.13	2	1.09	18	6.73*	22	6.68	3.29*	1.65
Lymphatic, hematopoietic	9	4.43*	39	4.97*	46	6.26*	47	4.50*	141	27.68	5.09*	12.18
Hodgkin lymphoma	0	0.00	1	0.82	0	0.00	0	0.00	1	3.67	0.27	-0.29
Non-Hodgkin lymphoma	7	8.23*	18	5.29*	17	4.98*	36	6.73*	78	13.02	5.99*	6.99
Myeloma	0	0.00	2	2.28	1	1.27	2	1.67	5	3.10	1.61	0.20
Leukemia	2	3.16	18	7.67*	28	13.46*	9	3.18*	57	7.89	7.22*	5.28
Acute lymphocytic	0	0.00	0	0.00	1	6.07	2	10.65*	3	0.61	4.94	0.26
Chronic lymphocytic	0	0.00	0	0.00	2	3.16	0	0.00	2	2.45	0.82	-0.05
Acute non-lymphocytic	1	4.46	15	17.85*	21	27.98*	7	6.92*	44	2.83	15.57*	4.43
Chronic myeloid	1	10.44	1	2.74	2	5.90	0	0.00	4	1.27	3.16	0.29

*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 44,979 PYR and for male cancers on 48,029 PYR.

Hodgkin Lymphoma Both Sexes, No Radiotherapy

Table 16.1.11: Risk of subsequent primary cancers after Hodgkin lymphoma, both sexes, without initial radiotherapy, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	Number starting interval	Person-years in interval	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
	8,315	6,249	6,933	21,383	4,185	15,644	2,269	13,562	8,315	56,838		
All subsequent cancers	51	1.58*	185	1.81*	148	1.84*	179	2.08*	563	300.56	1.87*	46.17
All excluding same site	51	1.60*	185	1.83*	148	1.86*	179	2.09*	563	298.30	1.89*	46.57
Buccal cavity, pharynx	0	0.00	9	2.95*	4	1.74	6	2.57	19	8.65	2.20*	1.82
Lip	0	0.00	3	7.12*	2	6.76	1	3.65	6	1.13	5.29*	0.86
Tongue	0	0.00	2	3.17	0	0.00	3	5.70*	5	1.85	2.71	0.55
Salivary gland	0	0.00	1	3.73	1	4.78	0	0.00	2	0.78	2.56	0.21
Mouth	0	0.00	1	1.28	1	1.73	1	1.78	3	2.18	1.38	0.15
Nasopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.39	0.00	-0.07
Tonsil	0	0.00	1	3.10	0	0.00	0	0.00	1	0.96	1.04	0.01
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.24	0.00	-0.04
Hypopharynx	0	0.00	1	3.34	0	0.00	1	4.61	2	0.83	2.40	0.21
Digestive system	9	1.34	20	0.98	22	1.42	34	2.13*	85	58.59	1.45*	4.65
Esophagus	0	0.00	0	0.00	2	2.26	1	1.04	3	3.31	0.91	-0.05
Stomach	2	2.87	3	1.46	1	0.65	5	3.24*	11	5.85	1.88	0.91
Small intestine	0	0.00	1	3.10	0	0.00	2	6.58	3	0.99	3.03	0.35
Colon	4	1.35	8	0.90	11	1.63	13	1.90*	36	25.45	1.41	1.86
Rectum, rectosigmoid junction	1	0.82	4	1.08	2	0.72	0	0.00	7	10.46	0.67	-0.61
Anus, anal canal	0	0.00	0	0.00	2	10.44*	2	9.19*	4	0.72	5.59*	0.58
Liver	0	0.00	1	1.36	0	0.00	4	5.86*	5	2.25	2.22	0.48
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.70	0.00	-0.12
Bile ducts, other biliary	1	7.40	0	0.00	0	0.00	1	2.80	2	1.23	1.62	0.13
Pancreas	1	1.24	3	1.24	4	2.17	5	2.61	13	6.98	1.86	1.06
Respiratory system	5	0.92	43	2.52*	30	2.30*	30	2.24*	108	48.91	2.21*	10.40
Nose, nasal cavity, ear	0	0.00	1	6.07	0	0.00	0	0.00	1	0.48	2.10	0.09
Larynx	0	0.00	3	2.30	2	2.04	4	4.06*	9	3.68	2.44*	0.94
Lung, bronchus	5	1.01	39	2.52*	27	2.27*	26	2.12*	97	44.57	2.18*	9.22
Female breast	2	0.59	6	0.56	16	1.84*	26	2.70*	50	32.48	1.54*	7.63
Female genital system	0	0.00	8	1.56	4	1.03	9	2.30*	21	14.59	1.44	2.79
Cervix uteri	0	0.00	1	1.03	1	1.26	1	1.35	3	2.79	1.08	0.09
Corpus uteri	0	0.00	3	1.33	3	1.84	5	3.03	11	6.31	1.74	2.04
Ovary	0	0.00	3	1.99	0	0.00	3	2.46	6	4.39	1.37	0.70
Vagina	0	0.00	0	0.00	0	0.00	0	0.00	0	0.19	0.00	-0.08
Vulva	0	0.00	0	0.00	0	0.00	0	0.00	0	0.60	0.00	-0.26
Male genital system	5	0.91	10	0.56	15	1.01	12	0.68	42	56.10	0.75	-4.16
Prostate	5	0.96	9	0.53	14	1.00	11	0.65	39	53.05	0.74	-4.15
Testis	0	0.00	1	1.02	1	1.29	0	0.00	2	2.66	0.75	-0.20
Urinary system	3	1.22	9	1.17	9	1.50	6	0.94	27	22.51	1.20	0.79
Urinary bladder	1	0.61	5	0.98	8	2.04	5	1.21	19	14.79	1.28	0.74
Kidney parenchyma	2	3.07	3	1.41	1	0.58	1	0.51	7	6.46	1.08	0.09
Renal pelvis, other urinary	0	0.00	1	2.21	0	0.00	0	0.00	1	1.26	0.79	-0.05
Ureter	0	0.00	1	6.87	0	0.00	0	0.00	1	0.40	2.49	0.11
Bone, joints	0	0.00	1	5.08	0	0.00	2	16.44*	3	0.52	5.79*	0.44
Soft tissue including heart	1	5.84	2	3.53	1	2.26	4	8.85*	8	1.63	4.90*	1.12
Kaposi sarcoma	7	31.37*	4	4.57*	1	1.27	0	0.00	12	2.63	4.57*	1.65
Melanoma of skin	3	2.98	6	1.66	4	1.29	4	1.16	17	11.16	1.52	1.03
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.50	0.00	-0.09
Brain, central nervous system	0	0.00	2	1.31	2	1.70	0	0.00	4	4.34	0.92	-0.06
Thyroid	1	2.79	2	1.53	2	1.83	5	4.48*	10	3.87	2.58*	1.08
Lymphatic, hematopoietic	15	5.55*	58	6.68*	36	5.29*	32	4.53*	141	25.25	5.58*	20.36
Hodgkin lymphoma	0	0.00	0	0.00	0	0.00	0	0.00	0	2.26	0.00	-0.40
Non-Hodgkin lymphoma	12	10.11*	23	5.87*	12	3.75*	19	5.46*	66	11.79	5.60*	9.54
Myeloma	1	2.63	1	0.85	0	0.00	1	1.00	3	3.49	0.86	-0.09
Leukemia	2	2.29	34	12.57*	24	11.69*	12	5.75*	72	7.72	9.33*	11.31
Acute lymphocytic	0	0.00	2	12.52*	1	8.96	1	10.20	4	0.42	9.54*	0.63
Chronic lymphocytic	0	0.00	1	1.05	1	1.38	1	1.35	3	2.74	1.10	0.05
Acute non-lymphocytic	1	3.36	28	30.06*	22	31.03*	7	9.69*	58	2.66	21.80*	9.74
Chronic myeloid	0	0.00	0	0.00	0	0.00	3	9.44*	3	1.16	2.60	0.32

*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 22,953 PYR and for male cancers on 33,884 PYR.

Hodgkin Lymphoma Both Sexes, Long-term Follow-up, Radiotherapy

Table 16.12: Risk of subsequent primary cancers after Hodgkin lymphoma, both sexes, long-term follow-up, with initial radiotherapy, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<10 years		10-14 years		15-19 years		≥20 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	355	1.90*	177	2.96*	155	3.95*	87	3.88*	774	308.38	2.51*	50.06
All excluding same site	354	1.92*	177	2.99*	155	3.98*	87	3.91*	773	304.71	2.54*	50.35
Buccal cavity, pharynx	22	4.04*	4	2.43	8	7.41*	3	4.88	37	8.79	4.21*	3.03
Lip	3	4.06	0	0.00	0	0.00	0	0.00	3	1.09	2.74	0.20
Tongue	5	4.37*	2	5.31	2	7.75	0	0.00	9	1.93	4.65*	0.76
Salivary gland	6	10.90*	2	11.45*	6	53.80*	2	32.66*	16	0.90	17.82*	1.62
Mouth	4	2.91	0	0.00	0	0.00	0	0.00	4	2.16	1.85	0.20
Nasopharynx	1	3.67	0	0.00	0	0.00	0	0.00	1	0.44	2.28	0.06
Tonsil	0	0.00	0	0.00	0	0.00	1	11.04	1	1.01	0.99	0.00
Oropharynx	2	14.10*	0	0.00	0	0.00	0	0.00	2	0.23	8.62	0.19
Hypopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.75	0.00	-0.08
Digestive system	33	0.99	23	2.40*	25	4.08*	10	2.85*	91	52.61	1.73*	4.13
Esophagus	2	1.15	2	3.69	1	2.72	1	4.66	6	2.86	2.09	0.34
Stomach	6	1.79	4	4.44*	8	14.33*	5	16.26*	23	5.12	4.50*	1.92
Small intestine	2	3.50	0	0.00	0	0.00	0	0.00	2	0.99	2.02	0.11
Colon	15	1.03	11	2.72*	7	2.80*	2	1.44	35	22.44	1.56*	1.35
Rectum, rectosigmoid junction	5	0.81	1	0.56	1	0.88	0	0.00	7	9.75	0.72	-0.30
Anus, anal canal	0	0.00	1	6.02	2	16.63*	0	0.00	3	0.81	3.71	0.24
Liver	2	1.68	0	0.00	3	10.43*	0	0.00	5	2.07	2.42	0.32
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.62	0.00	-0.07
Bile ducts, other biliary	0	0.00	0	0.00	1	7.26	0	0.00	1	1.10	0.91	-0.01
Pancreas	1	0.26	3	2.69	2	2.78	1	2.39	7	6.17	1.13	0.09
Respiratory system	70	2.54*	32	3.96*	27	5.20*	14	4.66*	143	43.83	3.26*	10.66
Nose, nasal cavity, ear	0	0.00	0	0.00	0	0.00	1	30.12	1	0.50	2.01	0.05
Larynx	0	0.00	3	4.82	0	0.00	0	0.00	3	3.40	0.88	-0.04
Lung, bronchus	67	2.69*	29	3.96*	27	5.73*	13	4.76*	136	39.70	3.43*	10.35
Female breast	30	1.21	41	4.36*	46	6.87*	23	5.46*	140	45.13	3.10*	21.09
Female genital system	17	1.40	11	2.72*	7	2.61*	7	4.42*	42	20.49	2.05*	4.78
Cervix uteri	3	0.95	2	1.87	1	1.60	2	6.79	8	5.15	1.55	0.63
Corpus uteri	7	1.54	7	4.83*	4	3.88*	3	4.36	21	7.72	2.72*	2.95
Ovary	6	1.65	2	1.59	2	2.37	1	2.00	11	6.23	1.77	1.06
Vagina	0	0.00	0	0.00	0	0.00	1	64.71	1	0.23	4.41	0.17
Vulva	1	2.33	0	0.00	0	0.00	0	0.00	1	0.73	1.37	0.06
Male genital system	25	0.91	5	0.56	5	0.82	3	0.86	38	45.97	0.83	-1.66
Prostate	22	0.90	4	0.50	5	0.89	3	0.91	34	41.42	0.82	-1.54
Testis	3	1.07	1	1.21	0	0.00	0	0.00	4	4.20	0.95	-0.04
Urinary system	12	0.94	6	1.53	4	1.56	6	4.11*	28	20.73	1.35	0.78
Urinary bladder	7	0.84	2	0.82	2	1.30	3	3.52	14	13.12	1.07	0.09
Kidney parenchyma	3	0.80	3	2.31	1	1.10	2	3.66	9	6.52	1.38	0.27
Renal pelvis, other urinary	2	2.77	1	5.28	1	8.73	1	16.10	5	1.09	4.59*	0.42
Ureter	1	4.46	1	17.63	1	29.86	1	56.30	4	0.33	12.04*	0.39
Bone, joints	2	3.89	1	7.62	1	13.33	1	27.30	5	0.76	6.61*	0.46
Soft tissue including heart	10	7.86*	5	12.78*	4	16.25*	4	30.71*	23	2.04	11.28*	2.25
Kaposi sarcoma	3	1.26	1	0.99	0	0.00	0	0.00	4	4.00	1.00	0.00
Melanoma of skin	15	1.67	4	1.22	5	2.34	2	1.72	26	15.55	1.67*	1.12
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.58	0.00	-0.06
Brain, central nervous system	6	1.74	1	0.95	0	0.00	0	0.00	7	5.47	1.28	0.16
Thyroid	4	1.00	8	5.83*	7	8.20*	3	6.69*	22	6.68	3.29*	1.65
Lymphatic, hematopoietic	94	5.46*	28	5.25*	11	3.29*	8	4.51*	141	27.68	5.09*	12.18
Hodgkin lymphoma	1	0.39	0	0.00	0	0.00	0	0.00	1	3.67	0.27	-0.29
Non-Hodgkin lymphoma	42	5.47*	21	7.89*	8	4.58*	7	7.47*	78	13.02	5.99*	6.99
Myeloma	3	1.58	0	0.00	2	5.15	0	0.00	5	3.10	1.61	0.20
Leukemia	48	9.48*	7	4.81*	1	1.11	1	2.09	57	7.89	7.22*	5.28
Acute lymphocytic	1	2.39	1	9.62	0	0.00	1	36.71	3	0.61	4.94	0.26
Chronic lymphocytic	2	1.29	0	0.00	0	0.00	0	0.00	2	2.45	0.82	-0.05
Acute non-lymphocytic	37	20.39*	6	11.50*	1	3.15	0	0.00	44	2.83	15.57*	4.43
Chronic myeloid	4	5.00*	0	0.00	0	0.00	0	0.00	4	1.27	3.16	0.29

*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 44,979 PYR and for male cancers on 48,029 PYR.

Hodgkin Lymphoma

Both Sexes, Long-term Follow-up, No Radiotherapy

Table 16.13: Risk of subsequent primary cancers after Hodgkin lymphoma, both sexes, long-term follow-up, without initial radiotherapy, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<10 years		10-14 years		15-19 years		≥20 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
Number starting interval	8,315		2,269		1,115		459		8,315			
Person-years in interval	43,275		8,202		3,778		1,582		56,838			
All subsequent cancers	384	1.79*	102	2.12*	51	2.01*	26	2.05*	563	300.56	1.87*	46.17
All excluding same site	384	1.81*	102	2.14*	51	2.02*	26	2.06*	563	298.30	1.89*	46.57
Buccal cavity, pharynx	13	2.06*	2	1.52	4	5.96*	0	0.00	19	8.65	2.20*	1.82
Lip	5	5.82*	1	6.23	0	0.00	0	0.00	6	1.13	5.29*	0.86
Tongue	2	1.51	0	0.00	3	19.56*	0	0.00	5	1.85	2.71	0.55
Salivary gland	2	3.57	0	0.00	0	0.00	0	0.00	2	0.78	2.56	0.21
Mouth	2	1.24	0	0.00	1	6.19	0	0.00	3	2.18	1.38	0.15
Nasopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.39	0.00	-0.07
Tonsil	1	1.48	0	0.00	0	0.00	0	0.00	1	0.96	1.04	0.01
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.24	0.00	-0.04
Hypopharynx	1	1.62	1	8.02	0	0.00	0	0.00	2	0.83	2.40	0.21
Digestive system	51	1.20	15	1.66	14	3.04*	5	2.12	85	58.59	1.45*	4.65
Esophagus	2	0.85	0	0.00	1	3.59	0	0.00	3	3.31	0.91	-0.05
Stomach	6	1.39	4	4.58*	1	2.24	0	0.00	11	5.85	1.88	0.91
Small intestine	1	1.46	0	0.00	1	11.04	1	20.95	3	0.99	3.03	0.35
Colon	23	1.24	7	1.79	4	2.04	2	2.02	36	25.45	1.41	1.86
Rectum, rectosigmoid junction	7	0.91	0	0.00	0	0.00	0	0.00	7	10.46	0.67	-0.61
Anus, anal canal	2	4.02	0	0.00	1	15.35	1	29.50	4	0.72	5.59*	0.58
Liver	1	0.64	3	8.13*	0	0.00	1	8.80	5	2.25	2.22	0.48
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.70	0.00	-0.12
Bile ducts, other biliary	1	1.14	0	0.00	1	9.50	0	0.00	2	1.23	1.62	0.13
Pancreas	8	1.58	1	0.93	4	7.17*	0	0.00	13	6.98	1.86	1.06
Respiratory system	78	2.20*	16	2.12*	7	1.80	7	3.57*	108	48.91	2.21*	10.40
Nose, nasal cavity, ear	1	2.90	0	0.00	0	0.00	0	0.00	1	0.48	2.10	0.09
Larynx	5	1.85	3	5.34*	0	0.00	1	7.06	9	3.68	2.44*	0.94
Lung, bronchus	71	2.20*	13	1.88*	7	1.97	6	3.34*	97	44.57	2.18*	9.22
Female breast	24	1.05	18	3.34*	4	1.37	4	3.03	50	32.48	1.54*	7.63
Female genital system	12	1.12	6	2.67	2	1.72	1	1.98	21	14.59	1.44	2.79
Cervix uteri	2	0.98	1	2.24	0	0.00	0	0.00	3	2.79	1.08	0.09
Corpus uteri	6	1.29	3	3.23	1	2.01	1	4.48	11	6.31	1.74	2.04
Ovary	3	0.95	2	2.87	1	2.73	0	0.00	6	4.39	1.37	0.70
Vagina	0	0.00	0	0.00	0	0.00	0	0.00	0	0.19	0.00	-0.08
Vulva	0	0.00	0	0.00	0	0.00	0	0.00	0	0.60	0.00	-0.26
Male genital system	30	0.78	8	0.84	2	0.37	2	0.70	42	56.10	0.75	-4.16
Prostate	28	0.78	7	0.78	2	0.38	2	0.72	39	53.05	0.74	-4.15
Testis	2	0.99	0	0.00	0	0.00	0	0.00	2	2.66	0.75	-0.20
Urinary system	21	1.30	2	0.57	3	1.62	1	0.99	27	22.51	1.20	0.79
Urinary bladder	14	1.31	2	0.87	2	1.69	1	1.54	19	14.79	1.28	0.74
Kidney parenchyma	6	1.33	0	0.00	1	1.73	0	0.00	7	6.46	1.08	0.09
Renal pelvis, other urinary	1	1.07	0	0.00	0	0.00	0	0.00	1	1.26	0.79	-0.05
Ureter	1	3.32	0	0.00	0	0.00	0	0.00	1	0.40	2.49	0.11
Bone, joints	1	2.52	1	13.90	0	0.00	1	65.61	3	0.52	5.79*	0.44
Soft tissue including heart	4	3.39	3	11.73*	1	7.63	0	0.00	8	1.63	4.90*	1.12
Kaposi sarcoma	12	6.37*	0	0.00	0	0.00	0	0.00	12	2.63	4.57*	1.65
Melanoma of skin	13	1.69	3	1.57	0	0.00	1	1.90	17	11.16	1.52	1.03
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.50	0.00	-0.09
Brain, central nervous system	4	1.26	0	0.00	0	0.00	0	0.00	4	4.34	0.92	-0.06
Thyroid	5	1.82	2	3.12	2	6.18	1	6.66	10	3.87	2.58*	1.08
Lymphatic, hematopoietic	109	5.99*	22	5.52*	7	3.41*	3	2.94	141	25.25	5.58*	20.36
Hodgkin lymphoma	0	0.00	0	0.00	0	0.00	0	0.00	0	2.26	0.00	-0.40
Non-Hodgkin lymphoma	47	5.66*	12	6.18*	4	3.91*	3	5.84*	66	11.79	5.60*	9.54
Myeloma	2	0.80	1	1.80	0	0.00	0	0.00	3	3.49	0.86	-0.09
Leukemia	60	10.65*	9	7.60*	3	5.01*	0	0.00	72	7.72	9.33*	11.31
Acute lymphocytic	3	9.34*	1	16.98	0	0.00	0	0.00	4	0.42	9.54*	0.63
Chronic lymphocytic	2	1.00	1	2.38	0	0.00	0	0.00	3	2.74	1.10	0.05
Acute non-lymphocytic	51	26.31*	5	12.24*	2	9.60*	0	0.00	58	2.66	21.80*	9.74
Chronic myeloid	0	0.00	2	11.01*	1	10.88	0	0.00	3	1.16	2.60	0.32

*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 22,953 PYR and for male cancers on 33,884 PYR.

Table 16.2.1: Characteristics of patients with an initial non-Hodgkin lymphoma, both sexes, SEER 1973-2000.

Characteristics	Males		Females		Total	
	No.	%	No.	%	No.	%
Number of patients with 1st primary cancer						
Total	39,861	100.0	34,097	100.0	73,958	100.0
Initial treatment						
Any radiation	11,287	28.3	9,737	28.6	21,024	28.4
With surgery	2,933	7.4	2,830	8.3	5,763	7.8
Without surgery	8,354	21.0	6,907	20.3	15,261	20.6
No radiation	28,574	71.7	24,360	71.4	52,934	71.6
With surgery	6,473	16.2	6,013	17.6	12,486	16.9
Without surgery	22,101	55.4	18,347	53.8	40,448	54.7
Race						
White	34,949	87.7	30,384	89.1	65,333	88.3
Black	2,573	6.5	1,854	5.4	4,427	6.0
Other	2,149	5.4	1,691	5.0	3,840	5.2
Unknown	190	0.5	168	0.5	358	0.5
Age at 1st primary cancer diagnosis, years						
< 30	2,823	7.1	1,440	4.2	4,263	5.8
30–49	9,113	22.9	4,959	14.5	14,072	19.0
50–69	16,442	41.2	13,348	39.1	29,790	40.3
70–79	8,089	20.3	9,048	26.5	17,137	23.2
≥ 80	3,394	8.5	5,302	15.5	8,696	11.8
Number of patients with one or more primary cancers						
One primary cancer only	36,828	92.4	31,944	93.7	68,772	93.0
1st and 2nd cancers	2,761	6.9	1,982	5.8	4,743	6.4
1st, 2nd, and 3rd cancers	244	0.6	155	0.5	399	0.5
1st, 2nd, 3rd, and additional cancers	28	0.1	16	0.0	44	0.1
Other statistics						
Median age at 1st cancer diagnosis	61.0	—	67.0	—	63.8	—
Median year of 1st cancer diagnosis	1990.6	—	1990.0	—	1990.4	—
Median person-years at risk	2.5	—	3.0	—	2.7	—
Percent histologically confirmed*						
Both 1st and 2nd cancers	—	95.2	—	95.4	—	95.3
1st, 2nd, and additional cancers	—	94.8	—	94.9	—	94.8
1st cancer only	—	3.8	—	3.9	—	3.8

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

Non-Hodgkin Lymphoma Both Sexes

Table 16.2.2: Risk of subsequent primary cancers after non-Hodgkin lymphoma, both sexes,
SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	743	1.08*	2,191	1.07*	1,548	1.19*	1,195	1.26*	5,677	4,996.09	1.14*	19.31
All excluding same site	719	1.08*	2,124	1.07*	1,496	1.19*	1,151	1.26*	5,490	4,818.52	1.14*	19.04
Buccal cavity, pharynx	24	1.35	56	1.09	51	1.64*	39	1.85*	170	121.53	1.40*	1.37
Lip	5	1.87	9	1.19	11	2.48*	6	2.05	31	17.60	1.76*	0.38
Tongue	1	0.28	14	1.34	11	1.71	9	2.04	35	24.85	1.41	0.29
Salivary gland	3	1.92	6	1.29	7	2.38	6	2.76*	22	11.32	1.94*	0.30
Mouth	9	1.90	14	1.02	13	1.56	9	1.62	45	32.42	1.39*	0.36
Nasopharynx	0	0.00	4	1.96	2	1.65	2	2.51	8	4.77	1.68	0.09
Tonsil	2	1.21	2	0.41	2	0.69	5	2.62	11	11.28	0.98	-0.01
Oropharynx	1	2.05	0	0.00	0	0.00	0	0.00	1	3.35	0.30	-0.07
Hypopharynx	2	1.15	5	0.99	4	1.34	1	0.52	12	11.66	1.03	0.01
Digestive system	139	0.90	455	1.00	296	1.04	238	1.17*	1,128	1,097.36	1.03	0.87
Esophagus	8	1.11	11	0.52*	13	0.97	13	1.34	45	51.65	0.87	-0.19
Stomach	16	1.04	46	1.04	37	1.37	21	1.12	120	105.37	1.14	0.41
Small intestine	3	1.41	6	0.94	7	1.68	4	1.27	20	15.83	1.26	0.12
Colon	66	0.93	222	1.06	141	1.06	123	1.29*	552	507.05	1.09	1.27
Rectum, rectosigmoid junction	22	0.82	84	1.08	47	0.98	27	0.82	180	185.07	0.97	-0.14
Anus, anal canal	0	0.00	9	2.03	2	0.70	2	0.96	13	10.85	1.20	0.06
Liver	7	1.38	11	0.74	11	1.15	6	0.84	35	36.71	0.95	-0.05
Gallbladder	1	0.44	3	0.46	2	0.49	2	0.71	8	15.70	0.51	-0.22
Bile ducts, other biliary	2	0.60	11	1.10	6	0.92	9	1.79	28	24.88	1.13	0.09
Pancreas	11	0.59	50	0.91	28	0.81	30	1.20	119	132.99	0.89	-0.40
Respiratory system	135	1.16	425	1.23*	312	1.44*	222	1.43*	1,094	833.08	1.31*	7.40
Nose, nasal cavity, ear	1	0.98	3	1.00	5	2.66	2	1.50	11	7.24	1.52	0.11
Larynx	11	1.45	24	1.09	19	1.44	6	0.69	60	51.46	1.17	0.24
Lung, bronchus	123	1.15	398	1.25*	288	1.43*	214	1.48*	1,023	772.27	1.32*	7.11
Female breast	45	0.57*	193	0.80*	145	0.92	122	1.06	505	591.64	0.85*	-5.04
Female genital system	30	0.84	92	0.87	64	0.96	58	1.24	244	255.07	0.96	-0.64
Cervix uteri	3	0.76	6	0.53	3	0.45	6	1.38	18	26.45	0.68	-0.49
Corpus uteri	11	0.60	49	0.90	33	0.98	32	1.36	125	129.62	0.96	-0.27
Ovary	12	1.15	29	0.92	15	0.74	14	0.96	70	76.71	0.91	-0.39
Vagina	2	3.69	2	1.24	3	2.92	2	2.71	9	3.92	2.30*	0.30
Vulva	2	1.20	5	0.99	10	2.99*	3	1.18	20	12.60	1.59	0.43
Male genital system	89	0.71*	345	0.93	226	0.94	168	0.93	828	919.07	0.90*	-5.04
Prostate	88	0.72*	338	0.92	222	0.93	168	0.94	816	906.97	0.90*	-5.03
Testis	0	0.00	3	1.11	2	1.28	0	0.00	5	6.32	0.79	-0.07
Urinary system	91	1.69*	159	1.00	147	1.45*	136	1.83*	533	388.38	1.37*	4.10
Urinary bladder	34	0.92	111	1.02	104	1.50*	105	2.06*	354	266.58	1.33*	2.48
Kidney parenchyma	56	4.20*	39	0.98	39	1.52*	23	1.22	157	97.81	1.61*	1.68
Renal pelvis, other urinary	1	0.29	9	0.90	4	0.65	8	1.82	22	24.00	0.92	-0.06
Ureter	0	0.00	1	0.30	2	0.98	2	1.40	5	7.91	0.63	-0.08
Bone, joints	2	3.08	5	2.63	5	4.28*	4	4.90*	16	4.53	3.53*	0.33
Soft tissue including heart	0	0.00	12	1.47	11	2.11*	4	1.03	27	20.02	1.35	0.20
Kaposi sarcoma	64	48.45*	36	9.75*	10	4.42*	3	2.00	113	8.78	12.87*	2.96
Melanoma of skin	22	1.39	84	1.74*	53	1.68*	30	1.23	189	120.07	1.57*	1.95
Eye, orbit	2	1.93	2	0.66	2	1.07	0	0.00	6	7.25	0.83	-0.04
Brain, central nervous system	9	1.23	22	1.02	8	0.59	16	1.68	55	51.90	1.06	0.09
Thyroid	12	2.93*	14	1.15	8	1.05	4	0.73	38	29.41	1.29	0.24
Lymphatic, hematopoietic	52	0.99	200	1.28*	153	1.53*	95	1.29*	500	382.79	1.31*	3.32
Hodgkin lymphoma	3	1.58	29	5.34*	12	3.69*	17	7.70*	61	12.79	4.77*	1.37
Non-Hodgkin lymphoma	24	1.01	67	0.93	52	1.11	44	1.25	187	177.56	1.05	0.27
Myeloma	4	0.46	13	0.50*	11	0.67	7	0.58	35	63.05	0.56*	-0.80
Leukemia	21	1.16	91	1.71*	78	2.32*	27	1.11	217	129.39	1.68*	2.48
Acute lymphocytic	1	1.82	0	0.00	2	1.99	0	0.00	3	3.86	0.78	-0.02
Chronic lymphocytic	2	0.28	11	0.52*	7	0.53	5	0.53	25	51.13	0.49*	-0.74
Acute non-lymphocytic	11	1.80	59	3.27*	54	4.70*	18	2.13*	142	44.14	3.22*	2.77
Chronic myeloid	4	1.62	11	1.52	8	1.75	2	0.60	25	17.63	1.42	0.21

*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 171,844 PYR and for male cancers on 180,851 PYR.

Table 16.2.3: Risk of subsequent primary cancers after non-Hodgkin lymphoma, both sexes, long-term follow-up, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<10 years		10-14 years		15-19 years		≥20 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	4,482	1.11*	763	1.25*	307	1.22*	125	1.46*	5,677	4,996.09	1.14*	19.31
All excluding same site	4,339	1.11*	732	1.24*	298	1.23*	121	1.47*	5,490	4,818.52	1.14*	19.04
Buccal cavity, pharynx	131	1.30*	28	2.03*	11	2.03*	0	0.00	170	121.53	1.40*	1.37
Lip	25	1.70*	6	3.11*	0	0.00	0	0.00	31	17.60	1.76*	0.38
Tongue	26	1.27	6	2.08	3	2.61	0	0.00	35	24.85	1.41	0.29
Salivary gland	16	1.75	2	1.44	4	6.89*	0	0.00	22	11.32	1.94*	0.30
Mouth	36	1.34	8	2.18	1	0.70	0	0.00	45	32.42	1.39*	0.36
Nasopharynx	6	1.51	1	1.90	1	4.95	0	0.00	8	4.77	1.68	0.09
Tonsil	6	0.64	3	2.38	2	4.08	0	0.00	11	11.28	0.98	-0.01
Oropharynx	1	0.36	0	0.00	0	0.00	0	0.00	1	3.35	0.30	-0.07
Hypopharynx	11	1.13	1	0.78	0	0.00	0	0.00	12	11.66	1.03	0.01
Digestive system	890	1.00	137	1.04	72	1.34*	29	1.56*	1,128	1,097.36	1.03	0.87
Esophagus	32	0.76	10	1.61	3	1.17	0	0.00	45	51.65	0.87	-0.19
Stomach	99	1.14	13	1.07	7	1.44	1	0.61	120	105.37	1.14	0.41
Small intestine	16	1.26	2	1.00	2	2.35	0	0.00	20	15.83	1.26	0.12
Colon	429	1.04	71	1.16	37	1.47*	15	1.73	552	507.05	1.09	1.27
Rectum, rectosigmoid junction	153	1.01	12	0.56*	7	0.82	8	2.76*	180	185.07	0.97	-0.14
Anus, anal canal	11	1.26	0	0.00	2	3.58	0	0.00	13	10.85	1.20	0.06
Liver	29	0.98	6	1.33	0	0.00	0	0.00	35	36.71	0.95	-0.05
Gallbladder	6	0.47	2	1.10	0	0.00	0	0.00	8	15.70	0.51	-0.22
Bile ducts, other biliary	19	0.96	5	1.58	3	2.19	1	2.02	28	24.88	1.13	0.09
Pancreas	89	0.82	16	0.99	10	1.50	4	1.73	119	132.99	0.89	-0.40
Respiratory system	872	1.29*	141	1.41*	58	1.42*	23	1.66*	1,094	833.08	1.31*	7.40
Nose, nasal cavity, ear	9	1.52	1	1.16	1	2.84	0	0.00	11	7.24	1.52	0.11
Larynx	54	1.26	2	0.35	3	1.36	1	1.41	60	51.46	1.17	0.24
Lung, bronchus	809	1.29*	138	1.48*	54	1.41*	22	1.70*	1,023	772.27	1.32*	7.11
Female breast	383	0.80*	74	1.00	38	1.24	10	0.94	505	591.64	0.85*	-5.04
Female genital system	186	0.89	42	1.39	11	0.89	5	1.19	244	255.07	0.96	-0.64
Cervix uteri	12	0.54*	4	1.39	2	1.79	0	0.00	18	26.45	0.68	-0.49
Corpus uteri	93	0.88	24	1.58*	5	0.81	3	1.42	125	129.62	0.96	-0.27
Ovary	56	0.90	9	0.96	3	0.78	2	1.51	70	76.71	0.91	-0.39
Vagina	7	2.20	1	2.10	1	5.11	0	0.00	9	3.92	2.30*	0.30
Vulva	17	1.69	3	1.87	0	0.00	0	0.00	20	12.60	1.59	0.43
Male genital system	660	0.89*	109	0.93	42	0.86	17	1.09	828	919.07	0.90*	-5.04
Prostate	648	0.89*	109	0.94	42	0.87	17	1.10	816	906.97	0.90*	-5.03
Testis	5	0.96	0	0.00	0	0.00	0	0.00	5	6.32	0.79	-0.07
Urinary system	397	1.26*	82	1.73*	34	1.72*	20	2.89*	533	388.38	1.37*	4.10
Urinary bladder	249	1.15*	62	1.90*	27	1.99*	16	3.36*	354	266.58	1.33*	2.48
Kidney parenchyma	134	1.70*	16	1.32	5	0.99	2	1.14	157	97.81	1.61*	1.68
Renal pelvis, other urinary	14	0.71	4	1.41	2	1.73	2	5.00	22	24.00	0.92	-0.06
Ureter	3	0.46	2	2.16	0	0.00	0	0.00	5	7.91	0.63	-0.08
Bone, joints	12	3.23*	2	3.80	1	4.65	1	13.47	16	4.53	3.53*	0.33
Soft tissue including heart	23	1.42	1	0.41	2	1.93	1	2.72	27	20.02	1.35	0.20
Kaposi sarcoma	110	15.12*	3	2.92	0	0.00	0	0.00	113	8.78	12.87*	2.96
Melanoma of skin	159	1.66*	22	1.43	4	0.61	4	1.64	189	120.07	1.57*	1.95
Eye, orbit	6	1.01	0	0.00	0	0.00	0	0.00	6	7.25	0.83	-0.04
Brain, central nervous system	39	0.92	9	1.46	5	2.01	2	2.36	55	51.90	1.06	0.09
Thyroid	34	1.42	4	1.14	0	0.00	0	0.00	38	29.41	1.29	0.24
Lymphatic, hematopoietic	405	1.31*	69	1.46*	16	0.81	10	1.45	500	382.79	1.31*	3.32
Hodgkin lymphoma	44	4.16*	11	7.60*	3	5.24*	3	16.01*	61	12.79	4.77*	1.37
Non-Hodgkin lymphoma	143	1.00	31	1.38	9	0.95	4	1.19	187	177.56	1.05	0.27
Myeloma	28	0.55*	5	0.65	1	0.31	1	0.90	35	63.05	0.56*	-0.80
Leukemia	190	1.81*	22	1.41	3	0.46	2	0.89	217	129.39	1.68*	2.48
Acute lymphocytic	3	0.95	0	0.00	0	0.00	0	0.00	3	3.86	0.78	-0.02
Chronic lymphocytic	20	0.48*	3	0.49	1	0.40	1	1.18	25	51.13	0.49*	-0.74
Acute non-lymphocytic	124	3.48*	15	2.78*	2	0.88	1	1.24	142	44.14	3.22*	2.77
Chronic myeloid	23	1.61*	2	0.93	0	0.00	0	0.00	25	17.63	1.42	0.21

*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 171,844 PYR and for male cancers on 180,851 PYR.

Non-Hodgkin Lymphoma Females

Table 16.2.4: Risk of subsequent primary cancers after non-Hodgkin lymphoma, females, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	258	0.92	852	1.00	676	1.22*	556	1.36*	2,342	2,090.46	1.12*	14.64
All excluding same site	249	0.92	828	1.01	651	1.22*	533	1.36*	2,261	2,010.36	1.12*	14.59
Buccal cavity, pharynx	2	0.40	14	0.93	20	2.09*	8	1.17	44	36.42	1.21	0.44
Lip	0	0.00	0	0.00	2	2.89	2	3.81	4	2.61	1.53	0.08
Tongue	0	0.00	4	1.21	6	2.82*	2	1.32	12	8.06	1.49	0.23
Salivary gland	0	0.00	3	1.79	5	4.63*	0	0.00	8	4.12	1.94	0.23
Mouth	2	1.15	3	0.58	4	1.20	3	1.26	12	12.65	0.95	-0.04
Nasopharynx	0	0.00	2	3.36	1	2.67	0	0.00	3	1.43	2.09	0.09
Tonsil	0	0.00	0	0.00	1	1.28	1	1.94	2	3.00	0.67	-0.06
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.89	0.00	-0.05
Hypopharynx	0	0.00	2	1.99	1	1.60	0	0.00	3	2.38	1.26	0.04
Digestive system	61	0.92	188	0.95	145	1.13	123	1.30*	517	486.76	1.06	1.76
Esophagus	2	1.14	2	0.38	4	1.15	6	2.31	14	13.15	1.06	0.05
Stomach	6	1.16	19	1.26	15	1.56	15	2.18*	55	36.79	1.50*	1.06
Small intestine	0	0.00	2	0.72	3	1.60	0	0.00	5	7.01	0.71	-0.12
Colon	32	0.96	99	1.00	76	1.17	69	1.44*	276	245.43	1.12	1.78
Rectum, rectosigmoid junction	10	0.96	31	1.00	25	1.28	10	0.72	76	74.70	1.02	0.08
Rectum	7	1.03	25	1.24	16	1.24	6	0.65	54	49.17	1.10	0.28
Anus, anal canal	0	0.00	3	1.15	0	0.00	1	0.79	4	6.45	0.62	-0.14
Liver	3	2.15	1	0.24	4	1.42	1	0.46	9	10.65	0.85	-0.10
Gallbladder	1	0.65	2	0.45	2	0.72	1	0.52	6	10.70	0.56	-0.27
Bile ducts, other biliary	1	0.69	4	0.91	4	1.35	4	1.71	13	11.16	1.16	0.11
Pancreas	5	0.58	25	0.97	11	0.65	15	1.18	56	64.15	0.87	-0.47
Respiratory system	43	1.19	144	1.27*	129	1.70*	97	1.66*	413	283.63	1.46*	7.53
Nose, nasal cavity, ear	0	0.00	1	0.87	1	1.32	0	0.00	2	2.85	0.70	-0.05
Larynx	0	0.00	6	1.72	4	1.80	2	1.28	12	8.42	1.43	0.21
Lung, bronchus	43	1.24	137	1.27*	124	1.70*	95	1.70*	399	271.65	1.47*	7.41
Female breast	45	0.57*	193	0.80*	145	0.92	122	1.06	505	591.64	0.85*	-5.04
Female genital system	30	0.84	92	0.87	64	0.96	58	1.24	244	255.07	0.96	-0.64
Cervix uteri	3	0.76	6	0.53	3	0.45	6	1.38	18	26.45	0.68	-0.49
Corpus uteri	11	0.60	49	0.90	33	0.98	32	1.36	125	129.62	0.96	-0.27
Ovary	12	1.15	29	0.92	15	0.74	14	0.96	70	76.71	0.91	-0.39
Vagina	2	3.69	2	1.24	3	2.92	2	2.71	9	3.92	2.30*	0.30
Vulva	2	1.20	5	0.99	10	2.99*	3	1.18	20	12.60	1.59	0.43
Urinary system	28	2.07*	35	0.85	38	1.40	51	2.49*	152	102.32	1.49*	2.89
Urinary bladder	8	0.99	25	1.02	27	1.68*	41	3.38*	101	60.65	1.67*	2.35
Kidney parenchyma	19	4.41*	6	0.45*	11	1.24	6	0.89	42	33.25	1.26	0.51
Renal pelvis, other urinary	1	0.87	4	1.17	0	0.00	4	2.46	9	8.42	1.07	0.03
Ureter	0	0.00	1	0.94	0	0.00	2	4.01	3	2.61	1.15	0.02
Bone, joints	2	7.50	0	0.00	4	7.93*	2	5.49	8	1.93	4.14*	0.35
Soft tissue including heart	0	0.00	4	1.19	3	1.36	2	1.20	9	8.34	1.08	0.04
Kaposi sarcoma	0	0.00	1	3.05	4	18.04*	0	0.00	5	0.82	6.06*	0.24
Melanoma of skin	11	2.00	30	1.75*	22	1.94*	9	1.03	72	42.69	1.69*	1.71
Eye, orbit	1	2.36	1	0.80	0	0.00	0	0.00	2	3.02	0.66	-0.06
Brain, central nervous system	1	0.34	8	0.90	3	0.53	7	1.72	19	21.53	0.88	-0.15
Thyroid	6	2.37	10	1.30	5	1.03	3	0.85	24	18.59	1.29	0.31
Lymphatic, hematopoietic	20	0.92	86	1.31*	76	1.75*	44	1.34	226	163.88	1.38*	3.61
Hodgkin lymphoma	1	1.42	11	5.28*	6	4.61*	6	6.64*	24	4.99	4.81*	1.11
Non-Hodgkin lymphoma	9	0.87	24	0.75	25	1.17	23	1.40	81	80.11	1.01	0.05
Myeloma	3	0.82	9	0.81	5	0.68	3	0.55	20	27.54	0.73	-0.44
Leukemia	7	1.01	42	2.03*	40	2.96*	12	1.19	101	51.24	1.97*	2.90
Acute lymphocytic	1	4.81	0	0.00	1	2.46	0	0.00	2	1.54	1.30	0.03
Chronic lymphocytic	1	0.37	5	0.62	3	0.57	3	0.78	12	19.77	0.61	-0.45
Acute non-lymphocytic	3	1.23	31	4.22*	28	5.82*	8	2.19	70	18.24	3.84*	3.01
Chronic myeloid	1	1.06	4	1.41	4	2.16	0	0.00	9	7.02	1.28	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.

Table 16.2.5: Risk of subsequent primary cancers after non-Hodgkin lymphoma, males, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	485	1.18*	1,339	1.11*	872	1.16*	639	1.18*	3,335	2,905.62	1.15*	23.74
All excluding same site	470	1.18*	1,296	1.12*	845	1.16*	618	1.18*	3,229	2,808.17	1.15*	23.27
Buccal cavity, pharynx	22	1.73*	42	1.15	31	1.44	31	2.18*	126	85.11	1.48*	2.26
Lip	5	2.15	9	1.38	9	2.40*	4	1.66	27	14.98	1.80*	0.66
Tongue	1	0.41	10	1.40	5	1.17	7	2.41	23	16.79	1.37	0.34
Salivary gland	3	2.98	3	1.01	2	1.07	6	4.39*	14	7.20	1.94*	0.38
Mouth	7	2.33	11	1.28	9	1.80	6	1.88	33	19.77	1.67*	0.73
Nasopharynx	0	0.00	2	1.38	1	1.19	2	3.76	5	3.34	1.50	0.09
Tonsil	2	1.63	2	0.56	1	0.48	4	2.87	9	8.27	1.09	0.04
Oropharynx	1	2.74	0	0.00	0	0.00	0	0.00	1	2.46	0.41	-0.08
Hypopharynx	2	1.43	3	0.75	3	1.27	1	0.67	9	9.28	0.97	-0.02
Digestive system	78	0.88	267	1.04	151	0.96	115	1.05	611	610.60	1.00	0.02
Esophagus	6	1.09	9	0.56	9	0.91	7	0.99	31	38.50	0.81	-0.41
Stomach	10	0.98	27	0.93	22	1.26	6	0.51	65	68.58	0.95	-0.20
Small intestine	3	2.46	4	1.11	4	1.74	4	2.37	15	8.82	1.70	0.34
Colon	34	0.90	123	1.13	65	0.96	54	1.14	276	261.62	1.05	0.80
Rectum, rectosigmoid junction	12	0.74	53	1.13	22	0.78	17	0.89	104	110.37	0.94	-0.35
Anus, anal canal	0	0.00	6	3.29*	2	1.76	1	1.22	9	4.40	2.05	0.25
Liver	4	1.09	10	0.93	7	1.04	5	1.01	26	26.06	1.00	0.00
Gallbladder	0	0.00	1	0.47	0	0.00	1	1.15	2	4.99	0.40	-0.17
Bile ducts, other biliary	1	0.53	7	1.26	2	0.56	5	1.86	15	13.72	1.09	0.07
Pancreas	6	0.60	25	0.87	17	0.97	15	1.22	63	68.83	0.92	-0.32
Respiratory system	92	1.15	281	1.21*	183	1.30*	125	1.29*	681	549.45	1.24*	7.27
Nose, nasal cavity, ear	1	1.55	2	1.08	4	3.55	2	2.58	9	4.40	2.05	0.25
Larynx	11	1.71	18	0.97	15	1.37	4	0.56	48	43.04	1.12	0.27
Lung, bronchus	80	1.10	261	1.24*	164	1.27*	119	1.34*	624	500.63	1.25*	6.82
Male breast	0	0.00	3	1.32	2	1.41	2	1.94	7	5.49	1.27	0.08
Male genital system	89	0.71*	345	0.93	226	0.94	168	0.93	828	919.07	0.90*	-5.04
Prostate	88	0.72*	338	0.92	222	0.93	168	0.94	816	906.97	0.90*	-5.03
Testis	0	0.00	3	1.11	2	1.28	0	0.00	5	6.32	0.79	-0.07
Urinary system	63	1.56*	124	1.05	109	1.47*	85	1.58*	381	286.06	1.33*	5.25
Urinary bladder	26	0.90	86	1.01	77	1.45*	64	1.65*	253	205.93	1.23*	2.60
Kidney parenchyma	37	4.10*	33	1.24	28	1.67*	17	1.40	115	64.56	1.78*	2.79
Renal pelvis, other urinary	0	0.00	5	0.76	4	1.01	4	1.45	13	15.58	0.83	-0.14
Ureter	0	0.00	0	0.00	2	1.48	0	0.00	2	5.30	0.38	-0.18
Bone, joints	0	0.00	5	4.54*	1	1.50	2	4.43	8	2.60	3.08*	0.30
Soft tissue including heart	0	0.00	8	1.66	8	2.67*	2	0.91	18	11.68	1.54	0.35
Kaposi sarcoma	64	52.78*	35	10.41*	6	2.94*	3	2.25	108	7.95	13.58*	5.53
Melanoma of skin	11	1.07	54	1.74*	31	1.53*	21	1.34	117	77.38	1.51*	2.19
Eye, orbit	1	1.63	1	0.56	2	1.85	0	0.00	4	4.23	0.95	-0.01
Brain, central nervous system	8	1.83	14	1.10	5	0.64	9	1.66	36	30.38	1.19	0.31
Thyroid	6	3.84*	4	0.88	3	1.09	1	0.51	14	10.82	1.29	0.18
Lymphatic, hematopoietic	32	1.03	114	1.26*	77	1.36*	51	1.24	274	218.91	1.25*	3.05
Hodgkin lymphoma	2	1.67	18	5.38*	6	3.08*	11	8.44*	37	7.79	4.75*	1.61
Non-Hodgkin lymphoma	15	1.11	43	1.08	27	1.07	21	1.11	106	97.46	1.09	0.47
Myeloma	1	0.20	4	0.27*	6	0.65	4	0.60	15	35.52	0.42*	-1.13
Leukemia	14	1.25	49	1.51*	38	1.89*	15	1.05	116	78.15	1.48*	2.09
Acute lymphocytic	0	0.00	0	0.00	1	1.67	0	0.00	1	2.32	0.43	-0.07
Chronic lymphocytic	1	0.22	6	0.46*	4	0.49	2	0.35	13	31.35	0.41*	-1.01
Acute non-lymphocytic	8	2.17	28	2.61*	26	3.90*	10	2.08	72	25.90	2.78*	2.55
Chronic myeloid	3	1.96	7	1.59	4	1.47	2	1.01	16	10.62	1.51	0.30

*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.

Non-Hodgkin Lymphoma Both Sexes, <30 Years of Age

Table 16.2.6: Risk of subsequent primary cancers after non-Hodgkin lymphoma, both sexes, <30 years of age, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis													
	<1 year		1-4 years		5-9 years		≥10 years		Total					
	Number starting interval	Person-years in interval	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR		
All subsequent cancers	4,263	3,058	7	6.57*	25	5.95*	16	3.18*	19	1.67*	67	21.69	3.09*	13.38
All excluding same site	3,217	9,828	6	6.08*	23	5.92*	13	2.79*	17	1.60	59	20.17	2.93*	13.18
Buccal cavity, pharynx	3,058	9,828	0	0.00	0	0.00	1	9.46	1	3.18	2	0.52	3.82	0.50
Lip	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.06	0.00	-0.02
Tongue	0	0.00	0	0.00	0	0.00	0	0.00	1	12.60	1	0.12	8.26	0.30
Salivary gland	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.10	0.00	-0.03
Mouth	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.09	0.00	-0.03
Nasopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.07	0.00	-0.02
Tonsil	0	0.00	0	0.00	1	160.32*	0	0.00	0	0.00	1	0.06	17.94	0.32
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.01	0.00	0.00
Hypopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.02	0.00	-0.01
Digestive system	0	0.00	1	4.86	0	0.00	3	2.62	4	1.71	2.34	0.78	0.78	0.78
Esophagus	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.07	0.00	-0.02
Stomach	0	0.00	0	0.00	0	0.00	1	8.53	1	0.19	5.37	0.28	0.28	0.28
Small intestine	0	0.00	0	0.00	0	0.00	1	25.78	1	0.06	16.43	0.32	0.32	0.32
Colon	0	0.00	1	12.93	0	0.00	0	0.00	1	0.62	1.62	0.13	0.13	0.13
Rectum, rectosigmoid junction	0	0.00	0	0.00	0	0.00	0	0.00	0	0.34	0.00	-0.11	-0.11	-0.11
Anus, anal canal	0	0.00	0	0.00	0	0.00	0	0.00	0	0.07	0.00	-0.02	-0.02	-0.02
Liver	0	0.00	0	0.00	0	0.00	0	0.00	0	0.11	0.00	-0.04	-0.04	-0.04
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.01	0.00	0.00	0.00	0.00
Bile ducts, other biliary	0	0.00	0	0.00	0	0.00	0	0.00	0	0.04	0.00	-0.01	-0.01	-0.01
Pancreas	0	0.00	0	0.00	0	0.00	1	8.85	1	0.15	6.58	0.29	0.29	0.29
Respiratory system	0	0.00	1	12.61	1	7.10	1	1.40	3	0.96	3.14	0.69	0.69	0.69
Nose, nasal cavity, ear	0	0.00	0	0.00	0	0.00	0	0.00	0	0.04	0.00	-0.01	-0.01	-0.01
Larynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.09	0.00	-0.03	-0.03	-0.03
Lung, bronchus	0	0.00	1	20.66	1	9.61	1	1.64	3	0.77	3.89	0.76	0.76	0.76
Female breast	0	0.00	0	0.00	2	3.14	6	2.47	8	3.43	2.33*	4.12	4.12	4.12
Female genital system	0	0.00	1	2.59	0	0.00	0	0.00	1	2.01	0.50	-0.91	-0.91	-0.91
Cervix uteri	0	0.00	1	4.83	0	0.00	0	0.00	1	0.89	1.13	0.10	0.10	0.10
Corpus uteri	0	0.00	0	0.00	0	0.00	0	0.00	0	0.38	0.00	-0.34	-0.34	-0.34
Ovary	0	0.00	0	0.00	0	0.00	0	0.00	0	0.63	0.00	-0.57	-0.57	-0.57
Vagina	0	0.00	0	0.00	0	0.00	0	0.00	0	0.02	0.00	-0.01	-0.01	-0.01
Vulva	0	0.00	0	0.00	0	0.00	0	0.00	0	0.06	0.00	-0.05	-0.05	-0.05
Male genital system	0	0.00	0	0.00	1	2.14	0	0.00	1	1.88	0.53	-0.48	-0.48	-0.48
Prostate	0	0.00	0	0.00	0	0.00	0	0.00	0	0.26	0.00	-0.14	-0.14	-0.14
Testis	0	0.00	0	0.00	1	2.18	0	0.00	1	1.60	0.62	-0.33	-0.33	-0.33
Urinary system	0	0.00	0	0.00	0	0.00	1	2.01	1	0.76	1.32	0.08	0.08	0.08
Urinary bladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.37	0.00	-0.13	-0.13	-0.13
Kidney parenchyma	0	0.00	0	0.00	0	0.00	1	4.18	1	0.36	2.78	0.22	0.22	0.22
Renal pelvis, other urinary	0	0.00	0	0.00	0	0.00	0	0.00	0	0.02	0.00	-0.01	-0.01	-0.01
Ureter	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00	0.00	0.00	0.00
Bone, joints	0	0.00	1	11.64	1	14.21	0	0.00	2	0.25	7.96	0.59	0.59	0.59
Soft tissue including heart	0	0.00	0	0.00	0	0.00	0	0.00	0	0.39	0.00	-0.13	-0.13	-0.13
Kaposi sarcoma	5	98.15*	4	16.22*	1	2.76	0	0.00	10	1.15	8.71*	3.00	3.00	3.00
Melanoma of skin	0	0.00	3	6.36*	2	3.44	1	0.92	6	2.25	2.66	1.27	1.27	1.27
Eye, orbit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.06	0.00	-0.02	-0.02	-0.02
Brain, central nervous system	1	12.16	0	0.00	0	0.00	1	2.86	2	0.96	2.08	0.35	0.35	0.35
Thyroid	0	0.00	2	5.90	2	5.52	1	1.79	5	1.35	3.71*	1.24	1.24	1.24
Lymphatic, hematopoietic	1	3.60	10	10.50*	5	5.36*	4	2.71	20	3.64	5.50*	5.55	5.55	5.55
Hodgkin lymphoma	0	0.00	4	10.65*	1	3.12	1	3.00	6	1.14	5.25*	1.65	1.65	1.65
Non-Hodgkin lymphoma	1	12.59	2	6.40	3	7.89*	2	2.67	8	1.52	5.26*	2.20	2.20	2.20
Myeloma	0	0.00	0	0.00	1	74.16	0	0.00	1	0.09	11.24	0.31	0.31	0.31
Leukemia	0	0.00	4	15.55*	0	0.00	1	3.07	5	0.89	5.65*	1.40	1.40	1.40
Acute lymphocytic	0	0.00	0	0.00	0	0.00	0	0.00	0	0.27	0.00	-0.09	-0.09	-0.09
Chronic lymphocytic	0	0.00	0	0.00	0	0.00	0	0.00	0	0.05	0.00	-0.02	-0.02	-0.02
Acute non-lymphocytic	0	0.00	4	41.37*	0	0.00	1	7.66	5	0.35	14.48*	1.58	1.58	1.58
Chronic myeloid	0	0.00	0	0.00	0	0.00	0	0.00	0	0.16	0.00	-0.06	-0.06	-0.06

*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 11,090 PYR and for male cancers on 18,373 PYR.

Table 16.2.7: Risk of subsequent primary cancers after non-Hodgkin lymphoma, both sexes, 30-49 years of age, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	93	4.21*	151	1.68*	161	1.71*	260	1.66*	665	362.91	1.83*	37.29
All excluding same site	88	4.22*	139	1.63*	154	1.71*	250	1.66*	631	346.90	1.82*	35.07
Buccal cavity, pharynx	1	1.18	5	1.44	8	2.24	9	1.88	23	12.70	1.81*	1.27
Lip	0	0.00	0	0.00	1	3.11	1	2.26	2	1.20	1.67	0.10
Tongue	0	0.00	1	1.26	3	3.59	2	1.77	6	2.95	2.03	0.38
Salivary gland	0	0.00	0	0.00	0	0.00	0	0.00	0	1.08	0.00	-0.13
Mouth	0	0.00	2	2.38	2	2.24	2	1.66	6	3.14	1.91	0.35
Nasopharynx	0	0.00	1	4.28	0	0.00	1	4.29	2	0.74	2.71	0.16
Tonsil	1	8.16	1	1.97	0	0.00	3	4.77	5	1.78	2.81	0.40
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.36	0.00	-0.04
Hypopharynx	0	0.00	0	0.00	2	6.39	0	0.00	2	1.09	1.83	0.11
Digestive system	1	0.34	17	1.34	17	1.17	42	1.60*	77	56.31	1.37*	2.55
Esophagus	0	0.00	1	1.25	0	0.00	5	2.90	6	3.66	1.64	0.29
Stomach	1	3.06	1	0.76	1	0.72	5	2.22	8	5.30	1.51	0.33
Small intestine	0	0.00	1	2.90	1	2.78	0	0.00	2	1.35	1.48	0.08
Colon	0	0.00	6	1.30	4	0.74	16	1.53	26	21.59	1.20	0.54
Rectum, rectosigmoid junction	0	0.00	3	1.16	5	1.65	5	0.96	13	11.38	1.14	0.20
Anus, anal canal	0	0.00	4	12.36*	1	3.17	1	2.29	6	1.16	5.18*	0.60
Liver	0	0.00	1	1.47	0	0.00	1	0.82	2	2.81	0.71	-0.10
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	0.56	0.00	-0.07
Bile ducts, other biliary	0	0.00	0	0.00	2	7.10	3	5.45*	5	1.14	4.40*	0.48
Pancreas	0	0.00	0	0.00	3	1.77	6	1.91	9	6.59	1.37	0.30
Respiratory system	5	2.05	19	1.69*	35	2.53*	60	2.30*	119	53.56	2.22*	8.08
Nose, nasal cavity, ear	0	0.00	1	5.43	0	0.00	1	4.13	2	0.65	3.07	0.17
Larynx	0	0.00	1	0.87	3	2.25	2	0.97	6	4.80	1.25	0.15
Lung, bronchus	5	2.37	17	1.72*	32	2.61*	57	2.41*	111	47.90	2.32*	7.79
Female breast	6	1.24	5	0.25*	19	0.99	31	1.24	61	68.60	0.89	-2.22
Female genital system	4	2.13	7	0.92	15	2.04*	17	1.72*	43	26.74	1.61*	4.75
Cervix uteri	2	3.35	2	0.99	1	0.69	3	2.42	8	5.31	1.51	0.78
Corpus uteri	2	3.34	2	0.71	8	2.49*	8	1.58	20	11.68	1.71*	2.43
Ovary	0	0.00	3	1.27	1	0.44	4	1.34	8	8.21	0.97	-0.06
Vagina	0	0.00	0	0.00	1	14.79	1	9.76	2	0.25	7.86	0.51
Vulva	0	0.00	0	0.00	4	19.27*	1	3.37	5	0.78	6.40*	1.23
Male genital system	0	0.00	8	1.41	11	1.24	21	0.78	40	42.75	0.94	-0.59
Prostate	0	0.00	4	0.95	9	1.12	21	0.79	34	39.35	0.86	-1.14
Testis	0	0.00	2	1.45	1	1.41	0	0.00	3	2.97	1.01	0.01
Urinary system	8	6.29*	6	1.10	13	2.09*	32	2.89*	59	24.07	2.45*	4.31
Urinary bladder	1	1.52	3	1.04	9	2.62*	22	3.32*	35	13.61	2.57*	2.64
Kidney parenchyma	7	12.39*	1	0.42	4	1.57	8	2.02	20	9.45	2.12*	1.30
Renal pelvis, other urinary	0	0.00	2	9.24*	0	0.00	2	4.09	4	1.00	3.98*	0.37
Ureter	0	0.00	0	0.00	0	0.00	0	0.00	0	0.26	0.00	-0.03
Bone, joints	1	15.43	3	14.01*	1	6.03	2	10.91*	7	0.63	11.14*	0.79
Soft tissue including heart	0	0.00	2	2.77	2	3.31	0	0.00	4	2.26	1.77	0.21
Kaposi sarcoma	49	70.76*	28	15.14*	6	5.93*	2	4.07	85	4.05	21.01*	9.99
Melanoma of skin	4	2.37	13	2.14*	10	1.93	7	1.16	34	18.99	1.79*	1.85
Eye, orbit	0	0.00	0	0.00	1	4.95	0	0.00	1	0.74	1.36	0.03
Brain, central nervous system	1	1.84	3	1.53	0	0.00	3	1.44	7	6.31	1.11	0.09
Thyroid	2	2.82	5	2.05	1	0.54	0	0.00	8	6.78	1.18	0.15
Lymphatic, hematopoietic	8	3.47*	26	3.06*	20	2.54*	26	2.29*	80	30.04	2.66*	6.17
Hodgkin lymphoma	1	3.21	4	4.28*	2	3.25	7	13.26*	14	2.39	5.86*	1.43
Non-Hodgkin lymphoma	5	3.97*	12	2.61*	7	1.65	10	1.69	34	16.01	2.12*	2.22
Myeloma	0	0.00	1	1.26	0	0.00	1	0.60	2	3.57	0.56	-0.19
Leukemia	2	3.59	9	4.17*	11	5.22*	8	2.46*	30	8.07	3.72*	2.71
Acute lymphocytic	0	0.00	0	0.00	1	7.49	0	0.00	1	0.49	2.03	0.06
Chronic lymphocytic	0	0.00	1	1.77	2	2.85	1	0.79	4	2.66	1.51	0.17
Acute non-lymphocytic	2	9.57*	7	9.11*	8	11.38*	7	6.52*	24	2.75	8.71*	2.62
Chronic myeloid	0	0.00	0	0.00	0	0.00	0	0.00	0	1.34	0.00	-0.17

*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 34,275 PYR and for male cancers on 46,741 PYR.

Non-Hodgkin Lymphoma Both Sexes, 50-69 Years of Age

Table 16.2.8: Risk of subsequent primary cancers after non-Hodgkin lymphoma, both sexes, 50-69 years of age, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis												
	<1 year		1-4 years		5-9 years		≥10 years		Total				
	Number starting interval	29,790	Person-years in interval	21,789	O	O/E	O	O/E	O	O/E	O	E	O/E
All subsequent cancers	317	1.20*	1,067	1.13*	893	1.17*	772	1.19*	3,049	2,621.79	1.16*	26.44	
All excluding same site	307	1.20*	1,039	1.13*	865	1.17*	745	1.20*	2,956	2,533.45	1.17*	26.16	
Buccal cavity, pharynx	12	1.39	24	0.85	29	1.50*	26	1.92*	91	69.67	1.31*	1.32	
Lip	2	1.92	4	1.15	7	2.77*	3	1.51	16	9.05	1.77*	0.43	
Tongue	0	0.00	7	1.19	7	1.73	6	2.16	20	14.54	1.38	0.34	
Salivary gland	1	1.71	3	1.47	4	2.55	5	3.67*	13	5.55	2.34*	0.46	
Mouth	6	2.62	4	0.54	7	1.37	7	1.95	24	18.45	1.30	0.34	
Nasopharynx	0	0.00	2	1.67	0	0.00	1	2.13	3	2.81	1.07	0.01	
Tonsil	1	1.05	1	0.33	1	0.53	2	1.77	5	6.97	0.72	-0.12	
Oropharynx	1	3.67	0	0.00	0	0.00	0	0.00	1	2.13	0.47	-0.07	
Hypopharynx	0	0.00	2	0.63	2	0.95	1	0.76	5	7.54	0.66	-0.16	
Digestive system	56	1.09	190	1.02	160	1.04	151	1.10	557	528.47	1.05	1.77	
Esophagus	4	1.26	5	0.46	8	0.96	6	0.90	23	29.13	0.79	-0.38	
Stomach	6	1.20	16	0.90	16	1.12	11	0.88	49	49.45	0.99	-0.03	
Small intestine	2	2.47	4	1.37	4	1.68	3	1.43	13	8.20	1.59	0.30	
Colon	22	1.03	90	1.13	81	1.19	83	1.29*	276	232.99	1.18*	2.66	
Rectum, rectosigmoid junction	12	1.18	38	1.07	29	1.05	16	0.72	95	95.68	0.99	-0.04	
Anus, anal canal	0	0.00	4	1.86	1	0.61	1	0.77	6	5.71	1.05	0.02	
Liver	2	1.01	6	0.86	7	1.24	4	0.82	19	19.54	0.97	-0.03	
Gallbladder	0	0.00	1	0.44	0	0.00	2	1.07	3	6.74	0.45	-0.23	
Bile ducts, other biliary	1	1.02	3	0.82	2	0.63	4	1.20	10	11.15	0.90	-0.07	
Pancreas	6	0.96	22	0.97	11	0.59	20	1.18	59	64.51	0.91	-0.34	
Respiratory system	74	1.45*	262	1.45*	199	1.42*	145	1.30*	680	483.01	1.41*	12.19	
Nose, nasal cavity, ear	0	0.00	2	1.43	5	4.79*	1	1.16	8	3.73	2.14	0.26	
Larynx	5	1.22	18	1.34	12	1.31	4	0.67	39	32.61	1.20	0.40	
Lung, bronchus	69	1.49*	242	1.47*	182	1.40*	140	1.34*	633	445.56	1.42*	11.60	
Female breast	22	0.68	100	0.88	66	0.75*	64	0.89	252	305.38	0.83*	-6.76	
Female genital system	8	0.51*	48	0.90	32	0.83	30	1.02	118	137.29	0.86	-2.44	
Cervix uteri	0	0.00	2	0.37	1	0.29	1	0.45	4	12.81	0.31*	-1.12	
Corpus uteri	2	0.23*	27	0.91	18	0.85	18	1.16	65	75.01	0.87	-1.27	
Ovary	5	1.14	15	0.99	8	0.70	10	1.10	38	39.96	0.95	-0.25	
Vagina	1	5.74	2	3.24	2	3.92	1	2.13	6	1.77	3.39*	0.54	
Vulva	0	0.00	1	0.61	3	2.06	0	0.00	4	5.07	0.79	-0.14	
Male genital system	36	0.79	161	0.91	139	0.89	131	0.97	467	513.21	0.91*	-5.59	
Prostate	35	0.78	160	0.91	138	0.89	131	0.98	464	508.89	0.91*	-5.43	
Testis	0	0.00	1	1.50	0	0.00	0	0.00	1	1.40	0.71	-0.05	
Urinary system	43	2.18*	84	1.18	97	1.66*	92	1.79*	316	200.68	1.57*	7.14	
Urinary bladder	14	1.10	58	1.24	68	1.74*	72	2.02*	212	134.26	1.58*	4.81	
Kidney parenchyma	29	4.97*	24	1.18	27	1.72*	14	1.11	94	54.42	1.73*	2.45	
Renal pelvis, other urinary	0	0.00	2	0.47	2	0.57	6	1.92	10	12.00	0.83	-0.12	
Ureter	0	0.00	0	0.00	0	0.00	2	1.93	2	3.97	0.50	-0.12	
Bone, joints	0	0.00	1	1.16	3	4.81	2	4.28	6	2.21	2.72	0.23	
Soft tissue including heart	0	0.00	7	2.00	6	2.23	3	1.26	16	9.59	1.67	0.40	
Kaposi sarcoma	9	33.81*	4	5.15*	2	4.27	1	2.73	16	1.88	8.52*	0.87	
Melanoma of skin	8	1.18	39	1.68*	31	1.78*	21	1.45	99	61.83	1.60*	2.30	
Eye, orbit	1	2.28	1	0.67	0	0.00	0	0.00	2	3.87	0.52	-0.12	
Brain, central nervous system	7	2.15	11	1.00	5	0.62	11	1.80	34	28.41	1.20	0.35	
Thyroid	5	2.67	4	0.67	4	1.01	3	1.10	16	14.54	1.10	0.09	
Lymphatic, hematopoietic	22	1.21	87	1.33*	84	1.56*	54	1.10	247	186.37	1.33*	3.75	
Hodgkin lymphoma	1	1.37	14	6.04*	6	3.82*	8	7.01*	29	5.76	5.04*	1.44	
Non-Hodgkin lymphoma	10	1.16	28	0.90	28	1.10	27	1.16	93	88.34	1.05	0.29	
Myeloma	1	0.33	3	0.27*	6	0.65	5	0.60	15	31.62	0.47*	-1.03	
Leukemia	10	1.72	42	1.98*	44	2.51*	14	0.87	110	60.65	1.81*	3.05	
Acute lymphocytic	1	5.32	0	0.00	1	2.05	0	0.00	2	1.71	1.17	0.02	
Chronic lymphocytic	1	0.41	7	0.79	3	0.41	2	0.31	13	25.07	0.52*	-0.75	
Acute non-lymphocytic	4	2.12	30	4.29*	33	5.53*	9	1.58	76	20.57	3.70*	3.43	
Chronic myeloid	2	2.57	3	1.09	4	1.77	2	0.93	11	7.94	1.39	0.19	

*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 78,918 PYR and for male cancers on 82,637 PYR.

Table 16.2.9: Risk of subsequent primary cancers after non-Hodgkin lymphoma, both sexes, ≥70 years of age, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	326	0.81*	948	0.94	478	1.08	144	1.06	1,896	1,989.70	0.95*	-11.62
All excluding same site	318	0.82*	923	0.95	464	1.09	139	1.07	1,844	1,918.01	0.96	-9.17
Buccal cavity, pharynx	11	1.33	27	1.36	13	1.59	3	1.24	54	38.64	1.40*	1.90
Lip	3	1.94	5	1.35	3	1.91	2	4.24	13	7.29	1.78	0.71
Tongue	1	0.64	6	1.61	1	0.66	0	0.00	8	7.23	1.11	0.09
Salivary gland	2	2.26	3	1.33	3	2.82	1	2.65	9	4.58	1.96	0.55
Mouth	3	1.34	8	1.47	4	1.73	0	0.00	15	10.75	1.40	0.53
Nasopharynx	0	0.00	1	1.68	2	8.54	0	0.00	3	1.15	2.60	0.23
Tonsil	0	0.00	0	0.00	0	0.00	0	0.00	0	2.47	0.00	-0.31
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.86	0.00	-0.11
Hypopharynx	2	2.82	3	1.86	0	0.00	0	0.00	5	3.00	1.66	0.25
Digestive system	82	0.82	247	0.97	119	1.01	42	1.08	490	510.86	0.96	-2.59
Esophagus	4	1.03	5	0.52	5	1.23	2	1.60	16	18.79	0.85	-0.35
Stomach	9	0.89	29	1.15	20	1.76*	4	1.06	62	50.44	1.23	1.43
Small intestine	1	0.82	1	0.32	2	1.41	0	0.00	4	6.21	0.64	-0.27
Colon	44	0.91	125	1.00	56	0.95	24	1.20	249	251.86	0.99	-0.35
Rectum, rectosigmoid junction	10	0.63	43	1.09	13	0.76	6	1.15	72	77.67	0.93	-0.70
Anus, anal canal	0	0.00	1	0.51	0	0.00	0	0.00	1	3.91	0.26	-0.36
Liver	5	1.72	4	0.55	4	1.27	1	1.07	14	14.25	0.98	-0.03
Gallbladder	1	0.61	2	0.48	2	1.04	0	0.00	5	8.39	0.60	-0.42
Bile ducts, other biliary	1	0.43	8	1.32	2	0.66	2	1.79	13	12.56	1.04	0.06
Pancreas	5	0.41*	28	0.91	14	0.99	3	0.62	50	61.74	0.81	-1.46
Respiratory system	56	0.89	143	0.93	77	1.23	16	0.96	292	295.56	0.99	-0.44
Nose, nasal cavity, ear	1	1.80	0	0.00	0	0.00	0	0.00	1	2.82	0.35	-0.23
Larynx	6	1.87	5	0.67	4	1.49	0	0.00	15	13.96	1.07	0.13
Lung, bronchus	49	0.83	138	0.96	73	1.23	16	1.01	276	278.04	0.99	-0.25
Female breast	17	0.41*	88	0.82	58	1.17	21	1.29	184	214.23	0.86*	-6.36
Female genital system	18	1.01	36	0.80	17	0.86	11	1.71	82	89.03	0.92	-1.48
Cervix uteri	1	0.64	1	0.26	1	0.63	2	3.94	5	7.43	0.67	-0.51
Corpus uteri	7	0.80	20	0.91	7	0.76	6	2.22	40	42.56	0.94	-0.54
Ovary	7	1.29	11	0.79	6	0.94	0	0.00	24	27.91	0.86	-0.82
Vagina	1	2.85	0	0.00	0	0.00	0	0.00	1	1.88	0.53	-0.18
Vulva	2	1.70	4	1.26	3	1.81	2	2.96	11	6.69	1.65	0.91
Male genital system	53	0.68*	176	0.93	75	0.99	16	0.85	320	361.22	0.89*	-12.45
Prostate	53	0.68*	174	0.93	75	1.00	16	0.85	318	358.47	0.89*	-12.23
Testis	0	0.00	0	0.00	0	0.00	0	0.00	0	0.35	0.00	-0.10
Urinary system	40	1.22	69	0.84	37	1.01	11	0.98	157	162.88	0.96	-0.73
Urinary bladder	19	0.80	50	0.84	27	1.01	11	1.33	107	118.33	0.90	-1.40
Kidney parenchyma	20	2.89*	14	0.81	8	1.09	0	0.00	42	33.58	1.25	1.04
Renal pelvis, other urinary	1	0.45	5	0.90	2	0.82	0	0.00	8	10.97	0.73	-0.37
Ureter	0	0.00	1	0.54	2	2.48	0	0.00	3	3.67	0.82	-0.08
Bone, joints	1	3.31	0	0.00	0	0.00	0	0.00	1	1.45	0.69	-0.06
Soft tissue including heart	0	0.00	3	0.78	3	1.66	1	1.64	7	7.79	0.90	-0.10
Kaposi sarcoma	1	3.21	0	0.00	1	2.39	0	0.00	2	1.71	1.17	0.04
Melanoma of skin	10	1.39	29	1.57*	10	1.18	1	0.35	50	37.01	1.35*	1.61
Eye, orbit	1	1.86	1	0.76	1	1.79	0	0.00	3	2.58	1.16	0.05
Brain, central nervous system	0	0.00	8	0.95	3	0.86	1	1.04	12	16.22	0.74	-0.52
Thyroid	5	3.51*	3	0.87	1	0.70	0	0.00	9	6.74	1.34	0.28
Lymphatic, hematopoietic	21	0.66	77	0.95	44	1.17	11	0.90	153	162.75	0.94	-1.21
Hodgkin lymphoma	1	1.34	7	3.88*	3	4.04	1	4.87	12	3.50	3.43*	1.05
Non-Hodgkin lymphoma	8	0.57	25	0.70	14	0.84	5	0.94	52	71.69	0.73*	-2.44
Myeloma	3	0.55	9	0.64	4	0.63	1	0.50	17	27.78	0.61*	-1.34
Leukemia	9	0.77	36	1.21	23	1.67*	4	0.86	72	59.78	1.20	1.52
Acute lymphocytic	0	0.00	0	0.00	0	0.00	0	0.00	0	1.39	0.00	-0.17
Chronic lymphocytic	1	0.22	3	0.26*	2	0.38	2	1.13	8	23.35	0.34*	-1.90
Acute non-lymphocytic	5	1.25	18	1.76*	13	2.76*	1	0.64	37	20.47	1.81*	2.05
Chronic myeloid	2	1.28	8	1.98	4	2.08	0	0.00	14	8.19	1.71	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 47,561 PYR and for male cancers on 33,100 PYR.

Non-Hodgkin Lymphoma Both Sexes, Radiotherapy

Table 16.2.10: Risk of subsequent primary cancers after non-Hodgkin lymphoma, both sexes, with initial radiotherapy, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
Number starting interval	21,024		15,192		7,852		4,008		21,024			
Person-years in interval	14,563		42,961		28,435		23,133		109,093			
All subsequent cancers	202	1.13	583	1.07	452	1.19*	439	1.30*	1,676	1,441.52	1.16*	21.49
All excluding same site	192	1.11	563	1.07	434	1.19*	417	1.28*	1,606	1,390.23	1.16*	19.78
Buccal cavity, pharynx	6	1.28	13	0.92	14	1.50	14	1.82	47	35.77	1.31	1.03
Lip	1	1.40	3	1.45	2	1.51	3	2.78	9	5.18	1.74	0.35
Tongue	0	0.00	0	0.00	4	2.09	2	1.24	6	7.31	0.82	-0.12
Salivary gland	0	0.00	0	0.00	2	2.35	3	3.87	5	3.27	1.53	0.16
Mouth	3	2.38	5	1.32	2	0.80	3	1.49	13	9.55	1.36	0.32
Nasopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	1.48	0.00	-0.14
Tonsil	1	2.28	1	0.76	1	1.16	2	2.83	5	3.32	1.50	0.15
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.98	0.00	-0.09
Hypopharynx	0	0.00	3	2.20	2	2.23	0	0.00	5	3.43	1.46	0.14
Digestive system	32	0.79	124	1.02	80	0.96	87	1.21	323	317.92	1.02	0.47
Esophagus	0	0.00	1	0.18*	3	0.78	6	1.73	10	14.76	0.68	-0.44
Stomach	4	0.97	16	1.33	11	1.38	8	1.19	39	30.91	1.26	0.74
Small intestine	2	3.69	2	1.19	2	1.67	3	2.71	9	4.52	1.99	0.41
Colon	13	0.70	54	0.97	36	0.93	42	1.26	145	146.30	0.99	-0.12
Rectum, rectosigmoid junction	3	0.42	25	1.19	15	1.06	9	0.76	52	54.09	0.96	-0.19
Anus, anal canal	0	0.00	2	1.67	0	0.00	2	2.74	4	3.15	1.27	0.08
Liver	5	3.78*	3	0.75	2	0.72	0	0.00	10	10.72	0.93	-0.07
Gallbladder	0	0.00	2	1.10	0	0.00	1	1.03	3	4.62	0.65	-0.15
Bile ducts, other biliary	1	1.14	3	1.13	2	1.06	3	1.70	9	7.18	1.25	0.17
Pancreas	4	0.82	15	1.02	8	0.79	13	1.48	40	38.43	1.04	0.14
Respiratory system	32	1.07	108	1.18	94	1.48*	76	1.37*	310	240.31	1.29*	6.39
Nose, nasal cavity, ear	1	3.68	0	0.00	0	0.00	1	2.10	2	2.12	0.94	-0.01
Larynx	5	2.54	7	1.18	6	1.53	1	0.31	19	15.04	1.26	0.36
Lung, bronchus	26	0.95	101	1.19	88	1.50*	74	1.44*	289	222.52	1.30*	6.09
Female breast	13	0.61	70	1.06	45	0.96	49	1.25	177	173.73	1.02	0.62
Female genital system	10	1.01	24	0.81	22	1.09	22	1.37	78	75.88	1.03	0.40
Cervix uteri	0	0.00	2	0.60	0	0.00	2	1.27	4	8.13	0.49	-0.78
Corpus uteri	5	0.99	14	0.92	14	1.37	12	1.50	45	38.53	1.17	1.22
Ovary	3	1.05	6	0.69	5	0.82	7	1.41	21	22.69	0.93	-0.32
Vagina	1	6.75	0	0.00	1	3.27	1	4.02	3	1.15	2.61	0.35
Vulva	1	2.20	1	0.72	2	2.01	0	0.00	4	3.68	1.09	0.06
Male genital system	28	0.93	82	0.87	75	1.12	55	0.83	240	257.09	0.93	-3.04
Prostate	28	0.95	81	0.88	74	1.13	55	0.84	238	253.29	0.94	-2.72
Testis	0	0.00	0	0.00	0	0.00	0	0.00	0	2.13	0.00	-0.38
Urinary system	21	1.53	33	0.79	35	1.20	52	1.96*	141	111.35	1.27*	2.72
Urinary bladder	8	0.85	22	0.77	21	1.06	41	2.25*	92	76.25	1.21	1.44
Kidney parenchyma	13	3.82*	10	0.95	12	1.62	8	1.18	43	28.14	1.53*	1.36
Renal pelvis, other urinary	0	0.00	1	0.37	2	1.10	3	1.92	6	6.96	0.86	-0.09
Ureter	0	0.00	0	0.00	1	1.66	2	3.91	3	2.30	1.30	0.06
Bone, joints	0	0.00	3	5.68*	3	8.43*	4	13.36*	10	1.36	7.35*	0.79
Soft tissue including heart	0	0.00	1	0.45	6	3.94*	2	1.45	9	5.84	1.54	0.29
Kaposi sarcoma	22	60.44*	6	5.85*	1	1.38	1	1.64	30	2.72	11.01*	2.50
Melanoma of skin	8	1.97	26	2.03*	10	1.09	15	1.71	59	34.89	1.69*	2.21
Eye, orbit	0	0.00	1	1.21	1	1.80	0	0.00	2	2.13	0.94	-0.01
Brain, central nervous system	4	2.08	5	0.85	2	0.49	6	1.74	17	15.31	1.11	0.16
Thyroid	6	5.27*	7	2.02	3	1.28	1	0.49	17	8.97	1.89*	0.74
Lymphatic, hematopoietic	14	1.02	55	1.32	40	1.37	36	1.38	145	110.60	1.31*	3.15
Hodgkin lymphoma	0	0.00	7	4.52*	4	3.92*	5	5.95*	16	3.95	4.06*	1.11
Non-Hodgkin lymphoma	10	1.62	20	1.05	18	1.32	22	1.77*	70	51.29	1.36*	1.72
Myeloma	1	0.45	3	0.44	2	0.42	2	0.47	8	18.00	0.44*	-0.92
Leukemia	3	0.63	25	1.76*	16	1.64	7	0.81	51	37.37	1.36*	1.25
Acute lymphocytic	0	0.00	0	0.00	1	3.28	0	0.00	1	1.15	0.87	-0.01
Chronic lymphocytic	0	0.00	2	0.36	2	0.52	0	0.00	4	14.70	0.27*	-0.98
Acute non-lymphocytic	2	1.25	16	3.31*	10	2.99*	6	2.01	34	12.76	2.67*	1.95
Chronic myeloid	0	0.00	3	1.55	3	2.26	0	0.00	6	5.10	1.18	0.08

*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 52,891 PYR and for male cancers on 56,202 PYR.

Table 16.2.11: Risk of subsequent primary cancers after non-Hodgkin lymphoma, both sexes, without initial radiotherapy, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	541	1.06	1,608	1.07*	1,096	1.18*	756	1.23*	4,001	3,554.57	1.13*	18.33
All excluding same site	527	1.07	1,561	1.08*	1,062	1.19*	734	1.25*	3,884	3,428.29	1.13*	18.71
Buccal cavity, pharynx	18	1.38	43	1.15	37	1.69*	25	1.87*	123	85.76	1.43*	1.53
Lip	4	2.03	6	1.09	9	2.89*	3	1.62	22	12.42	1.77*	0.39
Tongue	1	0.38	14	1.84*	7	1.55	7	2.49	29	17.54	1.65*	0.47
Salivary gland	3	2.60	6	1.77	5	2.39	3	2.14	17	8.04	2.11*	0.37
Mouth	6	1.73	9	0.90	11	1.89	6	1.69	32	22.86	1.40	0.38
Nasopharynx	0	0.00	4	2.75	2	2.41	2	4.04	8	3.29	2.43*	0.19
Tonsil	1	0.82	1	0.28	1	0.50	3	2.49	6	7.96	0.75	-0.08
Oropharynx	1	2.78	0	0.00	0	0.00	0	0.00	1	2.37	0.42	-0.06
Hypopharynx	2	1.57	2	0.55	2	0.96	1	0.83	7	8.23	0.85	-0.05
Digestive system	107	0.94	331	1.00	216	1.07	151	1.14	805	779.44	1.03	1.05
Esophagus	8	1.48	10	0.64	10	1.05	7	1.13	35	36.89	0.95	-0.08
Stomach	12	1.06	30	0.93	26	1.37	13	1.09	81	74.46	1.09	0.27
Small intestine	1	0.63	4	0.85	5	1.68	1	0.49	11	11.31	0.97	-0.01
Colon	53	1.01	168	1.10	105	1.12	81	1.31*	407	360.75	1.13*	1.90
Rectum, rectosigmoid junction	19	0.97	59	1.04	32	0.95	18	0.85	128	130.98	0.98	-0.12
Anus, anal canal	0	0.00	7	2.16	2	1.00	0	0.00	9	7.70	1.17	0.05
Liver	2	0.53	8	0.73	9	1.33	6	1.32	25	25.99	0.96	-0.04
Gallbladder	1	0.60	1	0.21	2	0.70	1	0.55	5	11.07	0.45	-0.25
Bile ducts, other biliary	1	0.40	8	1.09	4	0.86	6	1.83	19	17.70	1.07	0.05
Pancreas	7	0.51	35	0.87	20	0.82	17	1.04	79	94.55	0.84	-0.64
Respiratory system	103	1.19	317	1.25*	218	1.42*	146	1.47*	784	592.77	1.32*	7.85
Nose, nasal cavity, ear	0	0.00	3	1.37	5	3.77*	1	1.17	9	5.12	1.76	0.16
Larynx	6	1.07	17	1.06	13	1.40	5	0.91	41	36.42	1.13	0.19
Lung, bronchus	97	1.22	297	1.27*	200	1.40*	140	1.51*	734	549.75	1.34*	7.56
Female breast	32	0.56*	123	0.71*	100	0.91	73	0.96	328	417.91	0.78*	-7.56
Female genital system	20	0.78	68	0.89	42	0.91	36	1.17	166	179.19	0.93	-1.11
Cervix uteri	3	1.07	4	0.49	3	0.65	4	1.44	14	18.32	0.76	-0.36
Corpus uteri	6	0.46*	35	0.90	19	0.81	20	1.29	80	91.09	0.88	-0.93
Ovary	9	1.19	23	1.01	10	0.71	7	0.73	49	54.02	0.91	-0.42
Vagina	1	2.54	2	1.71	2	2.77	1	2.04	6	2.77	2.16	0.27
Vulva	1	0.82	4	1.10	8	3.41*	3	1.76	16	8.92	1.79*	0.60
Male genital system	61	0.64*	263	0.95	151	0.87	113	0.98	588	661.97	0.89*	-5.93
Prostate	60	0.64*	257	0.94	148	0.86	113	1.00	578	653.68	0.88*	-6.07
Testis	0	0.00	3	1.60	2	1.96	0	0.00	5	4.18	1.19	0.07
Urinary system	70	1.74*	126	1.07	112	1.55*	84	1.76*	392	277.04	1.41*	4.72
Urinary bladder	26	0.94	89	1.11	83	1.68*	64	1.96*	262	190.33	1.38*	2.94
Kidney parenchyma	43	4.33*	29	0.99	27	1.48	15	1.23	114	69.67	1.64*	1.82
Renal pelvis, other urinary	1	0.39	8	1.10	2	0.46	5	1.77	16	17.04	0.94	-0.04
Ureter	0	0.00	1	0.41	1	0.70	0	0.00	2	5.61	0.36	-0.15
Bone, joints	2	4.23	2	1.46	2	2.46	0	0.00	6	3.17	1.89	0.12
Soft tissue including heart	0	0.00	11	1.84	5	1.36	2	0.80	18	14.18	1.27	0.16
Kaposi sarcoma	42	43.88*	30	11.25*	9	5.86*	2	2.24	83	6.05	13.71*	3.16
Melanoma of skin	14	1.19	58	1.64*	43	1.92*	15	0.96	130	85.18	1.53*	1.84
Eye, orbit	2	2.63	1	0.45	1	0.76	0	0.00	4	5.12	0.78	-0.05
Brain, central nervous system	5	0.93	17	1.08	6	0.64	10	1.65	38	36.60	1.04	0.06
Thyroid	6	2.03	7	0.80	5	0.95	3	0.87	21	20.44	1.03	0.02
Lymphatic, hematopoietic	38	0.98	145	1.27*	113	1.59*	59	1.23	355	272.19	1.30*	3.40
Hodgkin lymphoma	3	2.20	22	5.67*	8	3.59*	12	8.78*	45	8.84	5.09*	1.48
Non-Hodgkin lymphoma	14	0.79	47	0.89	34	1.03	22	0.96	117	126.28	0.93	-0.38
Myeloma	3	0.46	10	0.53*	9	0.77	5	0.64	27	45.05	0.60*	-0.74
Leukemia	18	1.34	66	1.69*	62	2.60*	20	1.27	166	92.02	1.80*	3.04
Acute lymphocytic	1	2.49	0	0.00	1	1.43	0	0.00	2	2.71	0.74	-0.03
Chronic lymphocytic	2	0.38	9	0.58	5	0.53	5	0.81	21	36.43	0.58*	-0.63
Acute non-lymphocytic	9	1.99	43	3.25*	44	5.41*	12	2.19*	108	31.38	3.44*	3.15
Chronic myeloid	4	2.19	8	1.51	5	1.54	2	0.92	19	12.53	1.52	0.27

*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 118,953 PYR and for male cancers on 124,649 PYR.

Non-Hodgkin Lymphoma

Both Sexes, Long-term Follow-up, Radiotherapy

Table 16.2.12: Risk of subsequent primary cancers after non-Hodgkin lymphoma, both sexes, long-term follow-up, with initial radiotherapy, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis										EAR	
	<10 years		10-14 years		15-19 years		≥20 years		Total			
Number starting interval	21,024		4,008		1,901		794		21,024			
Person-years in interval	85,959		14,293		6,366		2,474		109,093			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	1,237	1.12*	260	1.28*	122	1.28*	57	1.46*	1,676	1,441.52	1.16*	21.49
All excluding same site	1,189	1.12*	244	1.25*	117	1.28*	56	1.49*	1,606	1,390.23	1.16*	19.78
Buccal cavity, pharynx	33	1.17	10	2.11*	4	1.90	0	0.00	47	35.77	1.31	1.03
Lip	6	1.46	3	4.51	0	0.00	0	0.00	9	5.18	1.74	0.35
Tongue	4	0.70	2	2.03	0	0.00	0	0.00	6	7.31	0.82	-0.12
Salivary gland	2	0.80	1	2.15	2	9.19*	0	0.00	5	3.27	1.53	0.16
Mouth	10	1.33	3	2.40	0	0.00	0	0.00	13	9.55	1.36	0.32
Nasopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	1.48	0.00	-0.14
Tonsil	3	1.15	0	0.00	2	10.22*	0	0.00	5	3.32	1.50	0.15
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.98	0.00	-0.09
Hypopharynx	5	1.84	0	0.00	0	0.00	0	0.00	5	3.43	1.46	0.14
Digestive system	236	0.96	41	0.93	30	1.51*	16	1.95*	323	317.92	1.02	0.47
Esophagus	4	0.35*	4	1.93	2	2.05	0	0.00	10	14.76	0.68	-0.44
Stomach	31	1.28	4	0.97	4	2.17	0	0.00	39	30.91	1.26	0.74
Small intestine	6	1.76	1	1.52	2	6.36	0	0.00	9	4.52	1.99	0.41
Colon	103	0.91	20	0.98	12	1.30	10	2.65*	145	146.30	0.99	-0.12
Rectum, rectosigmoid junction	43	1.02	4	0.55	2	0.62	3	2.29	52	54.09	0.96	-0.19
Anus, anal canal	2	0.83	0	0.00	2	9.77*	0	0.00	4	3.15	1.27	0.08
Liver	10	1.23	0	0.00	0	0.00	0	0.00	10	10.72	0.93	-0.07
Gallbladder	2	0.55	1	1.66	0	0.00	0	0.00	3	4.62	0.65	-0.15
Bile ducts, other biliary	6	1.11	2	1.92	1	1.99	0	0.00	9	7.18	1.25	0.17
Pancreas	27	0.91	5	0.94	5	2.05	3	2.98	40	38.43	1.04	0.14
Respiratory system	234	1.27*	38	1.13	30	1.94*	8	1.26	310	240.31	1.29*	6.39
Nose, nasal cavity, ear	1	0.61	0	0.00	1	7.58	0	0.00	2	2.12	0.94	-0.01
Larynx	18	1.53	0	0.00	1	1.13	0	0.00	19	15.04	1.26	0.36
Lung, bronchus	215	1.26*	38	1.22	28	1.94*	8	1.35	289	222.52	1.30*	6.09
Female breast	128	0.95	32	1.33	11	1.02	6	1.39	177	173.73	1.02	0.62
Female genital system	56	0.94	17	1.71	4	0.92	1	0.59	78	75.88	1.03	0.40
Cervix uteri	2	0.31	2	2.01	0	0.00	0	0.00	4	8.13	0.49	-0.78
Corpus uteri	33	1.08	10	2.01	1	0.46	1	1.17	45	38.53	1.17	1.22
Ovary	14	0.79	5	1.63	2	1.47	0	0.00	21	22.69	0.93	-0.32
Vagina	2	2.23	0	0.00	1	14.78	0	0.00	3	1.15	2.61	0.35
Vulva	4	1.41	0	0.00	0	0.00	0	0.00	4	3.68	1.09	0.06
Male genital system	185	0.97	33	0.85	13	0.66	9	1.13	240	257.09	0.93	-3.04
Prostate	183	0.97	33	0.86	13	0.67	9	1.15	238	253.29	0.94	-2.72
Testis	0	0.00	0	0.00	0	0.00	0	0.00	0	2.13	0.00	-0.38
Urinary system	89	1.05	33	2.09*	10	1.33	9	2.79*	141	111.35	1.27*	2.72
Urinary bladder	51	0.88	26	2.40*	8	1.55	7	3.14*	92	76.25	1.21	1.44
Kidney parenchyma	35	1.64*	5	1.24	2	1.04	1	1.23	43	28.14	1.53*	1.36
Renal pelvis, other urinary	3	0.56	2	2.12	0	0.00	1	5.52	6	6.96	0.86	-0.09
Ureter	1	0.56	2	6.40	0	0.00	0	0.00	3	2.30	1.30	0.06
Bone, joints	6	5.65*	2	10.97*	1	12.05	1	29.37	10	1.36	7.35*	0.79
Soft tissue including heart	7	1.57	0	0.00	2	5.12	0	0.00	9	5.84	1.54	0.29
Kaposi sarcoma	29	13.72*	1	2.50	0	0.00	0	0.00	30	2.72	11.01*	2.50
Melanoma of skin	44	1.69*	11	2.15*	2	0.79	2	1.74	59	34.89	1.69*	2.21
Eye, orbit	2	1.20	0	0.00	0	0.00	0	0.00	2	2.13	0.94	-0.01
Brain, central nervous system	11	0.93	3	1.43	2	2.10	1	2.56	17	15.31	1.11	0.16
Thyroid	16	2.30*	1	0.82	0	0.00	0	0.00	17	8.97	1.89*	0.74
Lymphatic, hematopoietic	109	1.29*	26	1.66*	7	0.95	3	0.97	145	110.60	1.31*	3.15
Hodgkin lymphoma	11	3.54*	3	5.77*	1	4.31	1	11.29	16	3.95	4.06*	1.11
Non-Hodgkin lymphoma	48	1.24	16	2.16*	5	1.42	1	0.66	70	51.29	1.36*	1.72
Myeloma	6	0.44*	2	0.78	0	0.00	0	0.00	8	18.00	0.44*	-0.92
Leukemia	44	1.53*	5	0.96	1	0.41	1	1.00	51	37.37	1.36*	1.25
Acute lymphocytic	1	1.12	0	0.00	0	0.00	0	0.00	1	1.15	0.87	-0.01
Chronic lymphocytic	4	0.35*	0	0.00	0	0.00	0	0.00	4	14.70	0.27*	-0.98
Acute non-lymphocytic	28	2.87*	4	2.24	1	1.19	1	2.78	34	12.76	2.67*	1.95
Chronic myeloid	6	1.53	0	0.00	0	0.00	0	0.00	6	5.10	1.18	0.08

*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 52,891 PYR and for male cancers on 56,202 PYR.

Non-Hodgkin Lymphoma Both Sexes, Long-term Follow-up, No Radiotherapy

Table 16.2.13: Risk of subsequent primary cancers after non-Hodgkin lymphoma, both sexes, long-term follow-up, without initial radiotherapy, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<10 years		10-14 years		15-19 years		≥20 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
	52,934		7,771		3,101		1,006		52,934			
	205,623		25,668		9,471		2,841		243,602			
All subsequent cancers	3,245	1.10*	503	1.23*	185	1.18*	68	1.45*	4,001	3,554.57	1.13*	18.33
All excluding same site	3,150	1.11*	488	1.24*	181	1.20*	65	1.44*	3,884	3,428.29	1.13*	18.71
Buccal cavity, pharynx	98	1.35*	18	1.98*	7	2.11	0	0.00	123	85.76	1.43*	1.53
Lip	19	1.80*	3	2.37	0	0.00	0	0.00	22	12.42	1.77*	0.39
Tongue	22	1.49	4	2.11	3	4.27	0	0.00	29	17.54	1.65*	0.47
Salivary gland	14	2.11*	1	1.08	2	5.51	0	0.00	17	8.04	2.11*	0.37
Mouth	26	1.35	5	2.07	1	1.13	0	0.00	32	22.86	1.40	0.38
Nasopharynx	6	2.15	1	2.96	1	8.26	0	0.00	8	3.29	2.43*	0.19
Tonsil	3	0.44	3	3.63	0	0.00	0	0.00	6	7.96	0.75	-0.08
Oropharynx	1	0.50	0	0.00	0	0.00	0	0.00	1	2.37	0.42	-0.06
Hypopharynx	6	0.85	1	1.20	0	0.00	0	0.00	7	8.23	0.85	-0.05
Digestive system	654	1.01	96	1.09	42	1.24	13	1.25	805	779.44	1.03	1.05
Esophagus	28	0.91	6	1.44	1	0.63	0	0.00	35	36.89	0.95	-0.08
Stomach	68	1.09	9	1.12	3	0.99	1	1.11	81	74.46	1.09	0.27
Small intestine	10	1.08	1	0.74	0	0.00	0	0.00	11	11.31	0.97	-0.01
Colon	326	1.09	51	1.24	25	1.56*	5	1.02	407	360.75	1.13*	1.90
Rectum, rectosigmoid junction	110	1.00	8	0.56	5	0.94	5	3.14*	128	130.98	0.98	-0.12
Anus, anal canal	9	1.42	0	0.00	0	0.00	0	0.00	9	7.70	1.17	0.05
Liver	19	0.89	6	2.00	0	0.00	0	0.00	25	25.99	0.96	-0.04
Gallbladder	4	0.43	1	0.82	0	0.00	0	0.00	5	11.07	0.45	-0.25
Bile ducts, other biliary	13	0.90	3	1.41	2	2.30	1	3.60	19	17.70	1.07	0.05
Pancreas	62	0.79	11	1.02	5	1.19	1	0.77	79	94.55	0.84	-0.64
Respiratory system	638	1.29*	103	1.55*	28	1.10	15	2.00*	784	592.77	1.32*	7.85
Nose, nasal cavity, ear	8	1.88	1	1.76	0	0.00	0	0.00	9	5.12	1.76	0.16
Larynx	36	1.16	2	0.53	2	1.51	1	2.75	41	36.42	1.13	0.19
Lung, bronchus	594	1.30*	100	1.61*	26	1.09	14	1.99*	734	549.75	1.34*	7.56
Female breast	255	0.75*	42	0.84	27	1.35	4	0.63	328	417.91	0.78*	-7.56
Female genital system	130	0.88	25	1.23	7	0.87	4	1.59	166	179.19	0.93	-1.11
Cervix uteri	10	0.64	2	1.07	2	2.91	0	0.00	14	18.32	0.76	-0.36
Corpus uteri	60	0.79	14	1.37	4	0.99	2	1.58	80	91.09	0.88	-0.93
Ovary	42	0.95	4	0.63	1	0.40	2	2.53	49	54.02	0.91	-0.42
Vagina	5	2.19	1	3.12	0	0.00	0	0.00	6	2.77	2.16	0.27
Vulva	13	1.80	3	2.74	0	0.00	0	0.00	16	8.92	1.79*	0.60
Male genital system	475	0.87*	76	0.98	29	0.99	8	1.04	588	661.97	0.89*	-5.93
Prostate	465	0.86*	76	0.99	29	1.00	8	1.05	578	653.68	0.88*	-6.07
Testis	5	1.40	0	0.00	0	0.00	0	0.00	5	4.18	1.19	0.07
Urinary system	308	1.34*	49	1.55*	24	1.96*	11	2.98*	392	277.04	1.41*	4.72
Urinary bladder	198	1.26*	36	1.66*	19	2.26*	9	3.56*	262	190.33	1.38*	2.94
Kidney parenchyma	99	1.72*	11	1.36	3	0.96	1	1.06	114	69.67	1.64*	1.82
Renal pelvis, other urinary	11	0.77	2	1.06	2	2.76	1	4.57	16	17.04	0.94	-0.04
Ureter	2	0.43	0	0.00	0	0.00	0	0.00	2	5.61	0.36	-0.15
Bone, joints	6	2.26	0	0.00	0	0.00	0	0.00	6	3.17	1.89	0.12
Soft tissue including heart	16	1.37	1	0.61	0	0.00	1	4.97	18	14.18	1.27	0.16
Kaposi sarcoma	81	15.70*	2	3.19	0	0.00	0	0.00	83	6.05	13.71*	3.16
Melanoma of skin	115	1.65*	11	1.07	2	0.49	2	1.55	130	85.18	1.53*	1.84
Eye, orbit	4	0.94	0	0.00	0	0.00	0	0.00	4	5.12	0.78	-0.05
Brain, central nervous system	28	0.92	6	1.47	3	1.95	1	2.18	38	36.60	1.04	0.06
Thyroid	18	1.06	3	1.31	0	0.00	0	0.00	21	20.44	1.03	0.02
Lymphatic, hematopoietic	296	1.32*	43	1.36	9	0.73	7	1.84	355	272.19	1.30*	3.40
Hodgkin lymphoma	33	4.41*	8	8.63*	2	5.88	2	20.23*	45	8.84	5.09*	1.48
Non-Hodgkin lymphoma	95	0.92	15	1.00	4	0.67	3	1.61	117	126.28	0.93	-0.38
Myeloma	22	0.59*	3	0.58	1	0.49	1	1.63	27	45.05	0.60*	-0.74
Leukemia	146	1.91*	17	1.63	2	0.49	1	0.81	166	92.02	1.80*	3.04
Acute lymphocytic	2	0.88	0	0.00	0	0.00	0	0.00	2	2.71	0.74	-0.03
Chronic lymphocytic	16	0.53*	3	0.73	1	0.64	1	2.14	21	36.43	0.58*	-0.63
Acute non-lymphocytic	96	3.71*	11	3.05*	1	0.70	0	0.00	108	31.38	3.44*	3.15
Chronic myeloid	17	1.64	2	1.39	0	0.00	0	0.00	19	12.53	1.52	0.27

*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 118,953 PYR and for male cancers on 124,649 PYR.

Myeloma Both Sexes

Table 16.3.1: Characteristics of patients with an initial myeloma, both sexes, SEER 1973-2000.

Characteristics	Males		Females		Total	
	No.	%	No.	%	No.	%
Number of patients with 1st primary cancer						
Total	12,419	100.0	11,419	100.0	23,838	100.0
Initial treatment						
Any radiation	3,852	31.0	3,193	28.0	7,045	29.6
With surgery	368	3.0	209	1.8	577	2.4
Without surgery	3,484	28.1	2,984	26.1	6,468	27.1
No radiation	8,567	69.0	8,226	72.0	16,793	70.4
With surgery	138	1.1	88	0.8	226	0.9
Without surgery	8,429	67.9	8,138	71.3	16,567	69.5
Race						
White	9,904	79.7	8,993	78.8	18,897	79.3
Black	1,875	15.1	1,912	16.7	3,787	15.9
Other	607	4.9	489	4.3	1,096	4.6
Unknown	33	0.3	25	0.2	58	0.2
Age at 1st primary cancer diagnosis, years						
< 30	30	0.2	20	0.2	50	0.2
30–49	1,112	9.0	782	6.8	1,894	7.9
50–69	6,108	49.2	4,773	41.8	10,881	45.6
70–79	3,587	28.9	3,639	31.9	7,226	30.3
≥ 80	1,582	12.7	2,205	19.3	3,787	15.9
Number of patients with one or more primary cancers						
One primary cancer only	11,710	94.3	10,977	96.1	22,687	95.2
1st and 2nd cancers	660	5.3	424	3.7	1,084	4.5
1st, 2nd, and 3rd cancers	48	0.4	18	0.2	66	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	67.6	—	70.3	—	68.9	—
Median year of 1st cancer diagnosis	1989.1	—	1988.7	—	1989.0	—
Median person-years at risk	2.0	—	2.0	—	2.0	—
Percent histologically confirmed*						
Both 1st and 2nd cancers	—	86.7	—	87.3	—	87.0
1st, 2nd, and additional cancers	—	86.5	—	87.3	—	86.8
1st cancer only	—	7.2	—	5.2	—	6.4

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

Table 16.3.2: Risk of subsequent primary cancers after myeloma, both sexes, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	250	0.88	626	0.93	252	1.17*	91	1.10	1,219	1,255.85	0.97	-5.19
All excluding same site	250	0.90	624	0.94	251	1.18*	91	1.12	1,216	1,238.01	0.98	-3.10
Buccal cavity, pharynx	4	0.56	9	0.54	5	0.98	1	0.57	19	30.84	0.62*	-1.67
Lip	1	0.95	0	0.00	0	0.00	0	0.00	1	4.30	0.23	-0.46
Tongue	0	0.00	3	0.90	1	0.97	0	0.00	4	6.13	0.65	-0.30
Salivary gland	0	0.00	1	0.69	1	2.19	0	0.00	2	2.68	0.75	-0.10
Mouth	2	1.04	2	0.44	1	0.73	1	2.12	6	8.28	0.72	-0.32
Nasopharynx	0	0.00	1	1.57	0	0.00	0	0.00	1	1.18	0.85	-0.03
Tonsil	0	0.00	1	0.63	2	4.09	0	0.00	3	2.92	1.03	0.01
Oropharynx	1	4.86	0	0.00	0	0.00	0	0.00	1	0.90	1.11	0.01
Hypopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	3.25	0.00	-0.46
Digestive system	59	0.89	154	0.99	64	1.31*	18	0.97	295	288.87	1.02	0.86
Esophagus	1	0.30	5	0.63	0	0.00	1	1.03	7	14.87	0.47*	-1.11
Stomach	3	0.43	18	1.10	6	1.18	2	1.04	29	30.38	0.95	-0.19
Small intestine	1	1.13	5	2.31	2	2.80	0	0.00	8	4.06	1.97	0.55
Colon	33	1.10	60	0.85	38	1.69*	10	1.17	141	131.87	1.07	1.28
Rectum, rectosigmoid junction	5	0.46	28	1.10	8	1.02	5	1.81	46	47.05	0.98	-0.15
Anus, anal canal	0	0.00	2	1.46	0	0.00	0	0.00	2	2.54	0.79	-0.08
Liver	4	1.85	8	1.54	0	0.00	0	0.00	12	9.69	1.24	0.32
Gallbladder	0	0.00	0	0.00	1	1.49	0	0.00	1	4.07	0.25	-0.43
Bile ducts, other biliary	2	1.48	5	1.55	2	1.91	0	0.00	9	6.03	1.49	0.42
Pancreas	9	1.11	22	1.15	7	1.16	0	0.00	38	35.63	1.07	0.33
Respiratory system	31	0.64*	110	0.94	36	0.97	15	1.07	192	216.47	0.89	-3.44
Nose, nasal cavity, ear	0	0.00	0	0.00	1	3.29	0	0.00	1	1.80	0.56	-0.11
Larynx	0	0.00	7	0.92	4	1.69	2	2.43	13	14.08	0.92	-0.15
Lung, bronchus	31	0.69*	103	0.96	31	0.90	13	1.00	178	200.06	0.89	-3.10
Female breast	23	0.82	53	0.78	14	0.65	5	0.58	95	126.32	0.75*	-9.16
Female genital system	8	0.61	30	0.97	7	0.74	4	1.11	49	56.94	0.86	-2.32
Cervix uteri	0	0.00	4	1.09	1	0.93	0	0.00	5	6.74	0.74	-0.51
Corpus uteri	7	1.06	15	0.97	3	0.64	2	1.12	27	28.50	0.95	-0.44
Ovary	1	0.27	8	0.90	2	0.72	1	0.92	12	16.50	0.73	-1.32
Vagina	0	0.00	0	0.00	0	0.00	0	0.00	0	1.03	0.00	-0.30
Vulva	0	0.00	2	1.35	0	0.00	1	5.16	3	2.76	1.09	0.07
Male genital system	43	0.77	93	0.68*	32	0.71*	15	0.83	183	255.75	0.72*	-19.74
Prostate	42	0.76	92	0.68*	32	0.71	15	0.83	181	253.46	0.71*	-19.66
Testis	1	5.81	0	0.00	0	0.00	0	0.00	1	0.69	1.44	0.08
Urinary system	29	1.33	54	1.05	28	1.72*	10	1.66	121	95.65	1.27*	3.57
Urinary bladder	17	1.13	34	0.96	21	1.89*	8	1.97	80	65.68	1.22	2.02
Kidney parenchyma	11	2.07*	15	1.17	6	1.44	2	1.26	34	23.85	1.43	1.43
Renal pelvis, other urinary	1	0.71	5	1.51	1	0.98	0	0.00	7	6.11	1.14	0.12
Ureter	0	0.00	3	2.81	0	0.00	0	0.00	3	1.96	1.53	0.15
Bone, joints	0	0.00	1	1.86	1	6.14	0	0.00	2	0.99	2.03	0.14
Soft tissue including heart	1	0.93	2	0.78	0	0.00	0	0.00	3	4.74	0.63	-0.24
Kaposi sarcoma	2	6.39	1	1.36	1	4.25	1	13.01	5	1.36	3.67*	0.51
Melanoma of skin	9	1.75	15	1.20	6	1.47	3	2.00	33	23.23	1.42	1.38
Eye, orbit	1	2.68	0	0.00	1	3.83	0	0.00	2	1.59	1.26	0.06
Brain, central nervous system	5	1.91	6	0.96	1	0.52	1	1.48	13	11.46	1.13	0.22
Thyroid	3	2.26	5	1.59	0	0.00	1	2.81	9	5.81	1.55	0.45
Lymphatic, hematopoietic	22	1.05	78	1.57*	53	3.34*	16	2.64*	169	92.48	1.83*	10.77
Hodgkin lymphoma	2	3.19	0	0.00	0	0.00	1	7.19	3	2.62	1.14	0.05
Non-Hodgkin lymphoma	11	1.24	22	1.03	14	2.02*	4	1.50	51	39.88	1.28	1.56
Myeloma	0	0.00*	2	0.21*	1	0.32	0	0.00	3	17.84	0.17*	-2.09
Leukemia	9	1.22	54	3.12*	38	7.01*	11	5.45*	112	32.14	3.49*	11.24
Acute lymphocytic	0	0.00	2	4.42	0	0.00	1	19.79	3	0.84	3.58	0.30
Chronic lymphocytic	0	0.00	0	0.00*	1	0.46	0	0.00	1	12.89	0.08*	-1.67
Acute non-lymphocytic	6	2.44	42	7.21*	34	18.53*	8	11.52*	90	10.82	8.32*	11.15
Chronic myeloid	3	2.98	6	2.54	1	1.34	1	3.51	11	4.40	2.50*	0.93

*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 34,191 PYR and for male cancers on 36,856 PYR.

Myeloma Females

Table 16.3.3: Risk of subsequent primary cancers after myeloma, females, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	93	0.89	244	0.97	87	1.09	36	1.12	460	468.83	0.98	-2.58
All excluding same site	93	0.90	244	0.98	87	1.11	36	1.14	460	461.50	1.00	-0.44
Buccal cavity, pharynx	0	0.00	2	0.45	1	0.73	1	1.89	4	8.16	0.49	-1.22
Lip	0	0.00	0	0.00	0	0.00	0	0.00	0	0.55	0.00	-0.16
Tongue	0	0.00	0	0.00	0	0.00	0	0.00	0	1.78	0.00	-0.52
Salivary gland	0	0.00	1	2.11	0	0.00	0	0.00	1	0.88	1.14	0.03
Mouth	0	0.00	1	0.65	0	0.00	1	5.37	2	2.86	0.70	-0.25
Nasopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.32	0.00	-0.09
Tonsil	0	0.00	0	0.00	1	8.59	0	0.00	1	0.71	1.41	0.09
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.21	0.00	-0.06
Hypopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.56	0.00	-0.16
Digestive system	21	0.79	66	1.04	28	1.39	6	0.74	121	118.60	1.02	0.70
Esophagus	0	0.00	0	0.00	0	0.00	0	0.00	0	3.45	0.00	-1.01
Stomach	1	0.45	9	1.71	2	1.20	1	1.56	13	9.82	1.32	0.93
Small intestine	0	0.00	1	1.14	2	6.95	0	0.00	3	1.65	1.82	0.39
Colon	12	0.90	29	0.91	18	1.78*	4	0.99	63	59.37	1.06	1.06
Rectum, rectosigmoid junction	2	0.49	10	1.04	3	1.02	1	0.89	16	17.71	0.90	-0.50
Rectum	2	0.75	9	1.44	2	1.04	0	0.00	13	11.56	1.12	0.42
Anus, anal canal	0	0.00	2	2.59	0	0.00	0	0.00	2	1.44	1.39	0.16
Liver	1	1.75	2	1.44	0	0.00	0	0.00	3	2.62	1.14	0.11
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	2.63	0.00	-0.77
Bile ducts, other biliary	2	3.62	1	0.75	1	2.27	0	0.00	4	2.51	1.59	0.44
Pancreas	3	0.84	12	1.40	2	0.73	0	0.00	17	15.98	1.06	0.30
Respiratory system	11	0.82	27	0.81	9	0.83	5	1.08	52	62.23	0.84	-2.99
Nose, nasal cavity, ear	0	0.00	0	0.00	0	0.00	0	0.00	0	0.65	0.00	-0.19
Larynx	0	0.00	0	0.00	0	0.00	1	7.42	1	1.98	0.51	-0.29
Lung, bronchus	11	0.86	27	0.85	9	0.86	4	0.90	51	59.44	0.86	-2.47
Female breast	23	0.82	53	0.78	14	0.65	5	0.58	95	126.32	0.75*	-9.16
Female genital system	8	0.61	30	0.97	7	0.74	4	1.11	49	56.94	0.86	-2.32
Cervix uteri	0	0.00	4	1.09	1	0.93	0	0.00	5	6.74	0.74	-0.51
Corpus uteri	7	1.06	15	0.97	3	0.64	2	1.12	27	28.50	0.95	-0.44
Ovary	1	0.27	8	0.90	2	0.72	1	0.92	12	16.50	0.73	-1.32
Vagina	0	0.00	0	0.00	0	0.00	0	0.00	0	1.03	0.00	-0.30
Vulva	0	0.00	2	1.35	0	0.00	1	5.16	3	2.76	1.09	0.07
Urinary system	6	1.17	11	0.89	7	1.77	1	0.61	25	23.12	1.08	0.55
Urinary bladder	5	1.63	4	0.54	4	1.71	1	1.05	14	13.73	1.02	0.08
Kidney parenchyma	1	0.62	4	1.01	2	1.55	0	0.00	7	7.43	0.94	-0.13
Renal pelvis, other urinary	0	0.00	3	2.83	1	3.01	0	0.00	4	1.97	2.03	0.59
Ureter	0	0.00	2	6.27	0	0.00	0	0.00	2	0.59	3.38	0.41
Bone, joints	0	0.00	0	0.00	1	15.06	0	0.00	1	0.40	2.49	0.17
Soft tissue including heart	1	2.40	2	1.99	0	0.00	0	0.00	3	1.87	1.60	0.33
Kaposi sarcoma	0	0.00	0	0.00	1	27.95	0	0.00	1	0.20	4.91	0.23
Melanoma of skin	3	1.82	4	1.00	1	0.77	1	1.90	9	7.48	1.20	0.45
Eye, orbit	1	6.97	0	0.00	0	0.00	0	0.00	1	0.61	1.63	0.11
Brain, central nervous system	2	1.99	1	0.41	1	1.32	1	3.41	5	4.47	1.12	0.15
Thyroid	0	0.00	4	2.13	0	0.00	1	4.41	5	3.48	1.44	0.44
Lymphatic, hematopoietic	12	1.46	37	1.87*	16	2.52*	10	3.85*	75	36.97	2.03*	11.12
Hodgkin lymphoma	0	0.00	0	0.00	0	0.00	1	16.89	1	0.98	1.02	0.01
Non-Hodgkin lymphoma	8	2.15	9	0.99	3	1.02	1	0.82	21	16.94	1.24	1.19
Myeloma	0	0.00	0	0.00*	0	0.00	0	0.00	0	7.33	0.00*	-2.14
Leukemia	4	1.51	28	4.45*	13	6.55*	8	10.03*	53	11.72	4.52*	12.07
Acute lymphocytic	0	0.00	2	11.72*	0	0.00	0	0.00	2	0.32	6.28	0.49
Chronic lymphocytic	0	0.00	0	0.00	0	0.00	0	0.00	0	4.58	0.00*	-1.34
Acute non-lymphocytic	2	2.18	22	10.00*	13	18.65*	7	24.46*	44	4.10	10.73*	11.67
Chronic myeloid	2	5.47	3	3.45	0	0.00	1	9.00	6	1.62	3.70*	1.28

*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 16.3.4: Risk of subsequent primary cancers after myeloma, males, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	O	O/E	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	157	0.88	382	0.90*	165	1.22*	55	1.09	759	787.02	0.96	-7.60
All excluding same site	157	0.89	380	0.91	164	1.23*	55	1.11	756	776.51	0.97	-5.56
Buccal cavity, pharynx	4	0.75	7	0.57	4	1.07	0	0.00	15	22.68	0.66	-2.09
Lip	1	1.07	0	0.00	0	0.00	0	0.00	1	3.75	0.27	-0.75
Tongue	0	0.00	3	1.27	1	1.36	0	0.00	4	4.35	0.92	-0.10
Salivary gland	0	0.00	0	0.00	1	3.24	0	0.00	1	1.80	0.56	-0.22
Mouth	2	1.56	1	0.34	1	1.12	0	0.00	4	5.42	0.74	-0.39
Nasopharynx	0	0.00	1	2.15	0	0.00	0	0.00	1	0.86	1.16	0.04
Tonsil	0	0.00	1	0.83	1	2.68	0	0.00	2	2.22	0.90	-0.06
Oropharynx	1	6.27	0	0.00	0	0.00	0	0.00	1	0.70	1.43	0.08
Hypopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	2.69	0.00	-0.73
Digestive system	38	0.97	88	0.96	36	1.25	12	1.15	174	170.27	1.02	1.01
Esophagus	1	0.39	5	0.81	0	0.00	1	1.37	7	11.42	0.61	-1.20
Stomach	2	0.42	9	0.81	4	1.16	1	0.78	16	20.56	0.78	-1.24
Small intestine	1	1.89	4	3.12	0	0.00	0	0.00	5	2.41	2.07	0.70
Colon	21	1.26	31	0.79	20	1.62	6	1.33	78	72.50	1.08	1.49
Rectum, rectosigmoid junction	3	0.44	18	1.13	5	1.03	4	2.43	30	29.33	1.02	0.18
Anus, anal canal	0	0.00	0	0.00	0	0.00	0	0.00	0	1.10	0.00	-0.30
Liver	3	1.89	6	1.58	0	0.00	0	0.00	9	7.07	1.27	0.52
Gallbladder	0	0.00	0	0.00	1	4.26	0	0.00	1	1.43	0.70	-0.12
Bile ducts, other biliary	0	0.00	4	2.12	1	1.65	0	0.00	5	3.52	1.42	0.40
Pancreas	6	1.32	10	0.95	5	1.51	0	0.00	21	19.64	1.07	0.37
Respiratory system	20	0.57*	83	1.00	27	1.03	10	1.07	140	154.24	0.91	-3.86
Nose, nasal cavity, ear	0	0.00	0	0.00	1	5.19	0	0.00	1	1.15	0.87	-0.04
Larynx	0	0.00	7	1.06	4	1.97	1	1.45	12	12.10	0.99	-0.03
Lung, bronchus	20	0.62*	76	1.00	22	0.92	9	1.05	127	140.62	0.90	-3.69
Male breast	1	2.94	0	0.00	0	0.00	0	0.00	1	1.50	0.67	-0.14
Male genital system	43	0.77	93	0.68*	32	0.71*	15	0.83	183	255.75	0.72*	-19.74
Prostate	42	0.76	92	0.68*	32	0.71	15	0.83	181	253.46	0.71*	-19.66
Testis	1	5.81	0	0.00	0	0.00	0	0.00	1	0.69	1.44	0.08
Urinary system	23	1.39	43	1.10	21	1.70*	9	2.05	96	72.52	1.32*	6.37
Urinary bladder	12	1.00	30	1.07	17	1.93*	7	2.25	66	51.95	1.27	3.81
Kidney parenchyma	10	2.72*	11	1.24	4	1.40	2	1.91	27	16.43	1.64*	2.87
Renal pelvis, other urinary	1	1.03	2	0.89	0	0.00	0	0.00	3	4.15	0.72	-0.31
Ureter	0	0.00	1	1.34	0	0.00	0	0.00	1	1.37	0.73	-0.10
Bone, joints	0	0.00	1	3.13	0	0.00	0	0.00	1	0.58	1.71	0.11
Soft tissue including heart	0	0.00	0	0.00	0	0.00	0	0.00	0	2.87	0.00	-0.78
Kaposi sarcoma	2	7.45	1	1.59	0	0.00	1	16.06	4	1.16	3.45	0.77
Melanoma of skin	6	1.72	11	1.29	5	1.80	2	2.06	24	15.75	1.52	2.24
Eye, orbit	0	0.00	0	0.00	1	6.19	0	0.00	1	0.98	1.02	0.01
Brain, central nervous system	3	1.86	5	1.31	0	0.00	0	0.00	8	6.99	1.14	0.27
Thyroid	3	5.56*	1	0.79	0	0.00	0	0.00	4	2.33	1.71	0.45
Lymphatic, hematopoietic	10	0.79	41	1.37	37	3.89*	6	1.74	94	55.51	1.69*	10.44
Hodgkin lymphoma	2	5.01	0	0.00	0	0.00	0	0.00	2	1.64	1.22	0.10
Non-Hodgkin lymphoma	3	0.58	13	1.05	11	2.75*	3	2.08	30	22.95	1.31	1.91
Myeloma	0	0.00	2	0.36	1	0.55	0	0.00	3	10.51	0.29*	-2.04
Leukemia	5	1.06	26	2.36*	25	7.28*	3	2.46	59	20.41	2.89*	10.47
Acute lymphocytic	0	0.00	0	0.00	0	0.00	1	34.76	1	0.52	1.93	0.13
Chronic lymphocytic	0	0.00	0	0.00*	1	0.72	0	0.00	1	8.31	0.12*	-1.98
Acute non-lymphocytic	4	2.59	20	5.52*	21	18.46*	1	2.45	46	6.71	6.85*	10.66
Chronic myeloid	1	1.56	3	2.01	1	2.13	0	0.00	5	2.78	1.80	0.60

*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.

Myeloma Both Sexes, <70 Years of Age

Table 16.3.5: Risk of subsequent primary cancers after myeloma, both sexes, <70 years of age, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	Number starting interval	Person-years in interval	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
All subsequent cancers	93	0.87	327	1.04	174	1.27*	80	1.18	674	624.11	1.08	10.88
All excluding same site	93	0.88	325	1.05	173	1.28*	80	1.20	671	615.76	1.09*	12.05
Buccal cavity, pharynx	2	0.56	7	0.72	2	0.54	1	0.66	12	18.52	0.65	-1.42
Lip	0	0.00	0	0.00	0	0.00	0	0.00	0	2.02	0.00	-0.44
Tongue	0	0.00	2	0.99	1	1.29	0	0.00	3	3.84	0.78	-0.18
Salivary gland	0	0.00	1	1.51	0	0.00	0	0.00	1	1.30	0.77	-0.07
Mouth	1	1.04	1	0.39	0	0.00	1	2.50	3	4.92	0.61	-0.42
Nasopharynx	0	0.00	1	2.37	0	0.00	0	0.00	1	0.80	1.25	0.04
Tonsil	0	0.00	1	0.91	1	2.49	0	0.00	2	2.07	0.96	-0.02
Oropharynx	1	8.35	0	0.00	0	0.00	0	0.00	1	0.61	1.63	0.08
Hypopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	2.19	0.00	-0.48
Digestive system	18	0.84	63	1.00	34	1.22	16	1.12	131	126.90	1.03	0.90
Esophagus	0	0.00	2	0.46	0	0.00	1	1.20	3	8.56	0.35	-1.21
Stomach	2	0.90	5	0.77	2	0.71	2	1.39	11	12.93	0.85	-0.42
Small intestine	0	0.00	4	3.89*	1	2.19	0	0.00	5	2.07	2.41	0.64
Colon	8	0.91	23	0.87	20	1.67*	8	1.25	59	53.58	1.10	1.18
Rectum, rectosigmoid junction	3	0.75	14	1.22	6	1.25	5	2.25	28	22.47	1.25	1.21
Anus, anal canal	0	0.00	0	0.00	0	0.00	0	0.00	0	1.37	0.00	-0.30
Liver	1	1.16	4	1.58	0	0.00	0	0.00	5	5.08	0.98	-0.02
Gallbladder	0	0.00	0	0.00	0	0.00	0	0.00	0	1.48	0.00	-0.32
Bile ducts, other biliary	0	0.00	1	0.87	1	1.88	0	0.00	2	2.36	0.85	-0.08
Pancreas	3	1.13	10	1.27	4	1.16	0	0.00	17	15.80	1.08	0.26
Respiratory system	13	0.61	67	1.09	32	1.24	14	1.16	126	120.30	1.05	1.24
Nose, nasal cavity, ear	0	0.00	0	0.00	1	5.28	0	0.00	1	0.92	1.09	0.02
Larynx	0	0.00	7	1.47	4	2.17	2	2.69	13	9.12	1.43	0.85
Lung, bronchus	13	0.68	60	1.07	27	1.14	12	1.07	112	109.98	1.02	0.44
Female breast	10	0.83	31	0.92	10	0.72	4	0.56	55	67.02	0.82	-5.88
Female genital system	3	0.50	17	1.06	4	0.65	4	1.33	28	31.19	0.90	-1.56
Cervix uteri	0	0.00	2	0.95	0	0.00	0	0.00	2	3.99	0.50	-0.97
Corpus uteri	2	0.63	9	1.06	2	0.62	2	1.30	15	16.39	0.92	-0.68
Ovary	1	0.62	5	1.13	1	0.56	1	1.11	8	8.72	0.92	-0.35
Vagina	0	0.00	0	0.00	0	0.00	0	0.00	0	0.44	0.00	-0.21
Vulva	0	0.00	1	2.05	0	0.00	1	7.45	2	1.00	1.99	0.49
Male genital system	10	0.52*	45	0.73*	23	0.77	15	0.98	93	126.29	0.74*	-13.11
Prostate	10	0.53*	45	0.74*	23	0.77	15	0.99	93	124.97	0.74*	-12.59
Testis	0	0.00	0	0.00	0	0.00	0	0.00	0	0.57	0.00	-0.23
Urinary system	14	1.84*	30	1.33	18	1.81*	8	1.66	70	44.95	1.56*	5.46
Urinary bladder	10	2.07	18	1.24	12	1.85	7	2.20	47	29.01	1.62*	3.92
Kidney parenchyma	4	1.72	10	1.49	5	1.75	1	0.73	20	13.25	1.51	1.47
Renal pelvis, other urinary	0	0.00	2	1.48	1	1.69	0	0.00	3	2.68	1.12	0.07
Ureter	0	0.00	1	2.37	0	0.00	0	0.00	1	0.84	1.20	0.04
Bone, joints	0	0.00	1	3.52	1	8.98	0	0.00	2	0.55	3.67	0.32
Soft tissue including heart	1	2.38	2	1.67	0	0.00	0	0.00	3	2.36	1.27	0.14
Kaposi sarcoma	2	11.75*	1	2.31	0	0.00	1	17.53	4	0.82	4.89*	0.69
Melanoma of skin	4	1.68	11	1.63	5	1.80	2	1.62	22	13.14	1.67*	1.93
Eye, orbit	0	0.00	0	0.00	1	5.82	0	0.00	1	0.84	1.19	0.03
Brain, central nervous system	2	1.61	2	0.58	1	0.73	1	1.72	6	6.63	0.90	-0.14
Thyroid	2	2.69	2	1.01	0	0.00	1	3.19	5	3.77	1.33	0.27
Lymphatic, hematopoietic	7	0.96	41	1.91*	42	4.46*	12	2.51*	102	42.91	2.38*	12.89
Hodgkin lymphoma	1	3.22	0	0.00	0	0.00	1	8.35	2	1.54	1.30	0.10
Non-Hodgkin lymphoma	4	1.22	8	0.83	10	2.35*	2	0.93	24	19.31	1.24	1.02
Myeloma	0	0.00	2	0.48	1	0.54	0	0.00	3	8.35	0.36	-1.17
Leukemia	2	0.87	31	4.52*	31	10.25*	9	5.92*	73	13.71	5.32*	12.93
Acute lymphocytic	0	0.00	1	4.78	0	0.00	1	25.20	2	0.41	4.87	0.35
Chronic lymphocytic	0	0.00	0	0.00	1	0.81	0	0.00	1	5.64	0.18*	-1.01
Acute non-lymphocytic	2	2.68	25	11.10*	28	27.57*	6	11.34*	61	4.54	13.43*	12.32
Chronic myeloid	0	0.00	3	3.18	0	0.00	1	4.69	4	1.89	2.11	0.46

*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 20,449 PYR and for male cancers on 25,391 PYR.

Table 16.3.6: Risk of subsequent primary cancers after myeloma, both sexes, ≥70 years of age, SEER 1973-2000.

Subsequent primary cancer	Years after first primary cancer diagnosis											
	<1 year		1-4 years		5-9 years		≥10 years		Total			
	Number starting interval	Person-years in interval	O	O/E	O	O/E	O	O/E	O	E	O/E	EAR
	11,013	7,181							204	565		
			7,296	14,424	1,450	3,037					11,013	25,207
All subsequent cancers	157	0.89	299	0.83*	78	0.99	11	0.73	545	631.73	0.86*	-34.41
All excluding same site	157	0.90	299	0.84*	78	1.00	11	0.75	545	622.25	0.88*	-30.65
Buccal cavity, pharynx	2	0.56	2	0.28	3	2.11	0	0.00	7	12.33	0.57	-2.11
Lip	1	1.50	0	0.00	0	0.00	0	0.00	1	2.28	0.44	-0.51
Tongue	0	0.00	1	0.76	0	0.00	0	0.00	1	2.29	0.44	-0.51
Salivary gland	0	0.00	0	0.00	1	5.51	0	0.00	1	1.38	0.73	-0.15
Mouth	1	1.04	1	0.52	1	2.51	0	0.00	3	3.36	0.89	-0.14
Nasopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.38	0.00	-0.15
Tonsil	0	0.00	0	0.00	1	11.32	0	0.00	1	0.85	1.17	0.06
Oropharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	0.29	0.00	-0.11
Hypopharynx	0	0.00	0	0.00	0	0.00	0	0.00	0	1.06	0.00	-0.42
Digestive system	41	0.92	91	0.99	30	1.42	2	0.47	164	161.98	1.01	0.80
Esophagus	1	0.55	3	0.83	0	0.00	0	0.00	4	6.31	0.63	-0.92
Stomach	1	0.21	13	1.32	4	1.76	0	0.00	18	17.45	1.03	0.22
Small intestine	1	1.84	1	0.88	1	3.86	0	0.00	3	1.99	1.51	0.40
Colon	25	1.18	37	0.83	18	1.72*	2	0.94	82	78.29	1.05	1.47
Rectum, rectosigmoid junction	2	0.29	14	1.00	2	0.66	0	0.00	18	24.58	0.73	-2.61
Anus, anal canal	0	0.00	2	3.01	0	0.00	0	0.00	2	1.16	1.72	0.33
Liver	3	2.32	4	1.51	0	0.00	0	0.00	7	4.61	1.52	0.95
Gallbladder	0	0.00	0	0.00	1	2.94	0	0.00	1	2.59	0.39	-0.63
Bile ducts, other biliary	2	2.06	4	1.93	1	1.95	0	0.00	7	3.67	1.91	1.32
Pancreas	6	1.10	12	1.06	3	1.16	0	0.00	21	19.82	1.06	0.47
Respiratory system	18	0.65	43	0.78	4	0.35*	1	0.53	66	96.17	0.69*	-11.97
Nose, nasal cavity, ear	0	0.00	0	0.00	0	0.00	0	0.00	0	0.88	0.00	-0.35
Larynx	0	0.00	0	0.00	0	0.00	0	0.00	0	4.96	0.00*	-1.97
Lung, bronchus	18	0.70	43	0.83	4	0.38*	1	0.56	66	90.08	0.73*	-9.55
Female breast	13	0.81	22	0.65*	4	0.52	1	0.69	40	59.30	0.67*	-14.05
Female genital system	5	0.70	13	0.88	3	0.93	0	0.00	21	25.75	0.82	-3.45
Cervix uteri	0	0.00	2	1.28	1	2.91	0	0.00	3	2.75	1.09	0.18
Corpus uteri	5	1.46	6	0.86	1	0.70	0	0.00	12	12.11	0.99	-0.08
Ovary	0	0.00	3	0.67	1	1.00	0	0.00	4	7.78	0.51	-2.75
Vagina	0	0.00	0	0.00	0	0.00	0	0.00	0	0.59	0.00	-0.43
Vulva	0	0.00	1	1.01	0	0.00	0	0.00	1	1.76	0.57	-0.55
Male genital system	33	0.90	48	0.64*	9	0.59	0	0.00	90	129.46	0.70*	-34.42
Prostate	32	0.88	47	0.64*	9	0.59	0	0.00	88	128.50	0.68*	-35.32
Testis	1	27.30	0	0.00	0	0.00	0	0.00	1	0.12	8.30	0.77
Urinary system	15	1.06	24	0.83	10	1.57	2	1.68	51	50.70	1.01	0.12
Urinary bladder	7	0.69	16	0.76	9	1.93	1	1.13	33	36.67	0.90	-1.45
Kidney parenchyma	7	2.35	5	0.82	1	0.77	1	4.36	14	10.60	1.32	1.35
Renal pelvis, other urinary	1	1.04	3	1.53	0	0.00	0	0.00	4	3.43	1.17	0.23
Ureter	0	0.00	2	3.10	0	0.00	0	0.00	2	1.13	1.77	0.35
Bone, joints	0	0.00	0	0.00	0	0.00	0	0.00	0	0.44	0.00	-0.17
Soft tissue including heart	0	0.00	0	0.00	0	0.00	0	0.00	0	2.38	0.00	-0.94
Kaposi sarcoma	0	0.00	0	0.00	1	12.95	0	0.00	1	0.54	1.84	0.18
Melanoma of skin	5	1.82	4	0.69	1	0.77	1	3.79	11	10.09	1.09	0.36
Eye, orbit	1	4.64	0	0.00	0	0.00	0	0.00	1	0.75	1.33	0.10
Brain, central nervous system	3	2.18	4	1.43	0	0.00	0	0.00	7	4.83	1.45	0.86
Thyroid	1	1.71	3	2.55	0	0.00	0	0.00	4	2.05	1.95	0.77
Lymphatic, hematopoietic	15	1.10	37	1.31	11	1.71	4	3.12	67	49.57	1.35*	6.91
Hodgkin lymphoma	1	3.15	0	0.00	0	0.00	0	0.00	1	1.09	0.92	-0.03
Non-Hodgkin lymphoma	7	1.25	14	1.19	4	1.49	2	3.86	27	20.57	1.31	2.55
Myeloma	0	0.00	0	0.00*	0	0.00	0	0.00	0	9.49	0.00*	-3.76
Leukemia	7	1.38	23	2.20*	7	2.92*	2	4.03	39	18.42	2.12*	8.16
Acute lymphocytic	0	0.00	1	4.11	0	0.00	0	0.00	1	0.43	2.34	0.23
Chronic lymphocytic	0	0.00	0	0.00*	0	0.00	0	0.00	0	7.25	0.00*	-2.88
Acute non-lymphocytic	4	2.33	17	4.76*	6	7.33*	2	12.10*	29	6.27	4.62*	9.02
Chronic myeloid	3	4.41	3	2.11	1	3.00	0	0.00	7	2.51	2.79*	1.78

*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 13,742 PYR and for male cancers on 11,465 PYR.

