

# Chapter 7

## New Malignancies Following Breast Cancer

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### Synopsis

The overall risk of subsequent cancer was increased by 18% among 322,863 women diagnosed with a first primary cancer of the breast during 1973-2000 (O/E=1.18, O=34,500, EAR=23 per 10,000 person-years). The highest cancer risks for a new cancer occurred after early-onset breast cancer (ages <40 years, O/E=3.33, EAR=71; ages 40-49 years, O/E=1.59, EAR=38). New primary cancers of the breast accounted for nearly 40% of all subsequent malignancies, with increased risks likely reflecting hormonal, genetic, and other risk factors that predisposed women to the initial breast malignancy, as well as intensive medical screening of the opposite breast. Genetic predisposition, notably from BRCA1/2 susceptibility genes, probably contributed to the pronounced excesses of subsequent breast and ovarian malignancies among younger women (ages <50 years). Risks were significantly elevated for subsequent cancers of the uterine corpus, which have been reported in association with the wide use of tamoxifen therapy since the early 1980s. In addition, the constellation of multiple primary cancers involving the breast, ovary, and uterine corpus may reflect shared hormonal, genetic, and lifestyle factors, such as nulliparity. Radiotherapy appeared to account for the observed excesses of cancers of the esophagus, lung, bone, and soft tissues among long-term survivors, while chemotherapy probably played the primary role in the elevated risk of acute non-lymphocytic leukemia. The increased risks for thyroid cancer and cutaneous melanoma after breast cancer, as well as reciprocally elevated risks of breast cancer after these tumors, provide clues to shared etiologic factors, including genetic susceptibility (e.g., BRCA2 and melanoma). Other cancer excesses may be related to increased medical surveillance (salivary gland cancer) or, in unusual cases, misclassified metastases (stomach cancer). Women with breast cancer also had significantly lower than expected risks for several subsequent malignancies, particularly cancers of the pancreas, cervix, and lung, as well as non-Hodgkin lymphoma and chronic lymphocytic leukemia. Some of these decreased risks have been related to lower rates of tobacco use among women with breast cancer than

those seen in the general population, or to other differences in social-class-related lifestyle factors.

The overall risk of subsequent cancers among 2,158 men diagnosed with breast cancer showed a borderline significant elevation (O/E=1.11, O=355, EAR=24). The large excess of new breast cancers was probably related to genetic predisposition, particularly BRCA2 mutations. A moderate elevation in risk of prostate cancer, noted only in the most recent period (1995 and later), may be related to increased medical surveillance or, less commonly, genetic factors such as BRCA2 mutations.

### Female Breast Cancer

Invasive breast cancer is the most frequently diagnosed new malignancy and the second most common cause of cancer death, after lung cancer, among women in the U.S. This malignancy currently accounts for 32% of all new cancer cases and 15% of cancer deaths among American women (Jemal et al, 2005). Incidence rates in the SEER database vary greatly by race and ethnic group, with lower rates seen for black, Asian, and Hispanic women than for white women. Although breast cancer incidence rates have been increasing since the 1980s, death rates have declined by about 2.3% per year since 1990 (Edwards et al, 2005), with some of the downturn related to increases in early detection by mammography and to effective treatment with adjuvant chemotherapy (Berry et al, 2005). About 72% of the invasive breast cancers reported to SEER are ductal carcinomas, not otherwise specified (NOS); 9% are lobular carcinomas; and the remaining 19% are other histologic types. The current relative survival rates for all breast cancers combined are 88.8% at 5 years (79.5% at 10 years) for white females, but only 75.3% at 5 years (63.9% at 10 years) for black females. Treatment for early-stage invasive breast cancer shifted in the 1980s and 1990s from radical mastectomy with or without regional radiotherapy to the chest wall and lymph nodes (post-mastectomy radiation) to increasing use of breast-conserving surgery followed by breast radiation (post-lumpectomy radiation) (Veronesi et al, 2005; Wood et al, 2005). Adjuvant chemotherapy (including alkylating agents) and hormones (tamoxifen) are also widely used.

*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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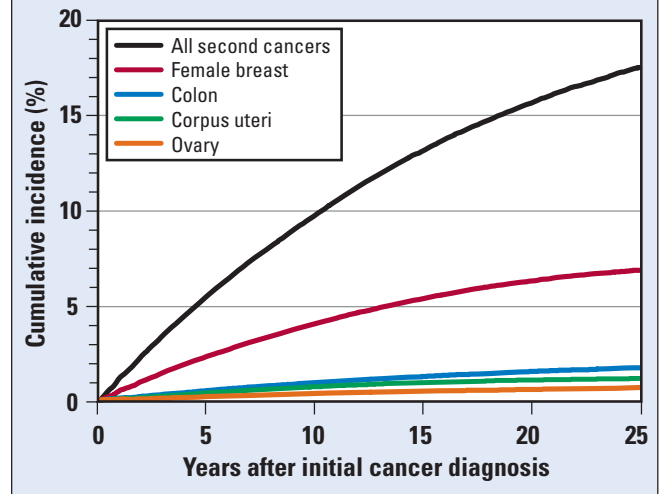
A large body of epidemiologic evidence links reproductive risk factors to breast cancer risk (Willett et al, 2000; Brinton et al, 2002). There is strong evidence that exogenous estrogens increase breast cancer risk close in time to the diagnosis, and that specific endogenous hormones play an important role in explaining risk. Factors consistently associated with an increased risk of breast cancer include late age at first birth, low parity (less than 2 births), early onset of menarche, late age at menopause, and hormone replacement therapy, while early menopause from ovarian ablation and longer lactation periods are associated with a reduction in risk. In addition, physical inactivity, regular alcohol use (>1 drink/day), greater height, and postmenopausal obesity have been shown to heighten risk. Breast cancer incidence is positively associated with higher socioeconomic status, which has been explained largely by known lifestyle and reproductive risk factors. Although relatively uncommon, exposure to ionizing radiation before the age of 40 years increases the risk of breast cancer, with elevated risks detected even from low-dose exposures (Ronckers et al, 2005a).

A family history of breast cancer is an important risk factor for this disease (Willett et al, 2000; Brinton et al, 2002; Thompson and Easton, 2004). The increased risk of breast cancer among women with at least one affected first-degree relative is about 2-fold, and the risk rises with increasing numbers and younger ages of affected relatives. Approximately 2% to 5% of breast cancers are probably attributable to the inheritance of rare, highly penetrant susceptibility genes, such as BRCA1/2. Women with BRCA1/2 mutations have a high cumulative risk of developing cancers of the breast (35%-84% by age 70 years) and ovary (10%-50%), with tumors tending to arise at an earlier age compared with sporadic cases (Nelson et al, 2005). Germline mutations of p53 (Li-Fraumeni syndrome) and the PTEN gene (Cowden disease) are rare and account for less than 1% of inherited breast cancer (Wood et al, 2005).

## Results and Discussion

A total of 34,500 subsequent primary cancers were observed among 322,863 women who had survived 2 months or more after an invasive breast cancer diagnosed during 1973-2000, reflecting an overall 18% elevation in the risk of new primary malignancies (O/E=1.18, 95% CI=1.17-1.20, EAR=23 per 10,000 person-years). Subsequent cancers occurred excessively in all follow-up intervals except among women surviving 20 years or more. The cumulative incidence of developing any second cancer after breast cancer, in analyses accounting for the competing risk of death, was 17.6% at 25 years (95% CI=17.4%-17.8%), which included a 6.9% incidence of new primary breast cancers (Figure 7.1). For all cancers combined, black women had higher risks of new malignancies than white women (O/E=1.52, EAR=52 versus O/E=1.16, EAR=20). The risk of subsequent cancer did not differ by histologic type of the original breast cancer

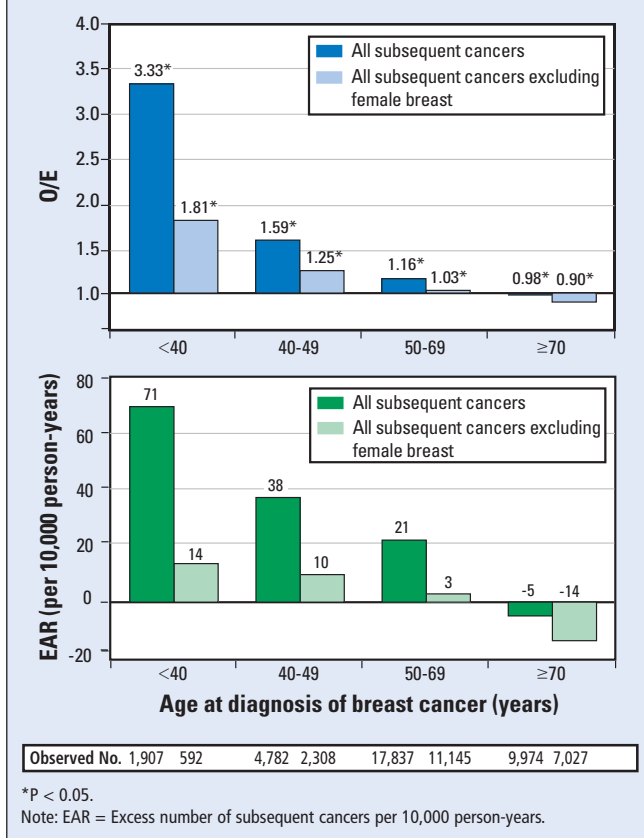
**Figure 7.1:** Cumulative incidence of developing a second cancer among patients with cancer of the breast, females, SEER 1973-2000.



(ductal versus lobular carcinomas). A strong inverse trend in subsequent cancer risk was observed with increasing age at first breast cancer diagnosis, with the highest risks occurring after early-onset breast cancer (ages <40 years, O/E=3.33, EAR=71; ages 40-49 years, O/E=1.59, EAR=38) (Figure 7.2). No excess risk was evident among women with breast cancer diagnosed at 70 years or older (O/E=0.98). When subsequent primary breast cancers were excluded from the analysis, the overall risk for all subsequent cancers combined declined to near unity (O/E=1.01); however, significant elevations in risk persisted for the younger age groups (ages <40 years, O/E=1.81, EAR=14; ages 40-49 years, O/E=1.25, EAR=10) (Figure 7.2). Women with an initial breast malignancy experienced significantly elevated risks for subsequent cancers of the salivary gland, esophagus, stomach, colon, breast, uterine corpus, ovary, thyroid, and soft tissues, as well as melanoma of the skin and acute non-lymphocytic leukemia (ANLL). Significant deficits in risk were observed for cancers of the liver, gallbladder, pancreas, lung (ages  $\geq$ 60 years), cervix, vagina, vulva, and brain and other parts of the central nervous system, as well as for non-Hodgkin lymphoma and chronic lymphocytic leukemia.

Second cancers after breast cancer have been extensively studied over the last 3 decades (reviewed in Daly and Costalas, 1999; Matesich and Shapiro, 2003; van Leeuwen and Travis, 2005), and many surveys using the SEER database have been published recently (Newcomb et al, 1999; Hall et al, 2001; Huang and Mackillop, 2001; Huang et al, 2001; Newschaffer et al, 2001; Yap et al, 2002; Bernstein et al, 2003; Gao et al, 2003; Kmet et al, 2003; Zablotska and Neugut, 2003; Curtis et al, 2004; Goggins et al, 2004; Zablotska et al, 2005). Overall estimates of second cancer risk from other registry-based studies have varied widely, with O/E ratios ranging from 1.0 to 2.4 (Adami et al, 1984; Ewertz and Mouridsen, 1985; Harvey and Brinton, 1985; Teppo et al, 1985;

**Figure 7.2:** Observed-to-expected ratio (O/E) and excess absolute risk (EAR) of subsequent primary cancers after cancer of the breast, females, SEER 1973-2000.



Brenner et al, 1993; Volk and Pompe-Kirn, 1997; Dong and Hemminki, 2001a; Evans et al, 2001; Levi et al, 2003; Soerjomataram et al, 2005; Mellekjaer et al, 2006).

Subsequent breast cancers, occurring predominantly in the opposite breast, accounted for nearly 40% of all new malignancies after an initial breast cancer in the current study. The risk of developing a new breast cancer was increased 67% over that expected in the general population during the first 10 years of follow-up, with significant elevations persisting at lower levels for at least 2 decades, consistent with the intense surveillance of the opposite breast for new disease. Young age at initial diagnosis (<50 years) and black race—but not histology (ductal versus lobular)—were strong predictors of elevated risk, similar to the results in previous studies (Chen et al, 1999; reviewed in Daly and Costalas, 1999; Gao et al, 2003). Genetic predisposition—in particular, germline mutations in the BRCA1/2 genes, which predispose to early-onset breast and ovarian cancers (Metcalf et al, 2004; Thompson and Easton, 2004)—probably contributed to the notably high risks of subsequent breast cancers that occurred after an initial cancer diagnosed at ages younger than 40 years (O/E=5.36) and ages 40 to 49 years (O/E=2.13). In the current SEER study, women treated with radiotherapy had marginally higher risks of developing a subsequent breast tumor than nonirradiated women. While these results are

generally consistent with the estimated 18% excess of contralateral breast cancer observed among irradiated women treated in randomized clinical trials (Clarke et al, 2005), other studies have reported that radiation has no effect on the overall risk of new breast cancers (Storm et al, 1992; Chen et al, 1999), except possibly for long-term survivors who were irradiated at a young age (Boice et al, 1992; Chen et al, 1999; Gao et al, 2003; van Leeuwen and Travis, 2005). In contrast, there is strong evidence that hormonal therapy with tamoxifen substantially reduces the risk of subsequent breast cancer by an estimated 33% (EBCTCG, 2005), and that adjuvant chemotherapy is associated with a modest protective effect. Other risk factors for second breast cancer risk cited in some, but not all, studies include higher body-mass index (Dignam et al, 2003; Li et al, 2003) and reproductive risk factors (late age at first birth, low parity) (Cook et al, 1996; Chen et al, 1999; Vaitinen and Hemminki, 2000).

The risk of subsequent ovarian cancer fell sharply with increasing age at initial breast cancer diagnosis (O/E=4.18, 1.78, and 1.30 for ages <40, 40-49, and 50-59 years, respectively); little or no excess was observed for ages 60 to 69 years (O/E=1.08) or 70 years or more (O/E=0.97). Breast cancer also occurred excessively after early-onset ovarian cancer (ages <50 years). This reciprocally increased risk in younger survivors has been noted in earlier registry-based studies (Evans et al, 2001; Hall et al, 2001; Mellekjaer et al, 2006) and is partly related to BRCA1/2 heritable syndromes. In addition, breast and ovarian cancers share endocrine-related risk factors, such as nulligravida, which may also contribute to these excesses (Hall et al, 2001; Brinton et al, 2005).

Breast cancer patients had an overall 35% increased risk of subsequent cancers of the uterine corpus. Significantly increased risks were observed in all age groups, with the highest absolute risk of uterine malignancies occurring among women ages 70 years or more at breast cancer diagnosis (O/E=1.59, EAR=5). Previous studies have indicated that tamoxifen therapy for breast cancer is associated with a 2- to 3-fold increased risk of adenocarcinomas of the uterine corpus, with risks rising with increasing duration of tamoxifen use (Fisher et al, 1994; Curtis et al, 1996, 2004; EBCTCG, 2005; Swerdlow et al, 2005). In addition, notably higher risks (4- to 13-fold) have been reported for tamoxifen-related uterine sarcomas, although these tumors are very rare and the excess absolute risk is small (Curtis et al, 2004; Swerdlow et al, 2005). Breast and uterine corpus cancers also share common risk factors, such as low parity, obesity, and hormone replacement therapy (Brinton et al, 2002, 2005), which may contribute to the reciprocally elevated risks observed for these tumors at older ages (ages ≥70 years).

Previous investigators have attributed the elevated risks of ANLL following breast cancer primarily to alkylating agent chemotherapy, with radiotherapy possibly adding to this risk (Curtis et al, 1992; Diamandidou et al, 1996; Smith et al, 2003; Praga et al, 2005). Some

studies (Fisher et al, 1985; Curtis et al, 1992), but not all (Curtis et al, 1989), have suggested that post-mastectomy radiotherapy (without chemotherapy) may confer a small increased risk of leukemia, with risks rising in relation to increasing bone marrow dose. Melphalan-based chemotherapy, which was used mainly in the 1970s, is known to be highly leukemogenic (Fisher et al, 1985; Curtis et al, 1992); however, only a negligible or small increase in risk has been reported following standard dose cyclophosphamide-methotrexate-fluorouracil (CMF) chemotherapy (Curtis et al, 1992; Valagussa et al, 1994; Tallman et al, 1995; Kaplan et al, 2004).

Cyclophosphamide-anthracycline-based regimens, in wider use in recent years, may be associated with higher leukemia risks, but in absolute terms the risk appears low when standard doses are administered (cumulative incidence less than 0.5% at 8-10 years) (Smith et al, 2003). However, at least 2 reports from clinical trial series indicate that leukemia risk may rise sharply with more intensive, higher-dose chemotherapy regimens (Smith et al, 2003; Praga et al, 2005), indicating that these patients need to be monitored closely for the late effects of therapy.

Although there was an overall decreased lung cancer risk following breast cancer, women who were initially treated with radiation had a significantly elevated risk for developing a new lung malignancy 10 years or more after irradiation (O/E=1.47, EAR=9), with the highest risk occurring among 20-year survivors (O/E=1.86, EAR=21). Risk was greater for the lung on the same side as the initial breast cancer, which would have received the higher radiation dose. Previous studies have also reported excess lung cancer incidence (Deutsch et al, 2003; Zablotska and Neugut, 2003; Clarke et al, 2005; Mellemkjaer et al, 2006) and mortality (Clarke et al, 2005; Darby et al, 2005) among women treated with radiation for breast malignancies. Most investigators have attributed the increased risk to post-mastectomy radiotherapy, which typically delivers high doses to thoracic organs, including the lungs, with a Connecticut study indicating that lung cancer risk increases with the radiation dose received (Inskip et al, 1994). Smoking may further heighten the risk of radiation-related lung cancer (Neugut et al, 1994; Ford et al, 2003), as has been observed following irradiation for Hodgkin disease (Travis et al, 2002). While no significant lung cancer excess has been reported following newer treatments with post-lumpectomy breast radiation (Zablotska and Neugut, 2003), the long-term hazards of these therapies remain to be clarified.

Radiation also appeared to contribute to the elevated risk of cancers of the esophagus, bone, and soft tissue among long-term survivors of breast cancer, with higher risks observed among irradiated patients compared with nonirradiated patients. The heightened risk of esophageal cancer was evident 5 years or more after radiation treatment, and risk rose to nearly 3-fold among 10-year survivors (O/E=2.93, O=28). Similar results were reported in a previous SEER survey (Zablotska et al, 2005) and in a study of women

enrolled in breast cancer clinical trials (Clarke et al, 2005). Increased risks involved mainly squamous cell carcinomas of the esophagus arising in the upper and middle sections (Zablotska et al, 2005), which would have received the highest radiation doses. Elevated risks of radiation-related bone sarcomas in our series appeared 10 years or more after initial exposure (O/E=6.11, O=8), while excesses of soft tissue sarcomas after radiotherapy were evident earlier in the follow-up period ( $\geq 5$  years, O/E=3.24, O=46). Particularly high risks were observed for subsequent angiosarcomas (O/E=17.44, O=11) and fibrosarcomas/fibrous histiocytomas (O/E=4.25, O=20) occurring 5 or more years after irradiation, whereas no excess of either tumor type was evident among patients treated with surgery alone. Several earlier studies have reported an elevated risk of radiation-related soft tissue sarcomas (Huang and Mackillop, 2001; Clarke et al, 2005; Kirova et al, 2005; Rubino et al, 2005) arising in the irradiated breast (after breast-conserving therapy), the chest/chest wall, or upper limb/shoulders. Some soft tissue sarcomas of the upper limbs may be related to the lymphedema that may complicate radical mastectomy and predispose to lymphangiosarcoma in the Stewart-Treves syndrome (Stewart and Treves, 1948). In rare cases, breast cancer and sarcomas may arise as components of the heritable Li-Fraumeni syndrome.

Although the increased risk of melanoma of the skin appeared to be limited to breast cancer patients treated with radiation (O/E=1.46 for irradiated patients versus O/E=1.07 for nonirradiated patients), a direct carcinogenic effect from radiation seems unlikely. There was no evidence of an increasing trend in risk over time, as might be expected with radiation-related solid tumors, and risks were similarly increased for melanomas that occurred at sites distant from the radiation fields, as well as for sites within or close to irradiated areas. Another possibility is that immunologic alterations associated with radiotherapy or chemotherapy may be involved. However, a reciprocally elevated risk of breast cancer after cutaneous melanoma suggests that these tumors may share hormonal or genetic mechanisms, such as BRCA2 mutations (Goggins et al, 2004; Thompson and Easton, 2004; Mellemkjaer et al, 2006).

The co-occurrence of breast and thyroid cancer at increased levels has been reported in several previous surveys (Harvey and Brinton, 1985; Huang et al, 2001; Sadezki et al, 2003; Ronckers et al, 2005b; Mellemkjaer et al, 2006), but reasons for this association remain unclear. Although female gender is a risk factor for thyroid cancer, only weak associations with hormonal risk factors have been noted previously (Negri et al, 1999). Both breast and follicular thyroid cancers are linked to Cowden disease, but this genetic condition is rare. Risks in the current study (Ronckers et al, 2005b) were similar among irradiated and nonirradiated women (O/E=1.28 versus 1.33), in agreement with most other investigations (Harvey and Brinton, 1985; Huang et al, 2001; Sadezki et al, 2003; Clarke et al, 2005) and with reports indicating

little or no elevation in thyroid cancer following radiation exposures at older ages (Ron et al, 1995).

Although a history of breast cancer has long been thought to be a risk factor for colorectal cancer, only a small increased risk of subsequent colon cancer (O/E=1.04) and no excess of rectal cancer (O/E=0.95) were observed in the current survey. The lack of a substantial elevated risk of colorectal cancer after breast cancer is consistent with 2 other registry-based studies (Evans et al, 2001; Levi et al, 2003) and a previous SEER analysis (Newschaffer et al, 2001). However, other surveys of breast cancer patients have reported 20% to 80% increased risks of subsequent colon and/or rectal cancer compared with that expected in the general population (Harvey and Brinton, 1985; Murakami et al, 1987; Neugut et al, 1991; Soerjomataram et al, 2005; Mellekjær et al, 2006), leading previous investigators to hypothesize that breast and colorectal cancers may share common dietary and hormonal risk factors. A recent study observed a 2-fold increase in the risk of colon cancer among breast cancer patients who had either a family history of breast cancer or a high body-mass index; the risk was unrelated to menopausal status, prior hormonal replacement therapy, or parity (Kmet et al, 2003). Although it has been reported that breast cancer may be part of the hereditary nonpolyposis colon cancer syndrome (Risinger et al, 1996), we did not observe an increased risk of breast cancer at any age after an initial cancer of the colon or rectum.

The increased risk of stomach cancer was restricted to women with lobular breast cancer (O/E=2.36, O=80). One explanation for this association may be misclassification of the stomach cancer, because the lobular subtype is overrepresented in gastric metastases secondary to the breast (Taal et al, 2000). A small number of subsequent stomach malignancies may be related to genetic predisposition, since carriers of BRCA2 mutations have been reported to have an increased risk of stomach cancer (Thompson and Easton, 2004).

Most of the heightened risk of salivary gland cancer was observed in the first 5 years following breast cancer diagnosis, suggesting increased diagnostic scrutiny of the head and neck area in the initial follow-up period. Although the salivary glands may receive substantial radiation doses during breast cancer therapy, the excesses in our study were observed among both irradiated and nonirradiated patients. No reciprocal elevation of breast cancer was noted after salivary gland cancer.

Significant deficits in risk of several subsequent smoking-related cancers, such as cancers of the respiratory tract, pancreas, and cervix, probably reflect lower rates of smoking and social-class-related lifestyle differences among breast cancer survivors. Significantly lower than expected risks of non-Hodgkin lymphoma and chronic lymphocytic leukemia were confined to the first 10 years of follow-up.

## Male Breast Cancer

Breast cancer among men is uncommon, accounting for less than 1% of breast cancers in the U.S. (Weiss et al, 2005). Incidence, however, has been rising (Giordano, 2005), and almost 1,700 new cases were expected to be diagnosed in 2005 (Jemal et al, 2005). Geographic and temporal variation in incidence rates resembles that for female breast cancer, with higher rates in Europe and North America (Weiss et al, 2005). Treatment for male breast cancer is similar to that for females, although conservative surgery is less frequently used (Winchester, 2002). Relative survival rates in SEER are somewhat lower for males (80.8% at 5 years and 68.6% at 10 years) than for females, reflecting in part a tendency toward a higher stage of disease at presentation for men. The histologic distribution of male and female breast cancer differed somewhat, with males having a higher percentage of ductal carcinoma and a lower percentage of lobular carcinoma than females.

Although the etiology of breast cancer in men is not well understood, hormonal and genetic factors appear to play a role (Weiss et al, 2005). As in women, an increased risk of breast cancer in men has been associated with a family history of breast cancer. BRCA2 mutations account for a higher percentage of inherited cases of male breast cancer than BRCA1 mutations (Winchester, 2002; Thompson and Easton, 2004). Other known or suspected risk factors include hormonal abnormalities, such as Klinefelter syndrome, gynecomastia, testicular disease, liver cirrhosis, treatment with exogenous estrogens, and radiation exposure.

## Results and Discussion

A borderline significant increased risk of subsequent cancers was observed among 2,158 men who survived 2 months or more following a diagnosis of breast cancer between 1973 and 2000 (O/E=1.11, O=355, 95% CI=0.99-1.23, EAR=24). Overall risk of developing a new malignancy was increased 31% among men initially diagnosed at ages younger than 65 years, whereas no excess was noted among older men (O/E=0.99). The cumulative incidence of developing a second cancer after male breast cancer rose to 21.8% (95% CI=19.4%-24.2%) at 25 years. Few studies have evaluated risks of new malignancies among men with breast cancer, although increased risks have been reported for second cancers of the contralateral breast, small intestine, rectum, pancreas, and prostate, as well as non-melanoma skin cancer and myeloid leukemia (Dong and Hemminki, 2001b; Auvinen et al, 2002; Hemminki et al, 2005).

The risk of subsequent breast cancer was strongly elevated (O/E=29.36, O=18, EAR=12), as was also reported in an earlier survey from the SEER registries (Auvinen et al, 2002) and a study from the Swedish Family-Cancer Database (Dong and Hemminki, 2001b). Men diagnosed with their first breast cancer before age 65 years had a higher relative risk of developing a new breast malignancy (O/E=44.51) than older men (O/E=20.60), although the

excess absolute risks were equivalent (close to 12 in both age groups). Risks were significantly elevated throughout the follow-up period. While the risk of subsequent breast cancer was about 2 times higher among men who received radiation compared with those who did not, the difference between the groups was not statistically significant. These findings are consistent with genetic predisposition in male breast cancer, due mainly to BRCA2 germline mutations (Giordano, 2005) or to hormonal factors, as illustrated by the elevated risk in Klinefelter syndrome.

Our survey revealed a statistically increased risk of subsequent prostate cancer (O/E=1.22) that was not detected in an earlier SEER survey of cases diagnosed through 1996 (Auvinen et al, 2002). A similarly elevated risk of prostate cancer after breast cancer was noted in a large international cancer registry study of 3,409 men with breast cancer (Hemminki et al, 2005). On the other hand, no significant excess of male breast cancer following prostate cancer was seen in the international study or in our survey, although an increased risk (2-fold) was noted in a Swedish registry series (Thellenberg et al, 2003). Genetic factors may contribute to the association because BRCA2 mutation carriers appear to have an increased risk of prostate cancer as well as male breast cancer (Kirchhoff et al, 2004). Medical surveillance may also play a role, as prostate-specific antigen (PSA) testing has increased among cancer patients in more recent years, and the excess risk in our series was limited to men diagnosed with localized-stage prostate cancer during the period 1995 to 2000.

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**Table 7.1.1:** Characteristics of patients with an initial cancer of the breast, females, SEER 1973-2000.

| Characteristics  | Males |   | Females |       | Total   |       |
|--|-------|---|---------|-------|---------|-------|
|  | No.   | % | No.     | %     | No.     | %     |
| <b>Number of patients with 1st primary cancer</b>          |       |   |         |       |         |       |
| <b>Total</b>   | —     | — | 322,863 | 100.0 | 322,863 | 100.0 |
| <b>Initial treatment</b>                                   |       |   |         |       |         |       |
| Any radiation  | —     | — | 109,188 | 33.8  | 109,188 | 33.8  |
| With surgery   | —     | — | 103,445 | 32.0  | 103,445 | 32.0  |
| Without surgery  | —     | — | 5,743   | 1.8   | 5,743   | 1.8   |
| No radiation   | —     | — | 213,675 | 66.2  | 213,675 | 66.2  |
| With surgery   | —     | — | 201,453 | 62.4  | 201,453 | 62.4  |
| Without surgery  | —     | — | 12,222  | 3.8   | 12,222  | 3.8   |
| <b>Race</b>  |       |   |         |       |         |       |
| White  | —     | — | 281,056 | 87.1  | 281,056 | 87.1  |
| Black  | —     | — | 24,378  | 7.6   | 24,378  | 7.6   |
| Other  | —     | — | 16,341  | 5.1   | 16,341  | 5.1   |
| Unknown  | —     | — | 1,088   | 0.3   | 1,088   | 0.3   |
| <b>Age at 1st primary cancer diagnosis, years</b>          |       |   |         |       |         |       |
| < 30   | —     | — | 2,372   | 0.7   | 2,372   | 0.7   |
| 30–49  | —     | — | 76,342  | 23.6  | 76,342  | 23.6  |
| 50–69  | —     | — | 145,405 | 45.0  | 145,405 | 45.0  |
| 70–79  | —     | — | 63,896  | 19.8  | 63,896  | 19.8  |
| ≥ 80   | —     | — | 34,848  | 10.8  | 34,848  | 10.8  |
| <b>Number of patients with one or more primary cancers</b> |       |   |         |       |         |       |
| One primary cancer only                                    | —     | — | 291,176 | 90.2  | 291,176 | 90.2  |
| 1st and 2nd cancers  | —     | — | 29,092  | 9.0   | 29,092  | 9.0   |
| 1st, 2nd, and 3rd cancers                                  | —     | — | 2,391   | 0.7   | 2,391   | 0.7   |
| 1st, 2nd, 3rd, and additional cancers                      | —     | — | 204     | 0.1   | 204     | 0.1   |
| <b>Other statistics</b>                                    |       |   |         |       |         |       |
| Median age at 1st cancer diagnosis                         | —     | — | 61.7    | —     | 61.7    | —     |
| Median year of 1st cancer diagnosis                        | —     | — | 1989.5  | —     | 1989.5  | —     |
| Median person-years at risk                                | —     | — | 5.6     | —     | 5.6     | —     |
| Percent histologically confirmed*                          |       |   |         |       |         |       |
| Both 1st and 2nd cancers                                   | —     | — | —       | 96.8  | —       | 96.8  |
| 1st, 2nd, and additional cancers                           | —     | — | —       | 96.4  | —       | 96.4  |
| 1st cancer only  | —     | — | —       | 2.9   | —       | 2.9   |

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

**Table 7.1.2:** Risk of subsequent primary cancers after cancer of the breast, females, 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   |
| <b>All subsequent cancers</b>        | 3,054                                      | 1.13*                    | 12,656    | 1.22* | 9,859     | 1.19* | 8,931     | 1.15* | 34,500 | 29,141.37 | 1.18* | 22.54 |
| All excluding same site              | 1,788                                      | 0.94*                    | 7,396     | 1.00  | 6,071     | 1.03* | 5,817     | 1.04* | 21,072 | 20,761.09 | 1.01* | 1.31  |
| <b>Buccal cavity, pharynx</b>        | 49   | 1.00                     | 189       | 1.02  | 171       | 1.18* | 142       | 1.09  | 551    | 510.33    | 1.08  | 0.17  |
| Lip                                  | 2  | 0.64                     | 10        | 0.81  | 7         | 0.69  | 14        | 1.42  | 33     | 35.48     | 0.93  | -0.01 |
| Tongue                               | 14   | 1.30                     | 43        | 1.05  | 35        | 1.09  | 29        | 1.00  | 121    | 113.04    | 1.07  | 0.03  |
| Salivary gland                       | 12   | 2.22*                    | 36        | 1.74* | 21        | 1.30  | 22        | 1.45  | 91     | 57.44     | 1.58* | 0.14  |
| Mouth                                | 13   | 0.78                     | 56        | 0.88  | 62        | 1.24  | 45        | 0.99  | 176    | 176.26    | 1.00  | 0.00  |
| Nasopharynx                          | 2  | 0.96                     | 12        | 1.55  | 7         | 1.21  | 3         | 0.59  | 24     | 20.69     | 1.16  | 0.01  |
| Tonsil                               | 3  | 0.67                     | 12        | 0.73  | 19        | 1.56  | 13        | 1.29  | 47     | 43.20     | 1.09  | 0.02  |
| Oropharynx                           | 1  | 0.83                     | 4         | 0.86  | 6         | 1.68  | 1         | 0.32  | 12     | 12.51     | 0.96  | 0.00  |
| Hypopharynx                          | 2  | 0.60                     | 8         | 0.63  | 8         | 0.84  | 9         | 1.09  | 27     | 33.83     | 0.80  | -0.03 |
| <b>Digestive system</b>              | 533  | 0.88*                    | 2,395     | 1.02  | 1,884     | 0.99  | 1,864     | 1.03  | 6,676  | 6,676.17  | 1.00  | 0.00  |
| Esophagus                            | 18   | 1.08                     | 68        | 1.05  | 71        | 1.36* | 86        | 1.71* | 243    | 183.56    | 1.32* | 0.25  |
| Stomach                              | 43   | 0.90                     | 221       | 1.21* | 151       | 1.05  | 158       | 1.20* | 573    | 507.10    | 1.13* | 0.28  |
| Small intestine                      | 2  | 0.23*                    | 33        | 0.98  | 33        | 1.18  | 38        | 1.36  | 106    | 98.04     | 1.08  | 0.03  |
| Colon                                | 284  | 0.94                     | 1,265     | 1.07* | 1,016     | 1.06  | 918       | 1.01  | 3,483  | 3,351.80  | 1.04* | 0.55  |
| Rectum, rectosigmoid junction        | 77   | 0.79*                    | 380       | 1.02  | 275       | 0.94  | 279       | 1.05  | 1,011  | 1,028.57  | 0.98  | -0.07 |
| Rectum                               | 55   | 0.86                     | 233       | 0.95  | 180       | 0.94  | 175       | 0.99  | 643    | 676.99    | 0.95  | -0.14 |
| Anus, anal canal                     | 8  | 0.97                     | 29        | 0.91  | 26        | 1.01  | 23        | 0.95  | 86     | 90.12     | 0.95  | -0.02 |
| Liver                                | 9  | 0.70                     | 30        | 0.60* | 23        | 0.55* | 36        | 0.85  | 98     | 147.46    | 0.66* | -0.21 |
| Gallbladder                          | 9  | 0.64                     | 34        | 0.64* | 20        | 0.48* | 40        | 1.08  | 103    | 145.80    | 0.71* | -0.18 |
| Bile ducts, other biliary            | 16   | 1.24                     | 50        | 0.98  | 30        | 0.69* | 43        | 0.97  | 139    | 151.85    | 0.92  | -0.05 |
| Pancreas                             | 63   | 0.80                     | 257       | 0.84* | 221       | 0.88* | 219       | 0.90  | 760    | 880.96    | 0.86* | -0.51 |
| <b>Respiratory system</b>            | 281  | 0.82*                    | 1,228     | 0.91* | 1,043     | 0.93* | 1,168     | 1.04  | 3,720  | 3,949.93  | 0.94* | -0.97 |
| Nose, nasal cavity, ear              | 3  | 0.82                     | 14        | 1.00  | 10        | 0.89  | 10        | 0.94  | 37     | 39.57     | 0.94  | -0.01 |
| Larynx                               | 12   | 1.03                     | 41        | 0.93  | 23        | 0.67  | 31        | 1.00  | 107    | 121.06    | 0.88  | -0.06 |
| Lung, bronchus                       | 263  | 0.81*                    | 1,171     | 0.91* | 1,007     | 0.93* | 1,122     | 1.04  | 3,563  | 3,779.40  | 0.94* | -0.91 |
| <b>Female breast</b>                 | 1,266                                      | 1.60*                    | 5,260     | 1.74* | 3,788     | 1.59* | 3,114     | 1.42* | 13,428 | 8,380.29  | 1.60* | 21.24 |
| <b>Female genital system</b>         | 406  | 1.13*                    | 1,672     | 1.25* | 1,322     | 1.31* | 1,014     | 1.14* | 4,414  | 3,603.65  | 1.22* | 3.41  |
| Cervix uteri                         | 37   | 0.82                     | 142       | 0.91  | 71        | 0.68* | 45        | 0.57* | 295    | 384.43    | 0.77* | -0.38 |
| Corpus uteri                         | 218  | 1.20*                    | 934       | 1.37* | 776       | 1.51* | 538       | 1.18* | 2,466  | 1,830.03  | 1.35* | 2.68  |
| Ovary                                | 131  | 1.26*                    | 499       | 1.27* | 395       | 1.29* | 349       | 1.26* | 1,374  | 1,079.84  | 1.27* | 1.24  |
| Vagina                               | 1  | 0.19                     | 15        | 0.75  | 11        | 0.71  | 12        | 0.85  | 39     | 54.81     | 0.71* | -0.07 |
| Vulva                                | 9  | 0.58                     | 50        | 0.83  | 38        | 0.77  | 40        | 0.84  | 137    | 172.86    | 0.79* | -0.15 |
| <b>Urinary system</b>                | 152  | 1.22*                    | 475       | 0.97  | 440       | 1.09  | 412       | 1.05  | 1,479  | 1,409.47  | 1.05  | 0.29  |
| Urinary bladder                      | 67   | 0.91                     | 269       | 0.93  | 273       | 1.15* | 266       | 1.15* | 875    | 831.20    | 1.05  | 0.18  |
| Kidney parenchyma                    | 77   | 1.87*                    | 172       | 1.07  | 132       | 1.00  | 115       | 0.89  | 496    | 464.18    | 1.07  | 0.13  |
| Renal pelvis, other urinary          | 8  | 0.78                     | 34        | 0.85  | 35        | 1.07  | 31        | 1.00  | 108    | 114.09    | 0.95  | -0.03 |
| Ureter                               | 2  | 0.64                     | 6         | 0.49  | 10        | 1.00  | 12        | 1.27  | 30     | 34.96     | 0.86  | -0.02 |
| <b>Bone, joints</b>                  | 2  | 0.77                     | 7         | 0.72  | 11        | 1.49  | 16        | 2.42* | 36     | 26.32     | 1.37  | 0.04  |
| <b>Soft tissue including heart</b>   | 6  | 0.56                     | 51        | 1.23  | 58        | 1.77* | 47        | 1.51* | 162    | 116.16    | 1.39* | 0.19  |
| <b>Kaposi sarcoma</b>                | 0  | 0.00                     | 1         | 0.26  | 1         | 0.31  | 4         | 1.31  | 6      | 11.16     | 0.54  | -0.02 |
| <b>Melanoma of skin</b>              | 74   | 1.32*                    | 251       | 1.17* | 196       | 1.16* | 179       | 1.14  | 700    | 595.34    | 1.18* | 0.44  |
| <b>Eye, orbit</b>                    | 1  | 0.25                     | 20        | 1.30  | 14        | 1.20  | 12        | 1.14  | 47     | 41.66     | 1.13  | 0.02  |
| <b>Brain, central nervous system</b> | 21   | 0.74                     | 110       | 1.02  | 68        | 0.81  | 55        | 0.72* | 254    | 296.76    | 0.86* | -0.18 |
| <b>Thyroid</b>                       | 56   | 2.01*                    | 127       | 1.25* | 97        | 1.33* | 65        | 1.07  | 345    | 262.84    | 1.31* | 0.35  |
| <b>Lymphatic, hematopoietic</b>      | 176  | 0.88                     | 735       | 0.94  | 625       | 0.97  | 649       | 1.05  | 2,185  | 2,246.18  | 0.97  | -0.26 |
| Hodgkin lymphoma                     | 11   | 1.61                     | 14        | 0.57* | 17        | 0.94  | 20        | 1.31  | 62     | 64.78     | 0.96  | -0.01 |
| Non-Hodgkin lymphoma                 | 81   | 0.85                     | 278       | 0.74* | 272       | 0.87* | 330       | 1.06  | 961    | 1,097.39  | 0.88* | -0.57 |
| Myeloma                              | 33   | 0.96                     | 134       | 1.00  | 98        | 0.90  | 99        | 0.95  | 364    | 382.33    | 0.95  | -0.08 |
| Leukemia                             | 51   | 0.80                     | 309       | 1.25* | 238       | 1.19* | 200       | 1.05  | 798    | 701.68    | 1.14* | 0.41  |
| Acute lymphocytic                    | 3  | 1.53                     | 10        | 1.34  | 7         | 1.18  | 2         | 0.37  | 22     | 20.80     | 1.06  | 0.01  |
| Chronic lymphocytic                  | 11   | 0.45*                    | 45        | 0.47* | 53        | 0.69* | 69        | 0.94  | 178    | 269.96    | 0.66* | -0.39 |
| Acute non-lymphocytic                | 25   | 1.11                     | 206       | 2.35* | 127       | 1.79* | 84        | 1.22  | 442    | 249.80    | 1.77* | 0.81  |
| Chronic myeloid                      | 8  | 0.90                     | 31        | 0.90  | 30        | 1.09  | 29        | 1.12  | 98     | 96.91     | 1.01  | 0.00  |

\*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 7.1.3:** Risk of subsequent primary cancers after cancer of the breast, females, 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   |
| <b>All subsequent cancers</b>        | 25,569                                     | 1.20* | 5,428       | 1.18* | 2,463       | 1.12* | 1,040     | 1.05  | 34,500 | 29,141.37 | 1.18* | 22.54 |
| All excluding same site              | 15,255                                     | 1.01  | 3,447       | 1.05* | 1,627       | 1.02  | 743       | 1.03  | 21,072 | 20,761.09 | 1.01* | 1.31  |
| <b>Buccal cavity, pharynx</b>        | 409  | 1.08  | 75          | 0.96  | 54          | 1.47* | 13        | 0.81  | 551    | 510.33    | 1.08  | 0.17  |
| Lip                                  | 19   | 0.74  | 8           | 1.41  | 3           | 1.06  | 3         | 2.27  | 33     | 35.48     | 0.93  | -0.01 |
| Tongue                               | 92   | 1.10  | 13          | 0.75  | 14          | 1.71  | 2         | 0.57  | 121    | 113.04    | 1.07  | 0.03  |
| Salivary gland                       | 69   | 1.63* | 11          | 1.24  | 7           | 1.62  | 4         | 2.05  | 91     | 57.44     | 1.58* | 0.14  |
| Mouth                                | 131  | 1.00  | 24          | 0.88  | 19          | 1.49  | 2         | 0.36  | 176    | 176.26    | 1.00  | 0.00  |
| Nasopharynx                          | 21   | 1.34  | 2           | 0.66  | 1           | 0.71  | 0         | 0.00  | 24     | 20.69     | 1.16  | 0.01  |
| Tonsil                               | 34   | 1.03  | 6           | 0.97  | 7           | 2.49  | 0         | 0.00  | 47     | 43.20     | 1.09  | 0.02  |
| Oropharynx                           | 11   | 1.17  | 1           | 0.54  | 0           | 0.00  | 0         | 0.00  | 12     | 12.51     | 0.96  | 0.00  |
| Hypopharynx                          | 18   | 0.70  | 7           | 1.40  | 1           | 0.44  | 1         | 1.03  | 27     | 33.83     | 0.80  | -0.03 |
| <b>Digestive system</b>              | 4,812                                      | 0.99  | 1,068       | 1.01  | 540         | 1.06  | 256       | 1.09  | 6,676  | 6,676.17  | 1.00  | 0.00  |
| Esophagus                            | 157  | 1.18* | 48          | 1.64* | 26          | 1.83* | 12        | 1.80  | 243    | 183.56    | 1.32* | 0.25  |
| Stomach                              | 415  | 1.11* | 94          | 1.20  | 40          | 1.08  | 24        | 1.43  | 573    | 507.10    | 1.13* | 0.28  |
| Small intestine                      | 68   | 0.97  | 23          | 1.43  | 14          | 1.73  | 1         | 0.26  | 106    | 98.04     | 1.08  | 0.03  |
| Colon                                | 2,565                                      | 1.05* | 525         | 0.98  | 261         | 1.01  | 132       | 1.11  | 3,483  | 3,351.80  | 1.04* | 0.55  |
| Rectum, rectosigmoid junction        | 732  | 0.96  | 159         | 1.01  | 90          | 1.22  | 30        | 0.91  | 1,011  | 1,028.57  | 0.98  | -0.07 |
| Rectum                               | 468  | 0.94  | 94          | 0.90  | 63          | 1.28  | 18        | 0.80  | 643    | 676.99    | 0.95  | -0.14 |
| Anus, anal canal                     | 63   | 0.96  | 11          | 0.77  | 7           | 1.02  | 5         | 1.63  | 86     | 90.12     | 0.95  | -0.02 |
| Liver                                | 62   | 0.59* | 21          | 0.87  | 7           | 0.57  | 8         | 1.30  | 98     | 147.46    | 0.66* | -0.21 |
| Gallbladder                          | 63   | 0.58* | 24          | 1.09  | 12          | 1.16  | 4         | 0.89  | 103    | 145.80    | 0.71* | -0.18 |
| Bile ducts, other biliary            | 96   | 0.89  | 25          | 0.99  | 11          | 0.86  | 7         | 1.13  | 139    | 151.85    | 0.92  | -0.05 |
| Pancreas                             | 541  | 0.85* | 124         | 0.87  | 67          | 0.97  | 28        | 0.87  | 760    | 880.96    | 0.86* | -0.51 |
| <b>Respiratory system</b>            | 2,552                                      | 0.90* | 656         | 1.01  | 341         | 1.05  | 171       | 1.12  | 3,720  | 3,949.93  | 0.94* | -0.97 |
| Nose, nasal cavity, ear              | 27   | 0.93  | 7           | 1.12  | 3           | 1.01  | 0         | 0.00  | 37     | 39.57     | 0.94  | -0.01 |
| Larynx                               | 76   | 0.84  | 18          | 0.97  | 11          | 1.27  | 2         | 0.55  | 107    | 121.06    | 0.88  | -0.06 |
| Lung, bronchus                       | 2,441                                      | 0.91* | 629         | 1.01  | 324         | 1.03  | 169       | 1.14  | 3,563  | 3,779.40  | 0.94* | -0.91 |
| <b>Female breast</b>                 | 10,314                                     | 1.67* | 1,981       | 1.52* | 836         | 1.36* | 297       | 1.10  | 13,428 | 8,380.29  | 1.60* | 21.24 |
| <b>Female genital system</b>         | 3,400                                      | 1.25* | 660         | 1.23* | 258         | 1.03  | 96        | 0.90  | 4,414  | 3,603.65  | 1.22* | 3.41  |
| Cervix uteri                         | 250  | 0.82* | 28          | 0.56* | 16          | 0.76  | 1         | 0.13* | 295    | 384.43    | 0.77* | -0.38 |
| Corpus uteri                         | 1,928                                      | 1.40* | 366         | 1.35* | 127         | 0.99  | 45        | 0.82  | 2,466  | 1,830.03  | 1.35* | 2.68  |
| Ovary                                | 1,025                                      | 1.28* | 216         | 1.31* | 91          | 1.17  | 42        | 1.25  | 1,374  | 1,079.84  | 1.27* | 1.24  |
| Vagina                               | 27   | 0.66* | 7           | 0.83  | 4           | 1.02  | 1         | 0.57  | 39     | 54.81     | 0.71* | -0.07 |
| Vulva                                | 97   | 0.78* | 28          | 1.00  | 9           | 0.66  | 3         | 0.47  | 137    | 172.86    | 0.79* | -0.15 |
| <b>Urinary system</b>                | 1,067                                      | 1.05  | 238         | 1.05  | 127         | 1.13  | 47        | 0.90  | 1,479  | 1,409.47  | 1.05  | 0.29  |
| Urinary bladder                      | 609  | 1.01  | 155         | 1.15  | 77          | 1.17  | 34        | 1.10  | 875    | 831.20    | 1.05  | 0.18  |
| Kidney parenchyma                    | 381  | 1.14* | 68          | 0.90  | 38          | 1.02  | 9         | 0.52* | 496    | 464.18    | 1.07  | 0.13  |
| Renal pelvis, other urinary          | 77   | 0.93  | 15          | 0.83  | 12          | 1.36  | 4         | 0.96  | 108    | 114.09    | 0.95  | -0.03 |
| Ureter                               | 18   | 0.71  | 4           | 0.73  | 6           | 2.24  | 2         | 1.59  | 30     | 34.96     | 0.86  | -0.02 |
| <b>Bone, joints</b>                  | 20   | 1.01  | 14          | 3.60* | 1           | 0.54  | 1         | 1.19  | 36     | 26.32     | 1.37  | 0.04  |
| <b>Soft tissue including heart</b>   | 115  | 1.35* | 27          | 1.48  | 12          | 1.34  | 8         | 1.99  | 162    | 116.16    | 1.39* | 0.19  |
| <b>Kaposi sarcoma</b>                | 2  | 0.25* | 3           | 1.63  | 1           | 1.16  | 0         | 0.00  | 6      | 11.16     | 0.54  | -0.02 |
| <b>Melanoma of skin</b>              | 521  | 1.19* | 115         | 1.25* | 36          | 0.81  | 28        | 1.37  | 700    | 595.34    | 1.18* | 0.44  |
| <b>Eye, orbit</b>                    | 35   | 1.13  | 6           | 0.96  | 4           | 1.32  | 2         | 1.55  | 47     | 41.66     | 1.13  | 0.02  |
| <b>Brain, central nervous system</b> | 199  | 0.90  | 32          | 0.70* | 18          | 0.84  | 5         | 0.53  | 254    | 296.76    | 0.86* | -0.18 |
| <b>Thyroid</b>                       | 280  | 1.39* | 45          | 1.22  | 11          | 0.66  | 9         | 1.27  | 345    | 262.84    | 1.31* | 0.35  |
| <b>Lymphatic, hematopoietic</b>      | 1,536                                      | 0.94* | 393         | 1.09  | 182         | 1.03  | 74        | 0.90  | 2,185  | 2,246.18  | 0.97  | -0.26 |
| Hodgkin lymphoma                     | 42   | 0.85  | 5           | 0.54  | 13          | 3.04* | 2         | 1.13  | 62     | 64.78     | 0.96  | -0.01 |
| Non-Hodgkin lymphoma                 | 631  | 0.80* | 209         | 1.17* | 84          | 0.94  | 37        | 0.88  | 961    | 1,097.39  | 0.88* | -0.57 |
| Myeloma                              | 265  | 0.95  | 62          | 1.01  | 27          | 0.90  | 10        | 0.73  | 364    | 382.33    | 0.95  | -0.08 |
| Leukemia                             | 598  | 1.17* | 117         | 1.05  | 58          | 1.07  | 25        | 1.02  | 798    | 701.68    | 1.14* | 0.41  |
| Acute lymphocytic                    | 20   | 1.30  | 1           | 0.31  | 1           | 0.66  | 0         | 0.00  | 22     | 20.80     | 1.06  | 0.01  |
| Chronic lymphocytic                  | 109  | 0.55* | 42          | 0.97  | 17          | 0.82  | 10        | 1.09  | 178    | 269.96    | 0.66* | -0.39 |
| Acute non-lymphocytic                | 358  | 1.98* | 46          | 1.15  | 25          | 1.28  | 13        | 1.40  | 442    | 249.80    | 1.77* | 0.81  |
| Chronic myeloid                      | 69   | 0.97  | 19          | 1.24  | 8           | 1.09  | 2         | 0.61  | 98     | 96.91     | 1.01  | 0.00  |

\*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.

**Breast**  
**Females, <40 Years of Age**

**Table 7.1.4:** Risk of subsequent primary cancers after cancer of the breast, females, <40 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   |
| <b>Number starting interval</b>      | 22,902                                     |        | 21,399    |        | 13,131    |       | 7,773     |       | 22,902  |        |       |       |
| <b>Person-years in interval</b>      | 18,485                                     |        | 67,341    |        | 51,066    |       | 51,480    |       | 188,371 |        |       |       |
| <b>All subsequent cancers</b>        | 135  | 5.14*  | 674       | 5.43*  | 497       | 3.43* | 601       | 2.17* | 1,907   | 571.85 | 3.33* | 70.88 |
| All excluding same site              | 32   | 1.96*  | 139       | 1.92*  | 131       | 1.66* | 290       | 1.82* | 592     | 326.71 | 1.81* | 14.08 |
| <b>Buccal cavity, pharynx</b>        | 0  | 0.00   | 1         | 0.57   | 4         | 1.83  | 8         | 1.76  | 13      | 8.84   | 1.47  | 0.22  |
| Lip                                  | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 0         | 0.00  | 0       | 0.37   | 0.00  | -0.02 |
| Tongue                               | 0  | 0.00   | 1         | 2.62   | 1         | 2.09  | 1         | 0.91  | 3       | 2.04   | 1.47  | 0.05  |
| Salivary gland                       | 0  | 0.00   | 0         | 0.00   | 1         | 2.25  | 6         | 9.54* | 7       | 1.70   | 4.11* | 0.28  |
| Mouth                                | 0  | 0.00   | 0         | 0.00   | 2         | 3.62  | 1         | 0.75  | 3       | 2.32   | 1.29  | 0.04  |
| Nasopharynx                          | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 0         | 0.00  | 0       | 0.74   | 0.00  | -0.04 |
| Tonsil                               | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 0         | 0.00  | 0       | 0.91   | 0.00  | -0.05 |
| Oropharynx                           | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 0         | 0.00  | 0       | 0.17   | 0.00  | -0.01 |
| Hypopharynx                          | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 0         | 0.00  | 0       | 0.42   | 0.00  | -0.02 |
| <b>Digestive system</b>              | 3  | 1.82   | 7         | 0.82   | 7         | 0.60  | 52        | 1.70* | 69      | 52.44  | 1.32* | 0.88  |
| Esophagus                            | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 3         | 3.23  | 3       | 1.36   | 2.21  | 0.09  |
| Stomach                              | 0  | 0.00   | 2         | 2.12   | 2         | 1.87  | 3         | 1.40  | 7       | 4.35   | 1.61  | 0.14  |
| Small intestine                      | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 1         | 1.18  | 1       | 1.58   | 0.63  | -0.03 |
| Colon                                | 1  | 1.41   | 4         | 1.12   | 0         | 0.00* | 21        | 1.61  | 26      | 22.09  | 1.18  | 0.21  |
| Rectum, rectosigmoid junction        | 1  | 3.15   | 0         | 0.00   | 2         | 0.81  | 10        | 1.59  | 13      | 10.79  | 1.20  | 0.12  |
| Rectum                               | 1  | 4.36   | 0         | 0.00   | 0         | 0.00  | 5         | 1.19  | 6       | 7.33   | 0.82  | -0.07 |
| Anus, anal canal                     | 0  | 0.00   | 0         | 0.00   | 1         | 2.11  | 3         | 3.23  | 4       | 1.77   | 2.25  | 0.12  |
| Liver                                | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 0         | 0.00  | 0       | 1.59   | 0.00  | -0.08 |
| Gallbladder                          | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 0         | 0.00  | 0       | 0.87   | 0.00  | -0.05 |
| Bile ducts, other biliary            | 0  | 0.00   | 1         | 6.10   | 0         | 0.00  | 0         | 0.00  | 1       | 1.07   | 0.94  | 0.00  |
| Pancreas                             | 1  | 7.64   | 0         | 0.00   | 1         | 0.88  | 8         | 2.22  | 10      | 5.60   | 1.79  | 0.23  |
| <b>Respiratory system</b>            | 2  | 2.20   | 22        | 4.09*  | 21        | 2.42* | 41        | 1.44* | 86      | 43.46  | 1.98* | 2.26  |
| Nose, nasal cavity, ear              | 0  | 0.00   | 1         | 5.86   | 1         | 5.81  | 0         | 0.00  | 2       | 0.69   | 2.89  | 0.07  |
| Larynx                               | 0  | 0.00   | 0         | 0.00   | 1         | 2.20  | 3         | 2.34  | 4       | 2.10   | 1.91  | 0.10  |
| Lung, bronchus                       | 2  | 2.49   | 21        | 4.33*  | 18        | 2.25* | 37        | 1.38  | 78      | 40.46  | 1.93* | 1.99  |
| <b>Female breast</b>                 | 103  | 10.40* | 535       | 10.32* | 366       | 5.54* | 311       | 2.65* | 1,315   | 245.14 | 5.36* | 56.80 |
| <b>Female genital system</b>         | 10   | 1.90   | 40        | 1.75*  | 60        | 2.49* | 107       | 2.50* | 217     | 94.88  | 2.29* | 6.48  |
| Cervix uteri                         | 5  | 1.90   | 3         | 0.30*  | 6         | 0.75  | 11        | 1.39  | 25      | 28.59  | 0.87  | -0.19 |
| Corpus uteri                         | 3  | 3.14   | 7         | 1.37   | 22        | 3.07* | 32        | 1.68* | 64      | 32.25  | 1.98* | 1.69  |
| Ovary                                | 2  | 1.45   | 28        | 4.40*  | 30        | 4.02* | 59        | 4.44* | 119     | 28.50  | 4.18* | 4.80  |
| Vagina                               | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 0         | 0.00  | 0       | 0.88   | 0.00  | -0.05 |
| Vulva                                | 0  | 0.00   | 1         | 1.42   | 0         | 0.00  | 1         | 0.79  | 2       | 2.89   | 0.69  | -0.05 |
| <b>Urinary system</b>                | 2  | 4.10   | 3         | 1.19   | 3         | 0.90  | 12        | 1.36  | 20      | 15.18  | 1.32  | 0.26  |
| Urinary bladder                      | 0  | 0.00   | 2         | 2.03   | 2         | 1.51  | 6         | 1.50  | 10      | 6.49   | 1.54  | 0.19  |
| Kidney parenchyma                    | 2  | 7.29   | 1         | 0.69   | 1         | 0.53  | 5         | 1.13  | 9       | 8.03   | 1.12  | 0.05  |
| Renal pelvis, other urinary          | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 1         | 2.40  | 1       | 0.65   | 1.53  | 0.02  |
| Ureter                               | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 1         | 11.19 | 1       | 0.12   | 8.51  | 0.05  |
| <b>Bone, joints</b>                  | 0  | 0.00   | 2         | 5.81   | 0         | 0.00  | 1         | 2.67  | 3       | 1.11   | 2.70  | 0.10  |
| <b>Soft tissue including heart</b>   | 0  | 0.00   | 4         | 3.94*  | 2         | 2.20  | 5         | 3.70* | 11      | 3.53   | 3.12* | 0.40  |
| <b>Kaposi sarcoma</b>                | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 0         | 0.00  | 0       | 0.17   | 0.00  | -0.01 |
| <b>Melanoma of skin</b>              | 1  | 0.41   | 12        | 1.20   | 12        | 1.33  | 15        | 1.36  | 40      | 32.45  | 1.23  | 0.40  |
| <b>Eye, orbit</b>                    | 0  | 0.00   | 2         | 9.93*  | 1         | 4.55  | 0         | 0.00  | 3       | 0.86   | 3.47  | 0.11  |
| <b>Brain, central nervous system</b> | 1  | 1.75   | 6         | 2.55   | 3         | 1.40  | 5         | 1.53  | 15      | 8.33   | 1.80* | 0.35  |
| <b>Thyroid</b>                       | 7  | 3.45*  | 8         | 1.03   | 6         | 0.93  | 9         | 1.25  | 30      | 23.45  | 1.28  | 0.35  |
| <b>Lymphatic, hematopoietic</b>      | 5  | 2.62   | 30        | 3.78*  | 11        | 1.35  | 28        | 1.78* | 74      | 33.73  | 2.19* | 2.14  |
| Hodgkin lymphoma                     | 1  | 1.82   | 1         | 0.57   | 1         | 0.93  | 2         | 2.03  | 5       | 4.37   | 1.14  | 0.03  |
| Non-Hodgkin lymphoma                 | 0  | 0.00   | 7         | 1.95   | 3         | 0.72  | 14        | 1.66  | 24      | 16.95  | 1.42  | 0.37  |
| Myeloma                              | 0  | 0.00   | 0         | 0.00   | 1         | 1.44  | 3         | 1.38  | 4       | 3.35   | 1.19  | 0.03  |
| Leukemia                             | 4  | 7.73*  | 22        | 10.14* | 6         | 2.70  | 9         | 2.17  | 41      | 9.06   | 4.52* | 1.70  |
| Acute lymphocytic                    | 1  | 16.70  | 1         | 4.05   | 0         | 0.00  | 0         | 0.00  | 2       | 0.78   | 2.55  | 0.06  |
| Chronic lymphocytic                  | 0  | 0.00   | 0         | 0.00   | 0         | 0.00  | 1         | 0.88  | 1       | 1.66   | 0.60  | -0.03 |
| Acute non-lymphocytic                | 3  | 11.18* | 19        | 17.39* | 4         | 3.85* | 7         | 4.12* | 33      | 4.10   | 8.05* | 1.53  |
| Chronic myeloid                      | 0  | 0.00   | 1         | 2.10   | 1         | 2.19  | 1         | 1.32  | 3       | 1.81   | 1.66  | 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.

**Table 7.1.5:** Risk of subsequent primary cancers after cancer of the breast, females, 40-49 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   |
| <b>All subsequent cancers</b>        | 365  | 2.20* | 1,472     | 1.98* | 1,270     | 1.64* | 1,675     | 1.26* | 4,782 | 3,011.07 | 1.59* | 37.79 |
| All excluding same site              | 109  | 1.20  | 591       | 1.41* | 609       | 1.32* | 999       | 1.14* | 2,308 | 1,848.91 | 1.25* | 9.80  |
| <b>Buccal cavity, pharynx</b>        | 4  | 1.44  | 19        | 1.46  | 21        | 1.44  | 26        | 1.07  | 70    | 54.66    | 1.28  | 0.33  |
| Lip                                  | 0  | 0.00  | 0         | 0.00  | 0         | 0.00  | 3         | 2.67  | 3     | 2.29     | 1.31  | 0.02  |
| Tongue                               | 0  | 0.00  | 3         | 1.06  | 5         | 1.46  | 8         | 1.38  | 16    | 12.62    | 1.27  | 0.07  |
| Salivary gland                       | 2  | 4.46  | 8         | 4.33* | 1         | 0.59  | 1         | 0.38  | 12    | 6.63     | 1.81  | 0.11  |
| Mouth                                | 2  | 2.57  | 6         | 1.55  | 5         | 1.11  | 9         | 1.19  | 22    | 16.74    | 1.31  | 0.11  |
| Nasopharynx                          | 0  | 0.00  | 2         | 2.10  | 1         | 1.27  | 0         | 0.00  | 3     | 3.11     | 0.96  | 0.00  |
| Tonsil                               | 0  | 0.00  | 0         | 0.00  | 5         | 2.89  | 1         | 0.39  | 6     | 6.14     | 0.98  | 0.00  |
| Oropharynx                           | 0  | 0.00  | 0         | 0.00  | 0         | 0.00  | 0         | 0.00  | 0     | 1.40     | 0.00  | -0.03 |
| Hypopharynx                          | 0  | 0.00  | 0         | 0.00  | 3         | 2.86  | 3         | 1.56  | 6     | 3.98     | 1.51  | 0.04  |
| <b>Digestive system</b>              | 16   | 1.04  | 88        | 1.15  | 113       | 1.20  | 230       | 1.09  | 447   | 397.15   | 1.13* | 1.06  |
| Esophagus                            | 1  | 2.35  | 2         | 0.91  | 6         | 1.97  | 15        | 2.04* | 24    | 13.00    | 1.85* | 0.23  |
| Stomach                              | 2  | 1.50  | 9         | 1.50  | 12        | 1.83  | 21        | 1.53  | 44    | 27.61    | 1.59* | 0.35  |
| Small intestine                      | 0  | 0.00  | 2         | 0.96  | 2         | 0.88  | 9         | 2.04  | 13    | 9.21     | 1.41  | 0.08  |
| Colon                                | 6  | 0.91  | 32        | 0.98  | 52        | 1.26  | 89        | 0.91  | 179   | 178.34   | 1.00  | 0.01  |
| Rectum, rectosigmoid junction        | 5  | 1.56  | 19        | 1.18  | 21        | 1.08  | 50        | 1.33  | 95    | 76.49    | 1.24* | 0.39  |
| Rectum                               | 3  | 1.40  | 11        | 1.03  | 14        | 1.11  | 29        | 1.16  | 57    | 50.28    | 1.13  | 0.14  |
| Anus, anal canal                     | 0  | 0.00  | 5         | 2.12  | 2         | 0.79  | 6         | 1.39  | 13    | 9.71     | 1.34  | 0.07  |
| Liver                                | 0  | 0.00  | 1         | 0.48  | 2         | 0.83  | 4         | 0.69  | 7     | 10.77    | 0.65  | -0.08 |
| Gallbladder                          | 0  | 0.00  | 1         | 0.72  | 0         | 0.00  | 6         | 1.45  | 7     | 7.64     | 0.92  | -0.01 |
| Bile ducts, other biliary            | 0  | 0.00  | 2         | 1.36  | 2         | 1.10  | 6         | 1.31  | 10    | 8.16     | 1.22  | 0.04  |
| Pancreas                             | 1  | 0.64  | 12        | 1.46  | 13        | 1.18  | 22        | 0.80  | 48    | 48.31    | 0.99  | -0.01 |
| <b>Respiratory system</b>            | 13   | 1.05  | 105       | 1.59* | 119       | 1.34* | 262       | 1.25* | 499   | 377.09   | 1.32* | 2.60  |
| Nose, nasal cavity, ear              | 0  | 0.00  | 2         | 2.20  | 1         | 1.06  | 2         | 1.24  | 5     | 3.66     | 1.36  | 0.03  |
| Larynx                               | 0  | 0.00  | 6         | 1.74  | 4         | 0.95  | 6         | 0.77  | 16    | 16.11    | 0.99  | 0.00  |
| Lung, bronchus                       | 13   | 1.13  | 97        | 1.58* | 114       | 1.36* | 253       | 1.27* | 477   | 356.29   | 1.34* | 2.58  |
| <b>Female breast</b>                 | 256  | 3.41* | 881       | 2.73* | 661       | 2.12* | 676       | 1.49* | 2,474 | 1,162.16 | 2.13* | 27.99 |
| <b>Female genital system</b>         | 25   | 0.90  | 198       | 1.60* | 181       | 1.47* | 190       | 1.02  | 594   | 460.96   | 1.29* | 2.84  |
| Cervix uteri                         | 4  | 0.52  | 24        | 0.87  | 14        | 0.70  | 7         | 0.36* | 49    | 74.94    | 0.65* | -0.55 |
| Corpus uteri                         | 5  | 0.50  | 86        | 1.70* | 79        | 1.35* | 96        | 0.96  | 266   | 218.86   | 1.22* | 1.01  |
| Ovary                                | 14   | 1.62  | 80        | 2.08* | 80        | 2.11* | 76        | 1.36* | 250   | 140.80   | 1.78* | 2.33  |
| Vagina                               | 0  | 0.00  | 1         | 0.91  | 2         | 1.74  | 2         | 0.97  | 5     | 4.57     | 1.09  | 0.01  |
| Vulva                                | 0  | 0.00  | 3         | 0.88  | 0         | 0.00  | 5         | 0.87  | 8     | 13.21    | 0.61  | -0.11 |
| <b>Urinary system</b>                | 8  | 1.95  | 27        | 1.32  | 30        | 1.18  | 72        | 1.26  | 137   | 107.15   | 1.28* | 0.64  |
| Urinary bladder                      | 1  | 0.56  | 15        | 1.61  | 17        | 1.39  | 47        | 1.58* | 80    | 52.96    | 1.51* | 0.58  |
| Kidney parenchyma                    | 6  | 2.79* | 10        | 0.98  | 12        | 1.00  | 22        | 0.92  | 50    | 48.16    | 1.04  | 0.04  |
| Renal pelvis, other urinary          | 1  | 5.55  | 2         | 2.03  | 1         | 0.73  | 3         | 0.86  | 7     | 6.03     | 1.16  | 0.02  |
| Ureter                               | 1  | 29.93 | 0         | 0.00  | 0         | 0.00  | 1         | 1.02  | 2     | 1.52     | 1.32  | 0.01  |
| <b>Bone, joints</b>                  | 1  | 3.67  | 0         | 0.00  | 2         | 2.27  | 6         | 4.98* | 9     | 3.43     | 2.63* | 0.12  |
| <b>Soft tissue including heart</b>   | 0  | 0.00  | 5         | 1.36  | 6         | 1.73  | 6         | 1.14  | 17    | 13.30    | 1.28  | 0.08  |
| <b>Kaposi sarcoma</b>                | 0  | 0.00  | 0         | 0.00  | 0         | 0.00  | 0         | 0.00  | 0     | 0.34     | 0.00  | -0.01 |
| <b>Melanoma of skin</b>              | 17   | 2.13* | 38        | 1.20  | 32        | 1.18  | 47        | 1.39* | 134   | 100.67   | 1.33* | 0.71  |
| <b>Eye, orbit</b>                    | 0  | 0.00  | 1         | 0.88  | 3         | 2.58  | 3         | 1.55  | 7     | 4.49     | 1.56  | 0.05  |
| <b>Brain, central nervous system</b> | 3  | 1.39  | 17        | 1.82* | 11        | 1.18  | 11        | 0.77  | 42    | 35.13    | 1.20  | 0.15  |
| <b>Thyroid</b>                       | 11   | 1.97  | 21        | 0.99  | 27        | 1.64* | 19        | 1.15  | 78    | 59.77    | 1.31* | 0.39  |
| <b>Lymphatic, hematopoietic</b>      | 7  | 0.81  | 60        | 1.53* | 54        | 1.25  | 104       | 1.21  | 225   | 176.95   | 1.27* | 1.03  |
| Hodgkin lymphoma                     | 0  | 0.00  | 0         | 0.00  | 2         | 0.87  | 3         | 1.04  | 5     | 8.84     | 0.57  | -0.08 |
| Non-Hodgkin lymphoma                 | 2  | 0.45  | 12        | 0.58  | 19        | 0.82  | 55        | 1.20  | 88    | 93.78    | 0.94  | -0.12 |
| Myeloma                              | 0  | 0.00  | 2         | 0.41  | 4         | 0.65  | 19        | 1.34  | 25    | 26.11    | 0.96  | -0.02 |
| Leukemia                             | 5  | 2.05  | 46        | 4.18* | 29        | 2.45* | 27        | 1.18  | 107   | 48.23    | 2.22* | 1.25  |
| Acute lymphocytic                    | 0  | 0.00  | 3         | 4.17  | 1         | 1.54  | 0         | 0.00  | 4     | 2.49     | 1.61  | 0.03  |
| Chronic lymphocytic                  | 1  | 2.18  | 5         | 1.90  | 4         | 1.11  | 11        | 1.29  | 21    | 15.26    | 1.38  | 0.12  |
| Acute non-lymphocytic                | 2  | 1.87  | 34        | 7.46* | 21        | 4.54* | 12        | 1.40  | 69    | 18.81    | 3.67* | 1.07  |
| Chronic myeloid                      | 1  | 1.99  | 2         | 0.91  | 2         | 0.95  | 4         | 1.22  | 9     | 8.09     | 1.11  | 0.02  |

\*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.

**Breast**  
**Females, 50-69 Years of Age**

**Table 7.1.6:** Risk of subsequent primary cancers after cancer of the breast, females, 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     |           |       |       |
|                                      | O  | O/E   | O         | O/E   | O         | O/E   | O         | O/E   | O         | E         | O/E   | EAR   |
| <b>Number starting interval</b>      | 145,405                                    |       | 134,297   |       | 85,924    |       | 48,956    |       | 145,405   |           |       |       |
| <b>Person-years in interval</b>      | 116,270                                    |       | 432,699   |       | 329,430   |       | 291,836   |       | 1,170,235 |           |       |       |
| <b>All subsequent cancers</b>        | 1,351                                      | 1.18* | 5,947     | 1.24* | 5,112     | 1.14* | 5,427     | 1.10* | 17,837    | 15,335.64 | 1.16* | 21.37 |
| All excluding same site              | 791  | 1.02  | 3,505     | 1.06* | 3,194     | 1.01  | 3,655     | 1.02  | 11,145    | 10,816.09 | 1.03* | 2.81  |
| <b>Buccal cavity, pharynx</b>        | 20   | 0.85  | 107       | 1.11  | 93        | 1.12  | 90        | 1.10  | 310       | 284.82    | 1.09  | 0.22  |
| Lip                                  | 0  | 0.00  | 5         | 1.10  | 3         | 0.65  | 6         | 0.98  | 14        | 16.27     | 0.86  | -0.02 |
| Tongue                               | 5  | 0.94  | 28        | 1.30  | 17        | 0.91  | 16        | 0.89  | 66        | 63.46     | 1.04  | 0.02  |
| Salivary gland                       | 4  | 1.78  | 13        | 1.41  | 12        | 1.45  | 14        | 1.54  | 43        | 28.85     | 1.49* | 0.12  |
| Mouth                                | 7  | 0.91  | 31        | 0.98  | 37        | 1.33  | 31        | 1.07  | 106       | 96.02     | 1.10  | 0.09  |
| Nasopharynx                          | 1  | 0.93  | 7         | 1.66  | 5         | 1.44  | 2         | 0.63  | 15        | 11.91     | 1.26  | 0.03  |
| Tonsil                               | 2  | 0.74  | 8         | 0.77  | 10        | 1.25  | 9         | 1.43  | 29        | 27.38     | 1.06  | 0.01  |
| Oropharynx                           | 0  | 0.00  | 3         | 1.09  | 2         | 0.85  | 1         | 0.49  | 6         | 7.80      | 0.77  | -0.02 |
| Hypopharynx                          | 1  | 0.51  | 7         | 0.88  | 5         | 0.76  | 6         | 1.08  | 19        | 22.02     | 0.86  | -0.03 |
| <b>Digestive system</b>              | 208  | 1.04  | 988       | 1.11* | 881       | 0.96  | 1,194     | 1.04  | 3,271     | 3,154.43  | 1.04* | 1.00  |
| Esophagus                            | 8  | 1.14  | 44        | 1.47* | 41        | 1.43* | 53        | 1.62* | 146       | 98.21     | 1.49* | 0.41  |
| Stomach                              | 15   | 1.07  | 90        | 1.45* | 58        | 0.91  | 108       | 1.31* | 271       | 222.39    | 1.22* | 0.42  |
| Small intestine                      | 1  | 0.29  | 20        | 1.33  | 25        | 1.68* | 20        | 1.11  | 66        | 51.29     | 1.29  | 0.13  |
| Colon                                | 110  | 1.18  | 472       | 1.12* | 445       | 1.00  | 593       | 1.02  | 1,620     | 1,538.43  | 1.05* | 0.70  |
| Rectum, rectosigmoid junction        | 36   | 0.98  | 168       | 1.06  | 141       | 0.93  | 161       | 0.95  | 506       | 516.27    | 0.98  | -0.09 |
| Rectum                               | 25   | 1.05  | 102       | 1.00  | 89        | 0.91  | 99        | 0.88  | 315       | 336.35    | 0.94  | -0.18 |
| Anus, anal canal                     | 4  | 1.12  | 13        | 0.85  | 16        | 1.13  | 13        | 0.86  | 46        | 48.07     | 0.96  | -0.02 |
| Liver                                | 3  | 0.66  | 18        | 0.88  | 15        | 0.68  | 25        | 0.88  | 61        | 75.34     | 0.81  | -0.12 |
| Gallbladder                          | 1  | 0.24  | 17        | 0.89  | 10        | 0.51* | 25        | 1.06  | 53        | 66.66     | 0.80  | -0.12 |
| Bile ducts, other biliary            | 4  | 1.05  | 19        | 1.08  | 14        | 0.73  | 31        | 1.11  | 68        | 68.45     | 0.99  | 0.00  |
| Pancreas                             | 23   | 0.89  | 115       | 0.98  | 105       | 0.85  | 150       | 0.95  | 393       | 423.55    | 0.93  | -0.26 |
| <b>Respiratory system</b>            | 143  | 0.87  | 711       | 0.98  | 658       | 0.93  | 771       | 1.00  | 2,283     | 2,364.67  | 0.97  | -0.70 |
| Nose, nasal cavity, ear              | 3  | 1.97  | 7         | 1.14  | 7         | 1.21  | 5         | 0.74  | 22        | 20.24     | 1.09  | 0.02  |
| Larynx                               | 8  | 1.15  | 28        | 1.01  | 16        | 0.70  | 20        | 1.03  | 72        | 77.16     | 0.93  | -0.04 |
| Lung, bronchus                       | 130  | 0.84* | 675       | 0.98  | 634       | 0.93  | 743       | 1.00  | 2,182     | 2,261.83  | 0.96  | -0.68 |
| <b>Female breast</b>                 | 560  | 1.53* | 2,442     | 1.64* | 1,918     | 1.45* | 1,772     | 1.32* | 6,692     | 4,519.55  | 1.48* | 18.56 |
| <b>Female genital system</b>         | 198  | 1.10  | 853       | 1.20* | 700       | 1.19* | 595       | 1.08  | 2,346     | 2,027.68  | 1.16* | 2.72  |
| Cervix uteri                         | 17   | 0.81  | 68        | 0.90  | 35        | 0.66* | 24        | 0.57* | 144       | 191.62    | 0.75* | -0.41 |
| Corpus uteri                         | 102  | 1.03  | 503       | 1.28* | 436       | 1.36* | 339       | 1.17* | 1,380     | 1,102.00  | 1.25* | 2.38  |
| Ovary                                | 72   | 1.46* | 242       | 1.22* | 196       | 1.14  | 186       | 1.09  | 696       | 590.51    | 1.18* | 0.90  |
| Vagina                               | 0  | 0.00  | 8         | 0.97  | 4         | 0.52  | 9         | 1.02  | 21        | 26.76     | 0.78  | -0.05 |
| Vulva                                | 4  | 0.83  | 18        | 0.85  | 18        | 0.83  | 22        | 0.76  | 62        | 76.70     | 0.81  | -0.13 |
| <b>Urinary system</b>                | 70   | 1.48* | 194       | 0.92  | 241       | 1.14  | 260       | 1.02  | 765       | 723.38    | 1.06  | 0.36  |
| Urinary bladder                      | 26   | 1.01  | 100       | 0.86  | 149       | 1.25* | 166       | 1.11  | 441       | 410.31    | 1.07  | 0.26  |
| Kidney parenchyma                    | 40   | 2.19* | 82        | 1.04  | 76        | 1.00  | 70        | 0.84  | 268       | 256.16    | 1.05  | 0.10  |
| Renal pelvis, other urinary          | 4  | 1.16  | 12        | 0.76  | 16        | 0.95  | 24        | 1.15  | 56        | 56.90     | 0.98  | -0.01 |
| Ureter                               | 0  | 0.00  | 2         | 0.43  | 4         | 0.78  | 9         | 1.41  | 15        | 17.20     | 0.87  | -0.02 |
| <b>Bone, joints</b>                  | 1  | 0.95  | 1         | 0.23  | 7         | 1.84  | 9         | 2.23* | 18        | 13.18     | 1.37  | 0.04  |
| <b>Soft tissue including heart</b>   | 2  | 0.46  | 29        | 1.63* | 29        | 1.79* | 32        | 1.70* | 92        | 57.22     | 1.61* | 0.30  |
| <b>Kaposi sarcoma</b>                | 0  | 0.00  | 1         | 1.57  | 0         | 0.00  | 2         | 1.20  | 3         | 3.23      | 0.93  | 0.00  |
| <b>Melanoma of skin</b>              | 37   | 1.50* | 114       | 1.15  | 97        | 1.13  | 93        | 1.03  | 341       | 299.79    | 1.14* | 0.35  |
| <b>Eye, orbit</b>                    | 0  | 0.00  | 6         | 0.78  | 8         | 1.21  | 6         | 0.91  | 20        | 22.71     | 0.88  | -0.02 |
| <b>Brain, central nervous system</b> | 10   | 0.77  | 58        | 1.07  | 38        | 0.77  | 35        | 0.70* | 141       | 166.70    | 0.85* | -0.22 |
| <b>Thyroid</b>                       | 28   | 2.17* | 62        | 1.29  | 53        | 1.45* | 30        | 0.94  | 173       | 129.18    | 1.34* | 0.37  |
| <b>Lymphatic, hematopoietic</b>      | 62   | 0.85  | 319       | 0.99  | 313       | 0.96  | 411       | 1.03  | 1,105     | 1,118.95  | 0.99  | -0.12 |
| Hodgkin lymphoma                     | 1  | 0.37  | 6         | 0.56  | 10        | 1.08  | 12        | 1.28  | 29        | 32.11     | 0.90  | -0.03 |
| Non-Hodgkin lymphoma                 | 36   | 0.99  | 115       | 0.71* | 125       | 0.75* | 207       | 1.02  | 483       | 566.72    | 0.85* | -0.72 |
| Myeloma                              | 11   | 0.87  | 57        | 1.02  | 51        | 0.90  | 65        | 0.94  | 184       | 194.78    | 0.94  | -0.09 |
| Leukemia                             | 14   | 0.67  | 141       | 1.53* | 127       | 1.36* | 127       | 1.07  | 409       | 325.35    | 1.26* | 0.71  |
| Acute lymphocytic                    | 1  | 1.30  | 2         | 0.64  | 5         | 1.78  | 1         | 0.32  | 9         | 9.84      | 0.91  | -0.01 |
| Chronic lymphocytic                  | 3  | 0.37  | 17        | 0.46* | 27        | 0.72  | 46        | 0.99  | 93        | 129.15    | 0.72* | -0.31 |
| Acute non-lymphocytic                | 9  | 1.21  | 107       | 3.24* | 69        | 2.06* | 53        | 1.22  | 238       | 117.49    | 2.03* | 1.03  |
| Chronic myeloid                      | 1  | 0.33  | 10        | 0.79  | 14        | 1.14  | 15        | 0.97  | 40        | 43.33     | 0.92  | -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.

**Table 7.1.7:** Risk of subsequent primary cancers after cancer of the breast, females, ≥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    |
| <b>All subsequent cancers</b>        | 1,203                                      | 0.88* | 4,563     | 0.97* | 2,980     | 1.03  | 1,228     | 0.98  | 9,974 | 10,222.81 | 0.98* | -4.53  |
| All excluding same site              | 856  | 0.84* | 3,161     | 0.89* | 2,137     | 0.97  | 873       | 0.90* | 7,027 | 7,769.38  | 0.90* | -13.50 |
| <b>Buccal cavity, pharynx</b>        | 25   | 1.13  | 62        | 0.82  | 53        | 1.18  | 18        | 0.92  | 158   | 162.01    | 0.98  | -0.07  |
| Lip                                  | 2  | 1.00  | 5         | 0.69  | 4         | 0.82  | 5         | 2.07  | 16    | 16.55     | 0.97  | -0.01  |
| Tongue                               | 9  | 1.89  | 11        | 0.68  | 12        | 1.24  | 4         | 0.94  | 36    | 34.93     | 1.03  | 0.02   |
| Salivary gland                       | 6  | 2.31  | 15        | 1.65  | 7         | 1.21  | 1         | 0.36  | 29    | 20.26     | 1.43  | 0.16   |
| Mouth                                | 4  | 0.49  | 19        | 0.68  | 18        | 1.05  | 4         | 0.52  | 45    | 61.17     | 0.74* | -0.29  |
| Nasopharynx                          | 1  | 1.38  | 3         | 1.26  | 1         | 0.75  | 1         | 1.97  | 6     | 4.94      | 1.21  | 0.02   |
| Tonsil                               | 1  | 0.71  | 4         | 0.90  | 4         | 1.78  | 3         | 4.50  | 12    | 8.77      | 1.37  | 0.06   |
| Oropharynx                           | 1  | 2.08  | 1         | 0.64  | 4         | 4.92* | 0         | 0.00  | 6     | 3.14      | 1.91  | 0.05   |
| Hypopharynx                          | 1  | 0.82  | 1         | 0.26  | 0         | 0.00  | 0         | 0.00  | 2     | 7.41      | 0.27* | -0.10  |
| <b>Digestive system</b>              | 306  | 0.79* | 1,312     | 0.95  | 883       | 0.99  | 388       | 0.95  | 2,889 | 3,072.15  | 0.94* | -3.33  |
| Esophagus                            | 9  | 0.97  | 22        | 0.68  | 24        | 1.19  | 15        | 1.62  | 70    | 71.00     | 0.99  | -0.02  |
| Stomach                              | 26   | 0.81  | 120       | 1.06  | 79        | 1.08  | 26        | 0.77  | 251   | 252.75    | 0.99  | -0.03  |
| Small intestine                      | 1  | 0.22  | 11        | 0.68  | 6         | 0.58  | 8         | 1.67  | 26    | 35.95     | 0.72  | -0.18  |
| Colon                                | 167  | 0.83* | 757       | 1.05  | 519       | 1.10* | 215       | 0.97  | 1,658 | 1,612.94  | 1.03  | 0.82   |
| Rectum, rectosigmoid junction        | 35   | 0.61* | 193       | 0.98  | 111       | 0.93  | 58        | 1.13  | 397   | 425.02    | 0.93  | -0.51  |
| Rectum                               | 26   | 0.69  | 120       | 0.92  | 77        | 0.96  | 42        | 1.19  | 265   | 283.03    | 0.94  | -0.33  |
| Anus, anal canal                     | 4  | 0.98  | 11        | 0.78  | 7         | 0.82  | 1         | 0.26  | 23    | 30.57     | 0.75  | -0.14  |
| Liver                                | 6  | 0.77  | 11        | 0.40* | 6         | 0.35* | 7         | 0.95  | 30    | 59.76     | 0.50* | -0.54  |
| Gallbladder                          | 8  | 0.85  | 16        | 0.49* | 10        | 0.50* | 9         | 1.05  | 43    | 70.62     | 0.61* | -0.50  |
| Bile ducts, other biliary            | 12   | 1.37  | 28        | 0.87  | 14        | 0.63  | 6         | 0.54  | 60    | 74.17     | 0.81  | -0.26  |
| Pancreas                             | 38   | 0.75  | 130       | 0.72* | 102       | 0.87  | 39        | 0.71* | 309   | 403.51    | 0.77* | -1.72  |
| <b>Respiratory system</b>            | 123  | 0.75* | 390       | 0.70* | 245       | 0.76* | 94        | 0.77* | 852   | 1,164.71  | 0.73* | -5.69  |
| Nose, nasal cavity, ear              | 0  | 0.00  | 4         | 0.59  | 1         | 0.23  | 3         | 1.54  | 8     | 14.97     | 0.53  | -0.13  |
| Larynx                               | 4  | 1.01  | 7         | 0.55  | 2         | 0.30  | 2         | 0.85  | 15    | 25.69     | 0.58* | -0.19  |
| Lung, bronchus                       | 118  | 0.75* | 378       | 0.70* | 241       | 0.78* | 89        | 0.76* | 826   | 1,120.83  | 0.74* | -5.36  |
| <b>Female breast</b>                 | 347  | 1.03  | 1,402     | 1.21* | 843       | 1.24* | 355       | 1.27* | 2,947 | 2,453.44  | 1.20* | 8.98   |
| <b>Female genital system</b>         | 173  | 1.18* | 581       | 1.19* | 381       | 1.38* | 122       | 1.10  | 1,257 | 1,020.13  | 1.23* | 4.31   |
| Cervix uteri                         | 11   | 0.81  | 47        | 1.08  | 16        | 0.69  | 3         | 0.33* | 77    | 89.28     | 0.86  | -0.22  |
| Corpus uteri                         | 108  | 1.51* | 338       | 1.45* | 239       | 1.90* | 71        | 1.54* | 756   | 476.92    | 1.59* | 5.08   |
| Ovary                                | 43   | 0.97  | 149       | 0.99  | 89        | 1.01  | 28        | 0.76  | 309   | 320.03    | 0.97  | -0.20  |
| Vagina                               | 1  | 0.34  | 6         | 0.58  | 5         | 0.78  | 1         | 0.36  | 13    | 22.60     | 0.58* | -0.17  |
| Vulva                                | 5  | 0.52  | 28        | 0.80  | 20        | 0.85  | 12        | 1.01  | 65    | 80.05     | 0.81  | -0.27  |
| <b>Urinary system</b>                | 72   | 0.99  | 251       | 0.98  | 166       | 1.03  | 68        | 0.94  | 557   | 563.77    | 0.99  | -0.12  |
| Urinary bladder                      | 40   | 0.87  | 152       | 0.93  | 105       | 1.01  | 47        | 0.97  | 344   | 361.44    | 0.95  | -0.32  |
| Kidney parenchyma                    | 29   | 1.42  | 79        | 1.11  | 43        | 1.01  | 18        | 1.01  | 169   | 151.83    | 1.11  | 0.31   |
| Renal pelvis, other urinary          | 3  | 0.45  | 20        | 0.86  | 18        | 1.25  | 3         | 0.49  | 44    | 50.50     | 0.87  | -0.12  |
| Ureter                               | 1  | 0.47  | 4         | 0.54  | 6         | 1.30  | 1         | 0.51  | 12    | 16.13     | 0.74  | -0.08  |
| <b>Bone, joints</b>                  | 0  | 0.00  | 4         | 0.99  | 2         | 0.83  | 0         | 0.00  | 6     | 8.61      | 0.70  | -0.05  |
| <b>Soft tissue including heart</b>   | 4  | 0.75  | 13        | 0.69  | 21        | 1.71* | 4         | 0.70  | 42    | 42.11     | 1.00  | 0.00   |
| <b>Kaposi sarcoma</b>                | 0  | 0.00  | 0         | 0.00  | 1         | 0.43  | 2         | 1.63  | 3     | 7.42      | 0.40  | -0.08  |
| <b>Melanoma of skin</b>              | 19   | 0.92  | 87        | 1.19  | 55        | 1.18  | 24        | 1.08  | 185   | 162.43    | 1.14  | 0.41   |
| <b>Eye, orbit</b>                    | 1  | 0.53  | 11        | 1.74  | 2         | 0.54  | 3         | 1.81  | 17    | 13.59     | 1.25  | 0.06   |
| <b>Brain, central nervous system</b> | 7  | 0.56  | 29        | 0.69* | 16        | 0.68  | 4         | 0.45  | 56    | 86.60     | 0.65* | -0.56  |
| <b>Thyroid</b>                       | 10   | 1.36  | 36        | 1.48* | 11        | 0.81  | 7         | 1.33  | 64    | 50.44     | 1.27  | 0.25   |
| <b>Lymphatic, hematopoietic</b>      | 102  | 0.87  | 326       | 0.78* | 247       | 0.93  | 106       | 0.89  | 781   | 916.55    | 0.85* | -2.47  |
| Hodgkin lymphoma                     | 9  | 3.23* | 7         | 0.75  | 4         | 0.75  | 3         | 1.51  | 23    | 19.46     | 1.18  | 0.06   |
| Non-Hodgkin lymphoma                 | 43   | 0.80  | 144       | 0.75* | 125       | 1.03  | 54        | 1.01  | 366   | 419.95    | 0.87* | -0.98  |
| Myeloma                              | 22   | 1.06  | 75        | 1.03  | 42        | 0.93  | 12        | 0.63  | 151   | 158.10    | 0.96  | -0.13  |
| Leukemia                             | 28   | 0.70  | 100       | 0.70* | 76        | 0.82  | 37        | 0.83  | 241   | 319.04    | 0.76* | -1.42  |
| Acute lymphocytic                    | 1  | 1.06  | 4         | 1.17  | 1         | 0.45  | 1         | 0.92  | 7     | 7.68      | 0.91  | -0.01  |
| Chronic lymphocytic                  | 7  | 0.44* | 23        | 0.41* | 22        | 0.62* | 11        | 0.66  | 63    | 123.89    | 0.51* | -1.11  |
| Acute non-lymphocytic                | 11   | 0.80  | 46        | 0.94  | 33        | 1.04  | 12        | 0.81  | 102   | 109.40    | 0.93  | -0.13  |
| Chronic myeloid                      | 6  | 1.13  | 18        | 0.94  | 13        | 1.02  | 9         | 1.40  | 46    | 43.69     | 1.05  | 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.

## Breast Females, Radiotherapy

**Table 7.1.8:** Risk of subsequent primary cancers after cancer of the breast, females, 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   |
| <b>All subsequent cancers</b>        | 933  | 1.12* | 3,971     | 1.32* | 2,845     | 1.39* | 2,176     | 1.44* | 9,925 | 7,400.22 | 1.34* | 38.35 |
| All excluding same site              | 523  | 0.91* | 2,217     | 1.06* | 1,649     | 1.15* | 1,338     | 1.25* | 5,727 | 5,167.83 | 1.11* | 8.49  |
| <b>Buccal cavity, pharynx</b>        | 19   | 1.28  | 51        | 0.96  | 49        | 1.38* | 21        | 0.82  | 140   | 129.15   | 1.08  | 0.16  |
| Lip                                  | 0  | 0.00  | 4         | 1.23  | 1         | 0.43  | 1         | 0.56  | 6     | 8.22     | 0.73  | -0.03 |
| Tongue                               | 6  | 1.80  | 11        | 0.92  | 9         | 1.13  | 5         | 0.88  | 31    | 28.93    | 1.07  | 0.03  |
| Salivary gland                       | 5  | 2.99  | 12        | 2.00* | 7         | 1.75  | 6         | 2.05  | 30    | 14.61    | 2.05* | 0.23  |
| Mouth                                | 7  | 1.42  | 13        | 0.73  | 18        | 1.50  | 2         | 0.23* | 40    | 43.55    | 0.92  | -0.05 |
| Nasopharynx                          | 0  | 0.00  | 1         | 0.42  | 1         | 0.66  | 1         | 0.97  | 3     | 5.61     | 0.53  | -0.04 |
| Tonsil                               | 0  | 0.00  | 6         | 1.22  | 8         | 2.58* | 2         | 0.96  | 16    | 11.50    | 1.39  | 0.07  |
| Oropharynx                           | 0  | 0.00  | 2         | 1.48  | 0         | 0.00  | 0         | 0.00  | 2     | 3.26     | 0.61  | -0.02 |
| Hypopharynx                          | 1  | 0.95  | 1         | 0.27  | 3         | 1.23  | 3         | 1.77  | 8     | 8.93     | 0.90  | -0.01 |
| <b>Digestive system</b>              | 133  | 0.80* | 652       | 1.06  | 451       | 1.04  | 352       | 1.06  | 1,588 | 1,549.84 | 1.02  | 0.58  |
| Esophagus                            | 4  | 0.82  | 20        | 1.12  | 28        | 2.24* | 28        | 2.93* | 80    | 44.83    | 1.78* | 0.53  |
| Stomach                              | 13   | 1.04  | 83        | 1.82* | 44        | 1.39* | 30        | 1.26  | 170   | 113.69   | 1.50* | 0.86  |
| Small intestine                      | 1  | 0.37  | 15        | 1.50  | 6         | 0.85  | 4         | 0.73  | 26    | 25.21    | 1.03  | 0.01  |
| Colon                                | 62   | 0.77* | 310       | 1.03  | 227       | 1.05  | 167       | 1.01  | 766   | 764.10   | 1.00  | 0.03  |
| Rectum, rectosigmoid junction        | 21   | 0.77  | 102       | 1.03  | 69        | 1.02  | 45        | 0.90  | 237   | 244.46   | 0.97  | -0.11 |
| Rectum                               | 15   | 0.84  | 72        | 1.10  | 47        | 1.05  | 30        | 0.90  | 164   | 161.40   | 1.02  | 0.04  |
| Anus, anal canal                     | 4  | 1.55  | 11        | 1.17  | 5         | 0.78  | 7         | 1.48  | 27    | 23.10    | 1.17  | 0.06  |
| Liver                                | 3  | 0.76  | 9         | 0.61  | 6         | 0.58  | 7         | 0.86  | 25    | 37.18    | 0.67* | -0.19 |
| Gallbladder                          | 2  | 0.56  | 14        | 1.07  | 4         | 0.44  | 4         | 0.60  | 24    | 32.52    | 0.74  | -0.13 |
| Bile ducts, other biliary            | 2  | 0.55  | 14        | 1.02  | 9         | 0.90  | 10        | 1.25  | 35    | 35.40    | 0.99  | -0.01 |
| Pancreas                             | 20   | 0.92  | 69        | 0.85  | 50        | 0.86  | 47        | 1.05  | 186   | 205.79   | 0.90  | -0.30 |
| <b>Respiratory system</b>            | 78   | 0.69* | 361       | 0.86* | 312       | 1.07  | 330       | 1.46* | 1,081 | 1,049.08 | 1.03  | 0.48  |
| Nose, nasal cavity, ear              | 2  | 1.84  | 6         | 1.52  | 2         | 0.74  | 5         | 2.46  | 15    | 9.80     | 1.53  | 0.08  |
| Larynx                               | 4  | 1.04  | 8         | 0.59  | 2         | 0.22* | 4         | 0.63  | 18    | 32.67    | 0.55* | -0.22 |
| Lung, bronchus                       | 71   | 0.66* | 347       | 0.87* | 306       | 1.09  | 318       | 1.47* | 1,042 | 1,004.09 | 1.04  | 0.58  |
| <b>Female breast</b>                 | 410  | 1.59* | 1,754     | 1.90* | 1,196     | 1.95* | 838       | 1.90* | 4,198 | 2,232.39 | 1.88* | 29.86 |
| <b>Female genital system</b>         | 120  | 1.06  | 526       | 1.33* | 358       | 1.40* | 232       | 1.30* | 1,236 | 944.32   | 1.31* | 4.43  |
| Cervix uteri                         | 15   | 1.05  | 51        | 1.10  | 18        | 0.67  | 11        | 0.68  | 95    | 103.73   | 0.92  | -0.13 |
| Corpus uteri                         | 63   | 1.09  | 300       | 1.48* | 221       | 1.68* | 122       | 1.32* | 706   | 483.77   | 1.46* | 3.38  |
| Ovary                                | 34   | 1.03  | 149       | 1.27* | 98        | 1.27* | 79        | 1.44* | 360   | 282.76   | 1.27* | 1.17  |
| Vagina                               | 0  | 0.00  | 5         | 0.93  | 2         | 0.55  | 7         | 2.61* | 14    | 13.19    | 1.06  | 0.01  |
| Vulva                                | 5  | 1.15  | 13        | 0.80  | 10        | 0.88  | 7         | 0.80  | 35    | 40.72    | 0.86  | -0.09 |
| <b>Urinary system</b>                | 46   | 1.24  | 150       | 1.09  | 110       | 1.13  | 81        | 1.09  | 387   | 346.43   | 1.12* | 0.62  |
| Urinary bladder                      | 18   | 0.86  | 77        | 0.98  | 65        | 1.17  | 49        | 1.14  | 209   | 197.94   | 1.06  | 0.17  |
| Kidney parenchyma                    | 24   | 1.80* | 64        | 1.31* | 39        | 1.16  | 25        | 0.97  | 152   | 121.61   | 1.25* | 0.46  |
| Renal pelvis, other urinary          | 4  | 1.39  | 9         | 0.84  | 6         | 0.79  | 7         | 1.21  | 26    | 26.88    | 0.97  | -0.01 |
| Ureter                               | 2  | 2.34  | 2         | 0.63  | 0         | 0.00  | 4         | 2.30  | 8     | 8.07     | 0.99  | 0.00  |
| <b>Bone, joints</b>                  | 0  | 0.00  | 2         | 0.69  | 3         | 1.60  | 8         | 6.11* | 13    | 6.89     | 1.89* | 0.09  |
| <b>Soft tissue including heart</b>   | 2  | 0.59  | 19        | 1.56  | 28        | 3.42* | 18        | 2.99* | 67    | 29.72    | 2.25* | 0.57  |
| <b>Kaposi sarcoma</b>                | 0  | 0.00  | 1         | 1.19  | 0         | 0.00  | 1         | 2.00  | 2     | 2.19     | 0.91  | 0.00  |
| <b>Melanoma of skin</b>              | 33   | 1.70* | 93        | 1.35* | 63        | 1.39* | 53        | 1.66* | 242   | 165.36   | 1.46* | 1.16  |
| <b>Eye, orbit</b>                    | 0  | 0.00  | 4         | 0.91  | 3         | 1.04  | 5         | 2.43  | 12    | 10.55    | 1.14  | 0.02  |
| <b>Brain, central nervous system</b> | 8  | 0.89  | 28        | 0.87  | 22        | 1.03  | 15        | 0.98  | 73    | 77.83    | 0.94  | -0.07 |
| <b>Thyroid</b>                       | 20   | 1.98* | 36        | 1.06  | 25        | 1.22  | 18        | 1.38  | 99    | 77.61    | 1.28* | 0.32  |
| <b>Lymphatic, hematopoietic</b>      | 49   | 0.82  | 255       | 1.16* | 194       | 1.26* | 165       | 1.41* | 663   | 550.35   | 1.20* | 1.71  |
| Hodgkin lymphoma                     | 5  | 2.30  | 6         | 0.82  | 11        | 2.41* | 7         | 2.30  | 29    | 17.13    | 1.69* | 0.18  |
| Non-Hodgkin lymphoma                 | 21   | 0.71  | 75        | 0.68* | 75        | 0.97  | 82        | 1.38* | 253   | 276.32   | 0.92  | -0.35 |
| Myeloma                              | 10   | 1.00  | 37        | 1.00  | 26        | 1.00  | 21        | 1.06  | 94    | 92.91    | 1.01  | 0.02  |
| Leukemia                             | 13   | 0.74  | 137       | 2.10* | 82        | 1.78* | 55        | 1.57* | 287   | 164.00   | 1.75* | 1.87  |
| Acute lymphocytic                    | 3  | 4.98* | 4         | 1.86  | 4         | 2.78  | 0         | 0.00  | 11    | 5.23     | 2.10* | 0.09  |
| Chronic lymphocytic                  | 1  | 0.15* | 15        | 0.61  | 17        | 0.97  | 25        | 1.87* | 58    | 61.99    | 0.94  | -0.06 |
| Acute non-lymphocytic                | 6  | 0.93  | 95        | 3.96* | 44        | 2.62* | 23        | 1.79* | 168   | 60.06    | 2.80* | 1.64  |
| Chronic myeloid                      | 3  | 1.20  | 15        | 1.65  | 9         | 1.42  | 6         | 1.26  | 33    | 22.68    | 1.45* | 0.16  |

\*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 7.1.9:** Risk of subsequent primary cancers after cancer of the breast, females, 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   |
| <b>All subsequent cancers</b>        | 2,121                                      | 1.14* | 8,685     | 1.18* | 7,014     | 1.12* | 6,755     | 1.08* | 24,575 | 21,741.16 | 1.13* | 16.49 |
| All excluding same site              | 1,265                                      | 0.95  | 5,179     | 0.98  | 4,422     | 0.99  | 4,479     | 0.99  | 15,345 | 15,593.26 | 0.98* | -1.44 |
| <b>Buccal cavity, pharynx</b>        | 30   | 0.88  | 138       | 1.04  | 122       | 1.12  | 121       | 1.15  | 411    | 381.18    | 1.08  | 0.17  |
| Lip                                  | 2  | 0.88  | 6         | 0.66  | 6         | 0.77  | 13        | 1.62  | 27     | 27.25     | 0.99  | 0.00  |
| Tongue                               | 8  | 1.08  | 32        | 1.10  | 26        | 1.07  | 24        | 1.03  | 90     | 84.11     | 1.07  | 0.03  |
| Salivary gland                       | 7  | 1.87  | 24        | 1.63* | 14        | 1.15  | 16        | 1.31  | 61     | 42.83     | 1.42* | 0.11  |
| Mouth                                | 6  | 0.51  | 43        | 0.93  | 44        | 1.16  | 43        | 1.17  | 136    | 132.71    | 1.02  | 0.02  |
| Nasopharynx                          | 2  | 1.43  | 11        | 2.05* | 6         | 1.40  | 2         | 0.50  | 21     | 15.08     | 1.39  | 0.03  |
| Tonsil                               | 3  | 0.99  | 6         | 0.52  | 11        | 1.21  | 11        | 1.38  | 31     | 31.69     | 0.98  | 0.00  |
| Oropharynx                           | 1  | 1.20  | 2         | 0.61  | 6         | 2.25  | 1         | 0.41  | 10     | 9.24      | 1.08  | 0.00  |
| Hypopharynx                          | 1  | 0.44  | 7         | 0.79  | 5         | 0.70  | 6         | 0.91  | 19     | 24.90     | 0.76  | -0.03 |
| <b>Digestive system</b>              | 400  | 0.91  | 1,743     | 1.00  | 1,433     | 0.97  | 1,512     | 1.03  | 5,088  | 5,126.33  | 0.99  | -0.22 |
| Esophagus                            | 14   | 1.19  | 48        | 1.03  | 43        | 1.08  | 58        | 1.43* | 163    | 138.73    | 1.17* | 0.14  |
| Stomach                              | 30   | 0.85  | 138       | 1.01  | 107       | 0.95  | 128       | 1.18  | 403    | 393.41    | 1.02  | 0.06  |
| Small intestine                      | 1  | 0.17* | 18        | 0.77  | 27        | 1.29  | 34        | 1.51* | 80     | 72.82     | 1.10  | 0.04  |
| Colon                                | 222  | 1.01  | 955       | 1.09* | 789       | 1.06  | 751       | 1.01  | 2,717  | 2,587.70  | 1.05* | 0.75  |
| Rectum, rectosigmoid junction        | 56   | 0.80  | 278       | 1.01  | 206       | 0.92  | 234       | 1.09  | 774    | 784.11    | 0.99  | -0.06 |
| Rectum                               | 40   | 0.87  | 161       | 0.90  | 133       | 0.90  | 145       | 1.01  | 479    | 515.59    | 0.93  | -0.21 |
| Anus, anal canal                     | 4  | 0.71  | 18        | 0.80  | 21        | 1.09  | 16        | 0.82  | 59     | 67.03     | 0.88  | -0.05 |
| Liver                                | 6  | 0.68  | 21        | 0.59* | 17        | 0.54* | 29        | 0.85  | 73     | 110.28    | 0.66* | -0.22 |
| Gallbladder                          | 7  | 0.68  | 20        | 0.50* | 16        | 0.49* | 36        | 1.19  | 79     | 113.28    | 0.70* | -0.20 |
| Bile ducts, other biliary            | 14   | 1.51  | 36        | 0.96  | 21        | 0.63* | 33        | 0.91  | 104    | 116.45    | 0.89  | -0.07 |
| Pancreas                             | 43   | 0.76  | 188       | 0.83* | 171       | 0.88  | 172       | 0.87  | 574    | 675.17    | 0.85* | -0.59 |
| <b>Respiratory system</b>            | 203  | 0.89  | 867       | 0.93* | 731       | 0.88* | 838       | 0.93* | 2,639  | 2,900.86  | 0.91* | -1.52 |
| Nose, nasal cavity, ear              | 1  | 0.39  | 8         | 0.80  | 8         | 0.94  | 5         | 0.58  | 22     | 29.77     | 0.74  | -0.05 |
| Larynx                               | 8  | 1.02  | 33        | 1.07  | 21        | 0.83  | 27        | 1.10  | 89     | 88.39     | 1.01  | 0.00  |
| Lung, bronchus                       | 192  | 0.88  | 824       | 0.92* | 701       | 0.88* | 804       | 0.93* | 2,521  | 2,775.31  | 0.91* | -1.48 |
| <b>Female breast</b>                 | 856  | 1.61* | 3,506     | 1.67* | 2,592     | 1.47* | 2,276     | 1.30* | 9,230  | 6,147.90  | 1.50* | 17.93 |
| <b>Female genital system</b>         | 286  | 1.16* | 1,146     | 1.21* | 964       | 1.28* | 782       | 1.10* | 3,178  | 2,659.33  | 1.20* | 3.02  |
| Cervix uteri                         | 22   | 0.72  | 91        | 0.83  | 53        | 0.68* | 34        | 0.54* | 200    | 280.69    | 0.71* | -0.47 |
| Corpus uteri                         | 155  | 1.25* | 634       | 1.33* | 555       | 1.46* | 416       | 1.15* | 1,760  | 1,346.26  | 1.31* | 2.41  |
| Ovary                                | 97   | 1.37* | 350       | 1.26* | 297       | 1.30* | 270       | 1.22* | 1,014  | 797.08    | 1.27* | 1.26  |
| Vagina                               | 1  | 0.27  | 10        | 0.69  | 9         | 0.76  | 5         | 0.44  | 25     | 41.62     | 0.60* | -0.10 |
| Vulva                                | 4  | 0.36* | 37        | 0.84  | 28        | 0.74  | 33        | 0.84  | 102    | 132.13    | 0.77* | -0.18 |
| <b>Urinary system</b>                | 106  | 1.21  | 325       | 0.92  | 330       | 1.08  | 331       | 1.04  | 1,092  | 1,063.05  | 1.03  | 0.17  |
| Urinary bladder                      | 49   | 0.93  | 192       | 0.91  | 208       | 1.14  | 217       | 1.15* | 666    | 633.26    | 1.05  | 0.19  |
| Kidney parenchyma                    | 53   | 1.91* | 108       | 0.96  | 93        | 0.94  | 90        | 0.86  | 344    | 342.57    | 1.00  | 0.01  |
| Renal pelvis, other urinary          | 4  | 0.54  | 25        | 0.85  | 29        | 1.16  | 24        | 0.95  | 82     | 87.21     | 0.94  | -0.03 |
| Ureter                               | 0  | 0.00  | 4         | 0.44  | 10        | 1.29  | 8         | 1.04  | 22     | 26.89     | 0.82  | -0.03 |
| <b>Bone, joints</b>                  | 2  | 1.13  | 5         | 0.73  | 8         | 1.45  | 8         | 1.51  | 23     | 19.43     | 1.18  | 0.02  |
| <b>Soft tissue including heart</b>   | 4  | 0.54  | 32        | 1.10  | 30        | 1.22  | 29        | 1.15  | 95     | 86.44     | 1.10  | 0.05  |
| <b>Kaposi sarcoma</b>                | 0  | 0.00  | 0         | 0.00  | 1         | 0.38  | 3         | 1.17  | 4      | 8.96      | 0.45  | -0.03 |
| <b>Melanoma of skin</b>              | 41   | 1.13  | 158       | 1.09  | 133       | 1.08  | 126       | 1.01  | 458    | 429.98    | 1.07  | 0.16  |
| <b>Eye, orbit</b>                    | 1  | 0.35  | 16        | 1.46  | 11        | 1.25  | 7         | 0.82  | 35     | 31.12     | 1.12  | 0.02  |
| <b>Brain, central nervous system</b> | 13   | 0.68  | 82        | 1.08  | 46        | 0.73* | 40        | 0.65* | 181    | 218.93    | 0.83* | -0.22 |
| <b>Thyroid</b>                       | 36   | 2.03* | 91        | 1.36* | 72        | 1.37* | 47        | 0.98  | 246    | 185.23    | 1.33* | 0.35  |
| <b>Lymphatic, hematopoietic</b>      | 127  | 0.90  | 480       | 0.85* | 431       | 0.88* | 484       | 0.96  | 1,522  | 1,695.83  | 0.90* | -1.01 |
| Hodgkin lymphoma                     | 6  | 1.29  | 8         | 0.46* | 6         | 0.45* | 13        | 1.07  | 33     | 47.65     | 0.69* | -0.09 |
| Non-Hodgkin lymphoma                 | 60   | 0.91  | 203       | 0.76* | 197       | 0.83* | 248       | 0.99  | 708    | 821.08    | 0.86* | -0.66 |
| Myeloma                              | 23   | 0.94  | 97        | 1.00  | 72        | 0.87  | 78        | 0.92  | 270    | 289.42    | 0.93  | -0.11 |
| Leukemia                             | 38   | 0.83  | 172       | 0.94  | 156       | 1.01  | 145       | 0.93  | 511    | 537.69    | 0.95  | -0.16 |
| Acute lymphocytic                    | 0  | 0.00  | 6         | 1.13  | 3         | 0.67  | 2         | 0.45  | 11     | 15.57     | 0.71  | -0.03 |
| Chronic lymphocytic                  | 10   | 0.56  | 30        | 0.42* | 36        | 0.60* | 44        | 0.74* | 120    | 207.97    | 0.58* | -0.51 |
| Acute non-lymphocytic                | 19   | 1.19  | 111       | 1.74* | 83        | 1.53* | 61        | 1.09  | 274    | 189.74    | 1.44* | 0.49  |
| Chronic myeloid                      | 5  | 0.78  | 16        | 0.63  | 21        | 0.99  | 23        | 1.08  | 65     | 74.23     | 0.88  | -0.05 |

\*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.

**Breast**  
**Females, Long-term Follow-up, Radiotherapy**

**Table 7.1.10:** Risk of subsequent primary cancers after cancer of the breast, females, 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   |
| <b>Number starting interval</b>      | 109,188                                    |       | 21,912      |       | 8,686       |       | 3,168     |       | 109,188 |          |       |       |
| <b>Person-years in interval</b>      | 547,798                                    |       | 72,946      |       | 26,986      |       | 10,566    |       | 658,296 |          |       |       |
| <b>All subsequent cancers</b>        | 7,749                                      | 1.32* | 1,433       | 1.50* | 520         | 1.34* | 223       | 1.32* | 9,925   | 7,400.22 | 1.34* | 38.35 |
| All excluding same site              | 4,389                                      | 1.07* | 855         | 1.27* | 323         | 1.17* | 160       | 1.31* | 5,727   | 5,167.83 | 1.11* | 8.49  |
| <b>Buccal cavity, pharynx</b>        | 119  | 1.15  | 13          | 0.80  | 5           | 0.77  | 3         | 1.10  | 140     | 129.15   | 1.08  | 0.16  |
| Lip                                  | 5  | 0.78  | 0           | 0.00  | 0           | 0.00  | 1         | 4.70  | 6       | 8.22     | 0.73  | -0.03 |
| Tongue                               | 26   | 1.12  | 1           | 0.27  | 3           | 2.07  | 1         | 1.66  | 31      | 28.93    | 1.07  | 0.03  |
| Salivary gland                       | 24   | 2.06* | 5           | 2.70  | 0           | 0.00  | 1         | 3.05  | 30      | 14.61    | 2.05* | 0.23  |
| Mouth                                | 38   | 1.09  | 2           | 0.36  | 0           | 0.00  | 0         | 0.00  | 40      | 43.55    | 0.92  | -0.05 |
| Nasopharynx                          | 2  | 0.44  | 0           | 0.00  | 1           | 3.84  | 0         | 0.00  | 3       | 5.61     | 0.53  | -0.04 |
| Tonsil                               | 14   | 1.48  | 1           | 0.74  | 1           | 1.89  | 0         | 0.00  | 16      | 11.50    | 1.39  | 0.07  |
| Oropharynx                           | 2  | 0.76  | 0           | 0.00  | 0           | 0.00  | 0         | 0.00  | 2       | 3.26     | 0.61  | -0.02 |
| Hypopharynx                          | 5  | 0.69  | 3           | 2.75  | 0           | 0.00  | 0         | 0.00  | 8       | 8.93     | 0.90  | -0.01 |
| <b>Digestive system</b>              | 1,236                                      | 1.02  | 224         | 1.08  | 83          | 0.97  | 45        | 1.16  | 1,588   | 1,549.84 | 1.02  | 0.58  |
| Esophagus                            | 52   | 1.47* | 16          | 2.68* | 10          | 4.06* | 2         | 1.78  | 80      | 44.83    | 1.78* | 0.53  |
| Stomach                              | 140  | 1.56* | 23          | 1.54  | 2           | 0.32  | 5         | 1.82  | 170     | 113.69   | 1.50* | 0.86  |
| Small intestine                      | 22   | 1.11  | 2           | 0.59  | 2           | 1.41  | 0         | 0.00  | 26      | 25.21    | 1.03  | 0.01  |
| Colon                                | 599  | 1.00  | 108         | 1.04  | 39          | 0.91  | 20        | 1.03  | 766     | 764.10   | 1.00  | 0.03  |
| Rectum, rectosigmoid junction        | 192  | 0.99  | 27          | 0.85  | 12          | 0.95  | 6         | 1.09  | 237     | 244.46   | 0.97  | -0.11 |
| Rectum                               | 134  | 1.05  | 17          | 0.81  | 8           | 0.95  | 5         | 1.33  | 164     | 161.40   | 1.02  | 0.04  |
| Anus, anal canal                     | 20   | 1.09  | 6           | 2.01  | 1           | 0.82  | 0         | 0.00  | 27      | 23.10    | 1.17  | 0.06  |
| Liver                                | 18   | 0.62* | 4           | 0.81  | 1           | 0.47  | 2         | 1.91  | 25      | 37.18    | 0.67* | -0.19 |
| Gallbladder                          | 20   | 0.77  | 2           | 0.47  | 1           | 0.58  | 1         | 1.36  | 24      | 32.52    | 0.74  | -0.13 |
| Bile ducts, other biliary            | 25   | 0.91  | 6           | 1.22  | 3           | 1.42  | 1         | 1.00  | 35      | 35.40    | 0.99  | -0.01 |
| Pancreas                             | 139  | 0.86  | 29          | 1.04  | 10          | 0.86  | 8         | 1.50  | 186     | 205.79   | 0.90  | -0.30 |
| <b>Respiratory system</b>            | 751  | 0.91* | 192         | 1.37* | 90          | 1.53* | 48        | 1.79* | 1,081   | 1,049.08 | 1.03  | 0.48  |
| Nose, nasal cavity, ear              | 10   | 1.29  | 5           | 3.90* | 0           | 0.00  | 0         | 0.00  | 15      | 9.80     | 1.53  | 0.08  |
| Larynx                               | 14   | 0.53* | 2           | 0.49  | 2           | 1.24  | 0         | 0.00  | 18      | 32.67    | 0.55* | -0.22 |
| Lung, bronchus                       | 724  | 0.92* | 184         | 1.37* | 86          | 1.52* | 48        | 1.86* | 1,042   | 1,004.09 | 1.04  | 0.58  |
| <b>Female breast</b>                 | 3,360                                      | 1.87* | 578         | 2.05* | 197         | 1.77* | 63        | 1.34* | 4,198   | 2,232.39 | 1.88* | 29.86 |
| <b>Female genital system</b>         | 1,004                                      | 1.31* | 160         | 1.39* | 49          | 1.08  | 23        | 1.24  | 1,236   | 944.32   | 1.31* | 4.43  |
| Cervix uteri                         | 84   | 0.96  | 7           | 0.64  | 4           | 1.01  | 0         | 0.00  | 95      | 103.73   | 0.92  | -0.13 |
| Corpus uteri                         | 584  | 1.49* | 88          | 1.49* | 24          | 1.03  | 10        | 1.03  | 706     | 483.77   | 1.46* | 3.38  |
| Ovary                                | 281  | 1.23* | 53          | 1.51* | 15          | 1.08  | 11        | 1.90  | 360     | 282.76   | 1.27* | 1.17  |
| Vagina                               | 7  | 0.67  | 4           | 2.35  | 3           | 4.41  | 0         | 0.00  | 14      | 13.19    | 1.06  | 0.01  |
| Vulva                                | 28   | 0.88  | 4           | 0.73  | 2           | 0.89  | 1         | 0.98  | 35      | 40.72    | 0.86  | -0.09 |
| <b>Urinary system</b>                | 306  | 1.13* | 53          | 1.14  | 22          | 1.14  | 6         | 0.68  | 387     | 346.43   | 1.12* | 0.62  |
| Urinary bladder                      | 160  | 1.03  | 33          | 1.23  | 11          | 0.98  | 5         | 0.98  | 209     | 197.94   | 1.06  | 0.17  |
| Kidney parenchyma                    | 127  | 1.32* | 17          | 1.06  | 7           | 1.05  | 1         | 0.34  | 152     | 121.61   | 1.25* | 0.46  |
| Renal pelvis, other urinary          | 19   | 0.90  | 3           | 0.84  | 4           | 2.68  | 0         | 0.00  | 26      | 26.88    | 0.97  | -0.01 |
| Ureter                               | 4  | 0.63  | 1           | 0.93  | 3           | 6.66* | 0         | 0.00  | 8       | 8.07     | 0.99  | 0.00  |
| <b>Bone, joints</b>                  | 5  | 0.90  | 7           | 8.36* | 1           | 3.04  | 0         | 0.00  | 13      | 6.89     | 1.89* | 0.09  |
| <b>Soft tissue including heart</b>   | 49   | 2.07* | 11          | 2.90* | 4           | 2.57  | 3         | 4.44  | 67      | 29.72    | 2.25* | 0.57  |
| <b>Kaposi sarcoma</b>                | 1  | 0.59  | 1           | 3.18  | 0           | 0.00  | 0         | 0.00  | 2       | 2.19     | 0.91  | 0.00  |
| <b>Melanoma of skin</b>              | 189  | 1.42* | 35          | 1.72* | 9           | 1.13  | 9         | 2.57* | 242     | 165.36   | 1.46* | 1.16  |
| <b>Eye, orbit</b>                    | 7  | 0.82  | 4           | 3.06  | 1           | 1.89  | 0         | 0.00  | 12      | 10.55    | 1.14  | 0.02  |
| <b>Brain, central nervous system</b> | 58   | 0.93  | 6           | 0.61  | 8           | 2.07  | 1         | 0.61  | 73      | 77.83    | 0.94  | -0.07 |
| <b>Thyroid</b>                       | 81   | 1.25  | 15          | 1.75  | 2           | 0.63  | 1         | 0.79  | 99      | 77.61    | 1.28* | 0.32  |
| <b>Lymphatic, hematopoietic</b>      | 498  | 1.15* | 106         | 1.44* | 42          | 1.38  | 17        | 1.24  | 663     | 550.35   | 1.20* | 1.71  |
| Hodgkin lymphoma                     | 22   | 1.56  | 1           | 0.51  | 4           | 5.22* | 2         | 6.55  | 29      | 17.13    | 1.69* | 0.18  |
| Non-Hodgkin lymphoma                 | 171  | 0.79* | 56          | 1.51* | 15          | 0.98  | 11        | 1.57  | 253     | 276.32   | 0.92  | -0.35 |
| Myeloma                              | 73   | 1.00  | 14          | 1.13  | 7           | 1.35  | 0         | 0.00  | 94      | 92.91    | 1.01  | 0.02  |
| Leukemia                             | 232  | 1.80* | 35          | 1.59* | 16          | 1.77* | 4         | 1.00  | 287     | 164.00   | 1.75* | 1.87  |
| Acute lymphocytic                    | 11   | 2.63* | 0           | 0.00  | 0           | 0.00  | 0         | 0.00  | 11      | 5.23     | 2.10* | 0.09  |
| Chronic lymphocytic                  | 33   | 0.68* | 18          | 2.15* | 6           | 1.73  | 1         | 0.67  | 58      | 61.99    | 0.94  | -0.06 |
| Acute non-lymphocytic                | 145  | 3.07* | 13          | 1.62  | 9           | 2.73* | 1         | 0.65  | 168     | 60.06    | 2.80* | 1.64  |
| Chronic myeloid                      | 27   | 1.51  | 3           | 1.00  | 1           | 0.82  | 2         | 3.81  | 33      | 22.68    | 1.45* | 0.16  |

\*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 7.1.11:** Risk of subsequent primary cancers after cancer of the breast, females, 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   |
| <b>All subsequent cancers</b>        | 17,820                                     | 1.15* | 3,995       | 1.10* | 1,943       | 1.07* | 817       | 0.99  | 24,575 | 21,741.16 | 1.13* | 16.49 |
| All excluding same site              | 10,866                                     | 0.98* | 2,592       | 1.00  | 1,304       | 0.99  | 583       | 0.97  | 15,345 | 15,593.26 | 0.98* | -1.44 |
| <b>Buccal cavity, pharynx</b>        | 290  | 1.05  | 62          | 1.01  | 49          | 1.62* | 10        | 0.76  | 411    | 381.18    | 1.08  | 0.17  |
| Lip                                  | 14   | 0.73  | 8           | 1.75  | 3           | 1.27  | 2         | 1.81  | 27     | 27.25     | 0.99  | 0.00  |
| Tongue                               | 66   | 1.09  | 12          | 0.87  | 11          | 1.64  | 1         | 0.34  | 90     | 84.11     | 1.07  | 0.03  |
| Salivary gland                       | 45   | 1.47* | 6           | 0.86  | 7           | 1.96  | 3         | 1.84  | 61     | 42.83     | 1.42* | 0.11  |
| Mouth                                | 93   | 0.97  | 22          | 1.02  | 19          | 1.80* | 2         | 0.43  | 136    | 132.71    | 1.02  | 0.02  |
| Nasopharynx                          | 19   | 1.72* | 2           | 0.85  | 0           | 0.00  | 0         | 0.00  | 21     | 15.08     | 1.39  | 0.03  |
| Tonsil                               | 20   | 0.84  | 5           | 1.03  | 6           | 2.63  | 0         | 0.00  | 31     | 31.69     | 0.98  | 0.00  |
| Oropharynx                           | 9  | 1.33  | 1           | 0.69  | 0           | 0.00  | 0         | 0.00  | 10     | 9.24      | 1.08  | 0.00  |
| Hypopharynx                          | 13   | 0.71  | 4           | 1.02  | 1           | 0.54  | 1         | 1.25  | 19     | 24.90     | 0.76  | -0.03 |
| <b>Digestive system</b>              | 3,576                                      | 0.98  | 844         | 0.99  | 457         | 1.08  | 211       | 1.07  | 5,088  | 5,126.33  | 0.99  | -0.22 |
| Esophagus                            | 105  | 1.07  | 32          | 1.37  | 16          | 1.36  | 10        | 1.80  | 163    | 138.73    | 1.17* | 0.14  |
| Stomach                              | 275  | 0.96  | 71          | 1.12  | 38          | 1.23  | 19        | 1.35  | 403    | 393.41    | 1.02  | 0.06  |
| Small intestine                      | 46   | 0.92  | 21          | 1.66* | 12          | 1.80  | 1         | 0.31  | 80     | 72.82     | 1.10  | 0.04  |
| Colon                                | 1,966                                      | 1.07* | 417         | 0.97  | 222         | 1.03  | 112       | 1.12  | 2,717  | 2,587.70  | 1.05* | 0.75  |
| Rectum, rectosigmoid junction        | 540  | 0.95  | 132         | 1.05  | 78          | 1.28* | 24        | 0.87  | 774    | 784.11    | 0.99  | -0.06 |
| Rectum                               | 334  | 0.90* | 77          | 0.92  | 55          | 1.34* | 13        | 0.69  | 479    | 515.59    | 0.93  | -0.21 |
| Anus, anal canal                     | 43   | 0.90  | 5           | 0.45  | 6           | 1.06  | 5         | 1.96  | 59     | 67.03     | 0.88  | -0.05 |
| Liver                                | 44   | 0.58* | 17          | 0.89  | 6           | 0.60  | 6         | 1.17  | 73     | 110.28    | 0.66* | -0.22 |
| Gallbladder                          | 43   | 0.52* | 22          | 1.23  | 11          | 1.28  | 3         | 0.80  | 79     | 113.28    | 0.70* | -0.20 |
| Bile ducts, other biliary            | 71   | 0.88  | 19          | 0.94  | 8           | 0.75  | 6         | 1.16  | 104    | 116.45    | 0.89  | -0.07 |
| Pancreas                             | 402  | 0.84* | 95          | 0.83  | 57          | 0.99  | 20        | 0.74  | 574    | 675.17    | 0.85* | -0.59 |
| <b>Respiratory system</b>            | 1,801                                      | 0.90* | 464         | 0.91  | 251         | 0.94  | 123       | 0.97  | 2,639  | 2,900.86  | 0.91* | -1.52 |
| Nose, nasal cavity, ear              | 17   | 0.80  | 2           | 0.40  | 3           | 1.22  | 0         | 0.00  | 22     | 29.77     | 0.74  | -0.05 |
| Larynx                               | 62   | 0.97  | 16          | 1.11  | 9           | 1.28  | 2         | 0.67  | 89     | 88.39     | 1.01  | 0.00  |
| Lung, bronchus                       | 1,717                                      | 0.90* | 445         | 0.91  | 238         | 0.93  | 121       | 0.99  | 2,521  | 2,775.31  | 0.91* | -1.48 |
| <b>Female breast</b>                 | 6,954                                      | 1.58* | 1,403       | 1.37* | 639         | 1.26* | 234       | 1.05  | 9,230  | 6,147.90  | 1.50* | 17.93 |
| <b>Female genital system</b>         | 2,396                                      | 1.23* | 500         | 1.19* | 209         | 1.02  | 73        | 0.83  | 3,178  | 2,659.33  | 1.20* | 3.02  |
| Cervix uteri                         | 166  | 0.76* | 21          | 0.54* | 12          | 0.70  | 1         | 0.15* | 200    | 280.69    | 0.71* | -0.47 |
| Corpus uteri                         | 1,344                                      | 1.37* | 278         | 1.31* | 103         | 0.98  | 35        | 0.77  | 1,760  | 1,346.26  | 1.31* | 2.41  |
| Ovary                                | 744  | 1.29* | 163         | 1.26* | 76          | 1.19  | 31        | 1.12  | 1,014  | 797.08    | 1.27* | 1.26  |
| Vagina                               | 20   | 0.66  | 3           | 0.45  | 1           | 0.31  | 1         | 0.69  | 25     | 41.62     | 0.60* | -0.10 |
| Vulva                                | 69   | 0.74* | 24          | 1.07  | 7           | 0.61  | 2         | 0.38  | 102    | 132.13    | 0.77* | -0.18 |
| <b>Urinary system</b>                | 761  | 1.02  | 185         | 1.02  | 105         | 1.13  | 41        | 0.94  | 1,092  | 1,063.05  | 1.03  | 0.17  |
| Urinary bladder                      | 449  | 1.01  | 122         | 1.14  | 66          | 1.20  | 29        | 1.13  | 666    | 633.26    | 1.05  | 0.19  |
| Kidney parenchyma                    | 254  | 1.07  | 51          | 0.86  | 31          | 1.01  | 8         | 0.56  | 344    | 342.57    | 1.00  | 0.01  |
| Renal pelvis, other urinary          | 58   | 0.94  | 12          | 0.83  | 8           | 1.10  | 4         | 1.15  | 82     | 87.21     | 0.94  | -0.03 |
| Ureter                               | 14   | 0.73  | 3           | 0.68  | 3           | 1.35  | 2         | 1.90  | 22     | 26.89     | 0.82  | -0.03 |
| <b>Bone, joints</b>                  | 15   | 1.06  | 7           | 2.29  | 0           | 0.00  | 1         | 1.43  | 23     | 19.43     | 1.18  | 0.02  |
| <b>Soft tissue including heart</b>   | 66   | 1.08  | 16          | 1.11  | 8           | 1.08  | 5         | 1.50  | 95     | 86.44     | 1.10  | 0.05  |
| <b>Kaposi sarcoma</b>                | 1  | 0.16* | 2           | 1.31  | 1           | 1.37  | 0         | 0.00  | 4      | 8.96      | 0.45  | -0.03 |
| <b>Melanoma of skin</b>              | 332  | 1.09  | 80          | 1.12  | 27          | 0.74  | 19        | 1.12  | 458    | 429.98    | 1.07  | 0.16  |
| <b>Eye, orbit</b>                    | 28   | 1.24  | 2           | 0.40  | 3           | 1.20  | 2         | 1.86  | 35     | 31.12     | 1.12  | 0.02  |
| <b>Brain, central nervous system</b> | 141  | 0.89  | 26          | 0.73  | 10          | 0.57  | 4         | 0.51  | 181    | 218.93    | 0.83* | -0.22 |
| <b>Thyroid</b>                       | 199  | 1.45* | 30          | 1.06  | 9           | 0.66  | 8         | 1.37  | 246    | 185.23    | 1.33* | 0.35  |
| <b>Lymphatic, hematopoietic</b>      | 1,038                                      | 0.87* | 287         | 1.00  | 140         | 0.95  | 57        | 0.84  | 1,522  | 1,695.83  | 0.90* | -1.01 |
| Hodgkin lymphoma                     | 20   | 0.56* | 4           | 0.55  | 9           | 2.56* | 0         | 0.00  | 33     | 47.65     | 0.69* | -0.09 |
| Non-Hodgkin lymphoma                 | 460  | 0.81* | 153         | 1.08  | 69          | 0.94  | 26        | 0.75  | 708    | 821.08    | 0.86* | -0.66 |
| Myeloma                              | 192  | 0.94  | 48          | 0.98  | 20          | 0.81  | 10        | 0.88  | 270    | 289.42    | 0.93  | -0.11 |
| Leukemia                             | 366  | 0.96  | 82          | 0.91  | 42          | 0.93  | 21        | 1.02  | 511    | 537.69    | 0.95  | -0.16 |
| Acute lymphocytic                    | 9  | 0.81  | 1           | 0.39  | 1           | 0.80  | 0         | 0.00  | 11     | 15.57     | 0.71  | -0.03 |
| Chronic lymphocytic                  | 76   | 0.51* | 24          | 0.69  | 11          | 0.64  | 9         | 1.18  | 120    | 207.97    | 0.58* | -0.51 |
| Acute non-lymphocytic                | 213  | 1.59* | 33          | 1.04  | 16          | 0.98  | 12        | 1.55  | 274    | 189.74    | 1.44* | 0.49  |
| Chronic myeloid                      | 42   | 0.79  | 16          | 1.30  | 7           | 1.14  | 0         | 0.00  | 65     | 74.23     | 0.88  | -0.05 |

\*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.

## Breast Infiltrating Ductal Carcinoma NOS, Females

**Table 7.1.12:** Risk of subsequent primary cancers after infiltrating ductal carcinoma of the breast, females, 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   |
|                                      | 225,778                                    | 180,326                  | 207,743   | 651,897 | 124,981   | 459,611 | 64,754    | 358,272 | 225,778 | 1,650,107 |       |       |
| <b>All subsequent cancers</b>        | 2,054                                      | 1.10*                    | 8,795     | 1.21*   | 6,831     | 1.18*   | 5,972     | 1.15*   | 23,652  | 20,131.63 | 1.17* | 21.33 |
| All excluding same site              | 1,253                                      | 0.95                     | 5,158     | 1.00    | 4,248     | 1.03    | 3,901     | 1.04*   | 14,560  | 14,315.82 | 1.02* | 1.48  |
| <b>Buccal cavity, pharynx</b>        | 33   | 0.97                     | 134       | 1.03    | 120       | 1.19    | 96        | 1.10    | 383     | 352.06    | 1.09  | 0.19  |
| Lip                                  | 2  | 0.93                     | 7         | 0.82    | 6         | 0.85    | 11        | 1.68    | 26      | 24.33     | 1.07  | 0.01  |
| Tongue                               | 9  | 1.20                     | 35        | 1.22    | 23        | 1.02    | 18        | 0.93    | 85      | 78.13     | 1.09  | 0.04  |
| Salivary gland                       | 8  | 2.13                     | 23        | 1.59*   | 16        | 1.41    | 18        | 1.78*   | 65      | 39.64     | 1.64* | 0.15  |
| Mouth                                | 8  | 0.69                     | 36        | 0.81    | 45        | 1.29    | 30        | 0.99    | 119     | 121.30    | 0.98  | -0.01 |
| Nasopharynx                          | 1  | 0.68                     | 8         | 1.45    | 4         | 0.97    | 1         | 0.29    | 14      | 14.53     | 0.96  | 0.00  |
| Tonsil                               | 3  | 0.97                     | 9         | 0.78    | 13        | 1.54    | 9         | 1.35    | 34      | 29.81     | 1.14  | 0.03  |
| Oropharynx                           | 1  | 1.18                     | 3         | 0.92    | 4         | 1.61    | 0         | 0.00    | 8       | 8.64      | 0.93  | 0.00  |
| Hypopharynx                          | 1  | 0.43                     | 5         | 0.56    | 4         | 0.60    | 7         | 1.27    | 17      | 23.34     | 0.73  | -0.04 |
| <b>Digestive system</b>              | 375  | 0.91                     | 1,605     | 0.98    | 1,282     | 0.97    | 1,215     | 1.01    | 4,477   | 4,572.17  | 0.98  | -0.58 |
| Esophagus                            | 10   | 0.87                     | 48        | 1.07    | 50        | 1.38*   | 57        | 1.71*   | 165     | 125.96    | 1.31* | 0.24  |
| Stomach                              | 26   | 0.80                     | 132       | 1.05    | 94        | 0.94    | 97        | 1.10    | 349     | 345.95    | 1.01  | 0.02  |
| Small intestine                      | 1  | 0.17*                    | 22        | 0.93    | 25        | 1.28    | 18        | 0.96    | 66      | 67.84     | 0.97  | -0.01 |
| Colon                                | 201  | 0.98                     | 861       | 1.06    | 701       | 1.05    | 593       | 0.98    | 2,356   | 2,291.94  | 1.03  | 0.39  |
| Rectum, rectosigmoid junction        | 60   | 0.90                     | 250       | 0.97    | 186       | 0.92    | 200       | 1.13    | 696     | 704.84    | 0.99  | -0.05 |
| Rectum                               | 43   | 0.99                     | 151       | 0.89    | 120       | 0.90    | 126       | 1.07    | 440     | 464.13    | 0.95  | -0.15 |
| Anus, anal canal                     | 7  | 1.22                     | 19        | 0.85    | 16        | 0.89    | 15        | 0.93    | 57      | 62.28     | 0.92  | -0.03 |
| Liver                                | 7  | 0.78                     | 19        | 0.54*   | 18        | 0.61*   | 20        | 0.70    | 64      | 102.54    | 0.62* | -0.23 |
| Gallbladder                          | 7  | 0.74                     | 21        | 0.57*   | 11        | 0.38*   | 25        | 1.02    | 64      | 99.31     | 0.64* | -0.21 |
| Bile ducts, other biliary            | 11   | 1.25                     | 33        | 0.92    | 19        | 0.62*   | 28        | 0.94    | 91      | 104.65    | 0.87  | -0.08 |
| Pancreas                             | 42   | 0.78                     | 181       | 0.85*   | 148       | 0.84*   | 149       | 0.92    | 520     | 603.87    | 0.86* | -0.51 |
| <b>Respiratory system</b>            | 202  | 0.84*                    | 889       | 0.93*   | 770       | 0.97    | 843       | 1.11*   | 2,704   | 2,749.05  | 0.98  | -0.27 |
| Nose, nasal cavity, ear              | 3  | 1.19                     | 9         | 0.92    | 8         | 1.02    | 7         | 0.98    | 27      | 27.29     | 0.99  | 0.00  |
| Larynx                               | 7  | 0.86                     | 27        | 0.87    | 19        | 0.79    | 19        | 0.93    | 72      | 83.85     | 0.86  | -0.07 |
| Lung, bronchus                       | 191  | 0.84*                    | 851       | 0.93*   | 740       | 0.97    | 813       | 1.12*   | 2,595   | 2,631.06  | 0.99  | -0.22 |
| <b>Female breast</b>                 | 801  | 1.45*                    | 3,637     | 1.71*   | 2,583     | 1.55*   | 2,071     | 1.41*   | 9,092   | 5,815.81  | 1.56* | 19.85 |
| <b>Female genital system</b>         | 302  | 1.21*                    | 1,190     | 1.27*   | 927       | 1.31*   | 644       | 1.08    | 3,063   | 2,489.76  | 1.23* | 3.47  |
| Cervix uteri                         | 28   | 0.90                     | 100       | 0.92    | 44        | 0.61*   | 31        | 0.60*   | 203     | 264.21    | 0.77* | -0.37 |
| Corpus uteri                         | 163  | 1.29*                    | 665       | 1.39*   | 561       | 1.57*   | 350       | 1.15*   | 1,739   | 1,265.74  | 1.37* | 2.87  |
| Ovary                                | 95   | 1.31*                    | 355       | 1.28*   | 260       | 1.22*   | 208       | 1.13    | 918     | 747.71    | 1.23* | 1.03  |
| Vagina                               | 1  | 0.28                     | 12        | 0.87    | 10        | 0.93    | 9         | 0.96    | 32      | 37.48     | 0.85  | -0.03 |
| Vulva                                | 5  | 0.47                     | 36        | 0.86    | 31        | 0.90    | 27        | 0.85    | 99      | 118.63    | 0.83  | -0.12 |
| <b>Urinary system</b>                | 100  | 1.16                     | 340       | 0.99    | 306       | 1.09    | 279       | 1.06    | 1,025   | 971.47    | 1.06  | 0.32  |
| Urinary bladder                      | 44   | 0.87                     | 201       | 1.00    | 193       | 1.17*   | 183       | 1.18*   | 621     | 570.99    | 1.09* | 0.30  |
| Kidney parenchyma                    | 49   | 1.71*                    | 114       | 1.00    | 87        | 0.94    | 76        | 0.87    | 326     | 322.13    | 1.01  | 0.02  |
| Renal pelvis, other urinary          | 7  | 0.99                     | 25        | 0.90    | 26        | 1.15    | 20        | 0.97    | 78      | 78.35     | 1.00  | 0.00  |
| Ureter                               | 1  | 0.46                     | 6         | 0.70    | 8         | 1.14    | 5         | 0.79    | 20      | 24.02     | 0.83  | -0.02 |
| <b>Bone, joints</b>                  | 2  | 1.11                     | 4         | 0.59    | 8         | 1.55    | 12        | 2.71*   | 26      | 18.18     | 1.43  | 0.05  |
| <b>Soft tissue including heart</b>   | 5  | 0.67                     | 37        | 1.28    | 45        | 1.96*   | 32        | 1.54*   | 119     | 80.27     | 1.48* | 0.23  |
| <b>Kaposi sarcoma</b>                | 0  | 0.00                     | 1         | 0.38    | 1         | 0.45    | 1         | 0.50    | 3       | 7.54      | 0.40  | -0.03 |
| <b>Melanoma of skin</b>              | 48   | 1.22                     | 171       | 1.13    | 149       | 1.25*   | 117       | 1.11    | 485     | 415.17    | 1.17* | 0.42  |
| <b>Eye, orbit</b>                    | 0  | 0.00                     | 19        | 1.78*   | 10        | 1.23    | 10        | 1.41    | 39      | 28.72     | 1.36  | 0.06  |
| <b>Brain, central nervous system</b> | 19   | 0.96                     | 69        | 0.91    | 49        | 0.83    | 43        | 0.84    | 180     | 205.88    | 0.87  | -0.16 |
| <b>Thyroid</b>                       | 35   | 1.77*                    | 81        | 1.12    | 71        | 1.38*   | 41        | 1.00    | 228     | 184.37    | 1.24* | 0.26  |
| <b>Lymphatic, hematopoietic</b>      | 110  | 0.79*                    | 520       | 0.95    | 422       | 0.94    | 440       | 1.06    | 1,492   | 1,548.36  | 0.96  | -0.34 |
| Hodgkin lymphoma                     | 7  | 1.47                     | 11        | 0.64    | 14        | 1.12    | 17        | 1.67    | 49      | 44.78     | 1.09  | 0.03  |
| Non-Hodgkin lymphoma                 | 55   | 0.83                     | 197       | 0.74*   | 187       | 0.85*   | 228       | 1.10    | 667     | 760.33    | 0.88* | -0.57 |
| Myeloma                              | 17   | 0.72                     | 98        | 1.05    | 55        | 0.73*   | 62        | 0.89    | 232     | 262.53    | 0.88  | -0.19 |
| Leukemia                             | 31   | 0.71                     | 214       | 1.25*   | 166       | 1.20*   | 133       | 1.05    | 544     | 480.71    | 1.13* | 0.38  |
| Acute lymphocytic                    | 2  | 1.47                     | 7         | 1.33    | 5         | 1.21    | 1         | 0.28    | 15      | 14.37     | 1.04  | 0.00  |
| Chronic lymphocytic                  | 7  | 0.42*                    | 32        | 0.49*   | 36        | 0.67*   | 46        | 0.95    | 121     | 184.62    | 0.66* | -0.39 |
| Acute non-lymphocytic                | 16   | 1.04                     | 145       | 2.38*   | 90        | 1.82*   | 54        | 1.18    | 305     | 171.75    | 1.78* | 0.81  |
| Chronic myeloid                      | 4  | 0.65                     | 17        | 0.71    | 19        | 0.99    | 19        | 1.10    | 59      | 66.38     | 0.89  | -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.

**Table 7.1.13:** Risk of subsequent primary cancers after lobular carcinoma of the breast, 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   |
| <b>All subsequent cancers</b>        | 248  | 1.22* | 890       | 1.15* | 716       | 1.24* | 561       | 1.14* | 2,415 | 2,045.17 | 1.18* | 23.45 |
| All excluding same site              | 127  | 0.89  | 526       | 0.96  | 474       | 1.15* | 374       | 1.05  | 1,501 | 1,458.28 | 1.03  | 2.71  |
| <b>Buccal cavity, pharynx</b>        | 3  | 0.83  | 16        | 1.17  | 16        | 1.60  | 6         | 0.72  | 41    | 35.65    | 1.15  | 0.34  |
| Lip                                  | 0  | 0.00  | 1         | 1.05  | 1         | 1.38  | 0         | 0.00  | 2     | 2.56     | 0.78  | -0.04 |
| Tongue                               | 0  | 0.00  | 2         | 0.66  | 3         | 1.35  | 1         | 0.54  | 6     | 7.90     | 0.76  | -0.12 |
| Salivary gland                       | 1  | 2.48  | 4         | 2.61  | 1         | 0.89  | 2         | 2.07  | 8     | 4.03     | 1.99  | 0.25  |
| Mouth                                | 1  | 0.80  | 8         | 1.69  | 7         | 2.01  | 2         | 0.69  | 18    | 12.38    | 1.45  | 0.36  |
| Nasopharynx                          | 1  | 7.11  | 1         | 1.92  | 1         | 2.68  | 0         | 0.00  | 3     | 1.34     | 2.23  | 0.11  |
| Tonsil                               | 0  | 0.00  | 0         | 0.00  | 2         | 2.42  | 0         | 0.00  | 2     | 2.96     | 0.68  | -0.06 |
| Oropharynx                           | 0  | 0.00  | 0         | 0.00  | 0         | 0.00  | 0         | 0.00  | 0     | 0.88     | 0.00  | -0.06 |
| Hypopharynx                          | 0  | 0.00  | 0         | 0.00  | 1         | 1.52  | 1         | 1.89  | 2     | 2.36     | 0.85  | -0.02 |
| <b>Digestive system</b>              | 39   | 0.87  | 183       | 1.05  | 152       | 1.15  | 139       | 1.22* | 513   | 465.20   | 1.10* | 3.03  |
| Esophagus                            | 2  | 1.62  | 3         | 0.63  | 8         | 2.22  | 4         | 1.27  | 17    | 12.76    | 1.33  | 0.27  |
| Stomach                              | 7  | 2.09  | 28        | 2.18* | 25        | 2.60* | 20        | 2.47* | 80    | 33.91    | 2.36* | 2.92  |
| Small intestine                      | 0  | 0.00  | 2         | 0.78  | 1         | 0.51  | 3         | 1.70  | 6     | 6.93     | 0.87  | -0.06 |
| Colon                                | 20   | 0.89  | 94        | 1.07  | 68        | 1.02  | 59        | 1.02  | 241   | 234.95   | 1.03  | 0.38  |
| Rectum, rectosigmoid junction        | 5  | 0.70  | 32        | 1.17  | 24        | 1.19  | 23        | 1.38  | 84    | 71.42    | 1.18  | 0.80  |
| Rectum                               | 4  | 0.85  | 18        | 1.00  | 15        | 1.13  | 17        | 1.52  | 54    | 47.13    | 1.15  | 0.44  |
| Anus, anal canal                     | 0  | 0.00  | 1         | 0.42  | 1         | 0.56  | 2         | 1.30  | 4     | 6.35     | 0.63  | -0.15 |
| Liver                                | 0  | 0.00  | 4         | 1.09  | 0         | 0.00  | 2         | 0.77  | 6     | 10.04    | 0.60  | -0.26 |
| Gallbladder                          | 0  | 0.00  | 2         | 0.52  | 1         | 0.35  | 2         | 0.86  | 5     | 9.98     | 0.50  | -0.32 |
| Bile ducts, other biliary            | 1  | 1.01  | 3         | 0.77  | 1         | 0.33  | 4         | 1.42  | 9     | 10.74    | 0.84  | -0.11 |
| Pancreas                             | 4  | 0.68  | 12        | 0.52* | 21        | 1.20  | 15        | 0.98  | 52    | 61.56    | 0.84  | -0.61 |
| <b>Respiratory system</b>            | 25   | 0.93  | 68        | 0.65* | 88        | 1.10  | 65        | 0.90  | 246   | 283.73   | 0.87* | -2.39 |
| Nose, nasal cavity, ear              | 0  | 0.00  | 1         | 0.96  | 1         | 1.28  | 1         | 1.48  | 3     | 2.77     | 1.08  | 0.01  |
| Larynx                               | 2  | 2.31  | 3         | 0.92  | 0         | 0.00  | 4         | 2.03  | 9     | 8.43     | 1.07  | 0.04  |
| Lung, bronchus                       | 23   | 0.89  | 64        | 0.64* | 87        | 1.14  | 60        | 0.86  | 234   | 271.84   | 0.86* | -2.40 |
| <b>Female breast</b>                 | 121  | 2.04* | 364       | 1.62* | 242       | 1.47* | 187       | 1.35* | 914   | 586.89   | 1.56* | 20.74 |
| <b>Female genital system</b>         | 19   | 0.73  | 121       | 1.24* | 88        | 1.27* | 52        | 0.92  | 280   | 249.36   | 1.12  | 1.94  |
| Cervix uteri                         | 1  | 0.35  | 8         | 0.79  | 4         | 0.61  | 3         | 0.64  | 16    | 24.31    | 0.66  | -0.53 |
| Corpus uteri                         | 11   | 0.82  | 76        | 1.52* | 54        | 1.53* | 34        | 1.17  | 175   | 127.95   | 1.37* | 2.98  |
| Ovary                                | 5  | 0.65  | 33        | 1.13  | 23        | 1.09  | 13        | 0.74  | 74    | 75.50    | 0.98  | -0.09 |
| Vagina                               | 0  | 0.00  | 1         | 0.70  | 0         | 0.00  | 0         | 0.00  | 1     | 3.74     | 0.27  | -0.17 |
| Vulva                                | 2  | 1.70  | 2         | 0.44  | 4         | 1.15  | 2         | 0.65  | 10    | 12.26    | 0.82  | -0.14 |
| <b>Urinary system</b>                | 11   | 1.14  | 34        | 0.91  | 29        | 1.03  | 31        | 1.24  | 105   | 100.21   | 1.05  | 0.30  |
| Urinary bladder                      | 6  | 1.06  | 19        | 0.86  | 18        | 1.07  | 19        | 1.28  | 62    | 59.25    | 1.05  | 0.17  |
| Kidney parenchyma                    | 5  | 1.57  | 13        | 1.06  | 9         | 0.97  | 8         | 0.97  | 35    | 32.92    | 1.06  | 0.13  |
| Renal pelvis, other urinary          | 0  | 0.00  | 2         | 0.66  | 2         | 0.88  | 4         | 2.03  | 8     | 8.05     | 0.99  | 0.00  |
| Ureter                               | 0  | 0.00  | 0         | 0.00  | 1         | 1.43  | 2         | 3.32  | 3     | 2.46     | 1.22  | 0.03  |
| <b>Bone, joints</b>                  | 0  | 0.00  | 0         | 0.00  | 0         | 0.00  | 1         | 2.37  | 1     | 1.82     | 0.55  | -0.05 |
| <b>Soft tissue including heart</b>   | 0  | 0.00  | 3         | 0.99  | 4         | 1.76  | 3         | 1.53  | 10    | 8.08     | 1.24  | 0.12  |
| <b>Kaposi sarcoma</b>                | 0  | 0.00  | 0         | 0.00  | 0         | 0.00  | 0         | 0.00  | 0     | 0.77     | 0.00  | -0.05 |
| <b>Melanoma of skin</b>              | 5  | 1.17  | 22        | 1.36  | 16        | 1.35  | 10        | 0.99  | 53    | 42.47    | 1.25  | 0.67  |
| <b>Eye, orbit</b>                    | 1  | 3.28  | 0         | 0.00  | 0         | 0.00  | 1         | 1.46  | 2     | 2.96     | 0.68  | -0.06 |
| <b>Brain, central nervous system</b> | 0  | 0.00  | 10        | 1.24  | 2         | 0.34  | 0         | 0.00* | 12    | 20.94    | 0.57  | -0.57 |
| <b>Thyroid</b>                       | 4  | 2.09  | 11        | 1.59  | 8         | 1.69  | 5         | 1.34  | 28    | 17.31    | 1.62* | 0.68  |
| <b>Lymphatic, hematopoietic</b>      | 18   | 1.18  | 49        | 0.83  | 54        | 1.20  | 45        | 1.14  | 166   | 158.94   | 1.04  | 0.45  |
| Hodgkin lymphoma                     | 2  | 4.21  | 1         | 0.58  | 0         | 0.00  | 0         | 0.00  | 3     | 4.38     | 0.68  | -0.09 |
| Non-Hodgkin lymphoma                 | 9  | 1.20  | 16        | 0.55* | 24        | 1.08  | 22        | 1.11  | 71    | 78.63    | 0.90  | -0.48 |
| Myeloma                              | 3  | 1.17  | 8         | 0.81  | 12        | 1.61  | 8         | 1.23  | 31    | 26.43    | 1.17  | 0.29  |
| Leukemia                             | 4  | 0.83  | 24        | 1.29  | 18        | 1.28  | 15        | 1.24  | 61    | 49.49    | 1.23  | 0.73  |
| Acute lymphocytic                    | 0  | 0.00  | 0         | 0.00  | 0         | 0.00  | 0         | 0.00  | 0     | 1.44     | 0.00  | -0.09 |
| Chronic lymphocytic                  | 1  | 0.54  | 5         | 0.70  | 5         | 0.92  | 7         | 1.50  | 18    | 19.16    | 0.94  | -0.07 |
| Acute non-lymphocytic                | 1  | 0.59  | 12        | 1.83  | 9         | 1.81  | 5         | 1.14  | 27    | 17.63    | 1.53* | 0.59  |
| Chronic myeloid                      | 2  | 3.02  | 5         | 1.96  | 2         | 1.04  | 3         | 1.83  | 12    | 6.77     | 1.77  | 0.33  |

\*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 7.2.1:** Characteristics of patients with an initial cancer of the breast, males, SEER 1973-2000.

| Characteristics  | Males  |       | Females |   | Total  |       |
|--|--------|-------|---------|---|--------|-------|
|  | No.    | %     | No.     | % | No.    | %     |
| <b>Number of patients with 1st primary cancer</b>          |        |       |         |   |        |       |
| <b>Total</b>   | 2,158  | 100.0 | —       | — | 2,158  | 100.0 |
| <b>Initial treatment</b>                                   |        |       |         |   |        |       |
| Any radiation  | 543    | 25.2  | —       | — | 543    | 25.2  |
| With surgery   | 487    | 22.6  | —       | — | 487    | 22.6  |
| Without surgery  | 56     | 2.6   | —       | — | 56     | 2.6   |
| No radiation   | 1,615  | 74.8  | —       | — | 1,615  | 74.8  |
| With surgery   | 1,524  | 70.6  | —       | — | 1,524  | 70.6  |
| Without surgery  | 91     | 4.2   | —       | — | 91     | 4.2   |
| <b>Race</b>  |        |       |         |   |        |       |
| White  | 1,835  | 85.0  | —       | — | 1,835  | 85.0  |
| Black  | 235    | 10.9  | —       | — | 235    | 10.9  |
| Other  | 79     | 3.7   | —       | — | 79     | 3.7   |
| Unknown  | 9      | 0.4   | —       | — | 9      | 0.4   |
| <b>Age at 1st primary cancer diagnosis, years</b>          |        |       |         |   |        |       |
| < 30   | 6      | 0.3   | —       | — | 6      | 0.3   |
| 30–49  | 255    | 11.8  | —       | — | 255    | 11.8  |
| 50–69  | 1,059  | 49.1  | —       | — | 1,059  | 49.1  |
| 70–79  | 548    | 25.4  | —       | — | 548    | 25.4  |
| ≥ 80   | 290    | 13.4  | —       | — | 290    | 13.4  |
| <b>Number of patients with one or more primary cancers</b> |        |       |         |   |        |       |
| One primary cancer only                                    | 1,843  | 85.4  | —       | — | 1,843  | 85.4  |
| 1st and 2nd cancers  | 280    | 13.0  | —       | — | 280    | 13.0  |
| 1st, 2nd, and 3rd cancers                                  | 31     | 1.4   | —       | — | 31     | 1.4   |
| 1st, 2nd, 3rd, and additional cancers                      | 4      | 0.2   | —       | — | 4      | 0.2   |
| <b>Other statistics</b>                                    |        |       |         |   |        |       |
| Median age at 1st cancer diagnosis                         | 66.0   | —     | —       | — | 66.0   | —     |
| Median year of 1st cancer diagnosis                        | 1989.0 | —     | —       | — | 1989.0 | —     |
| Median person-years at risk                                | 4.9    | —     | —       | — | 4.9    | —     |
| Percent histologically confirmed*                          |        |       |         |   |        |       |
| Both 1st and 2nd cancers                                   | —      | 97.5  | —       | — | —      | 97.5  |
| 1st, 2nd, and additional cancers                           | —      | 96.5  | —       | — | —      | 96.5  |
| 1st cancer only  | —      | 1.9   | —       | — | —      | 1.9   |

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

**Table 7.2.2:** Risk of subsequent primary cancers after cancer of the breast, 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   |
| <b>All subsequent cancers</b>        | 38   | 1.14   | 133       | 1.07   | 114       | 1.24*  | 70        | 0.99   | 355   | 320.94 | 1.11   | 24.10 |
| All excluding same site              | 36   | 1.08   | 123       | 0.99   | 110       | 1.20   | 68        | 0.96   | 337   | 320.33 | 1.05   | 11.80 |
| <b>Buccal cavity, pharynx</b>        | 1  | 0.99   | 2         | 0.55   | 3         | 1.21   | 3         | 1.76   | 9     | 8.81   | 1.02   | 0.13  |
| Lip                                  | 1  | 5.26   | 0         | 0.00   | 0         | 0.00   | 1         | 3.21   | 2     | 1.65   | 1.22   | 0.25  |
| Tongue                               | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 1         | 3.05   | 1     | 1.66   | 0.60   | -0.47 |
| Salivary gland                       | 0  | 0.00   | 1         | 3.32   | 0         | 0.00   | 0         | 0.00   | 1     | 0.78   | 1.28   | 0.15  |
| Mouth                                | 0  | 0.00   | 1         | 1.17   | 2         | 3.46   | 0         | 0.00   | 3     | 2.07   | 1.45   | 0.66  |
| Nasopharynx                          | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 0         | 0.00   | 0     | 0.31   | 0.00   | -0.22 |
| Tonsil                               | 0  | 0.00   | 0         | 0.00   | 1         | 4.50   | 0         | 0.00   | 1     | 0.80   | 1.25   | 0.14  |
| Oropharynx                           | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 1         | 20.31  | 1     | 0.25   | 3.97   | 0.53  |
| Hypopharynx                          | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 0         | 0.00   | 0     | 0.97   | 0.00   | -0.69 |
| <b>Digestive system</b>              | 9  | 1.22   | 24        | 0.88   | 23        | 1.15   | 12        | 0.80   | 68    | 69.79  | 0.97   | -1.27 |
| Esophagus                            | 0  | 0.00   | 1         | 0.59   | 2         | 1.66   | 0         | 0.00   | 3     | 4.26   | 0.70   | -0.89 |
| Stomach                              | 1  | 1.12   | 5         | 1.54   | 4         | 1.72   | 1         | 0.59   | 11    | 8.16   | 1.35   | 2.01  |
| Small intestine                      | 0  | 0.00   | 0         | 0.00   | 1         | 3.67   | 0         | 0.00   | 1     | 0.95   | 1.05   | 0.04  |
| Colon                                | 5  | 1.58   | 10        | 0.84   | 10        | 1.13   | 8         | 1.20   | 33    | 30.51  | 1.08   | 1.76  |
| Rectum, rectosigmoid junction        | 1  | 0.76   | 5         | 1.03   | 4         | 1.16   | 1         | 0.40   | 11    | 12.11  | 0.91   | -0.78 |
| Anus, anal canal                     | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 0         | 0.00   | 0     | 0.44   | 0.00   | -0.31 |
| Liver                                | 1  | 3.56   | 1         | 0.95   | 1         | 1.28   | 0         | 0.00   | 3     | 2.73   | 1.10   | 0.19  |
| Gallbladder                          | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 0         | 0.00   | 0     | 0.60   | 0.00   | -0.43 |
| Bile ducts, other biliary            | 1  | 6.51   | 1         | 1.71   | 0         | 0.00   | 0         | 0.00   | 2     | 1.55   | 1.29   | 0.32  |
| Pancreas                             | 0  | 0.00   | 1         | 0.32   | 1         | 0.44   | 2         | 1.19   | 4     | 7.93   | 0.50   | -2.78 |
| <b>Respiratory system</b>            | 1  | 0.15*  | 23        | 0.96   | 14        | 0.81   | 14        | 1.11   | 52    | 60.19  | 0.86   | -5.79 |
| Nose, nasal cavity, ear              | 0  | 0.00   | 1         | 5.38   | 0         | 0.00   | 0         | 0.00   | 1     | 0.47   | 2.15   | 0.38  |
| Larynx                               | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 1         | 1.14   | 1     | 4.52   | 0.22   | -2.49 |
| Lung, bronchus                       | 1  | 0.17*  | 22        | 1.01   | 14        | 0.89   | 13        | 1.12   | 50    | 55.05  | 0.91   | -3.57 |
| <b>Male breast</b>                   | 2  | 29.48* | 10        | 42.19* | 4         | 23.17* | 2         | 14.77* | 18    | 0.61   | 29.36* | 12.30 |
| <b>Male genital system</b>           | 13   | 1.26   | 45        | 1.15   | 41        | 1.37   | 27        | 1.12   | 126   | 103.62 | 1.22*  | 15.84 |
| Prostate                             | 13   | 1.27   | 44        | 1.13   | 41        | 1.38   | 27        | 1.13   | 125   | 102.69 | 1.22*  | 15.79 |
| Testis                               | 0  | 0.00   | 1         | 8.08   | 0         | 0.00   | 0         | 0.00   | 1     | 0.27   | 3.76   | 0.52  |
| <b>Urinary system</b>                | 4  | 1.25   | 11        | 0.91   | 14        | 1.56   | 4         | 0.57   | 33    | 31.24  | 1.06   | 1.25  |
| Urinary bladder                      | 3  | 1.29   | 8         | 0.91   | 13        | 1.97*  | 3         | 0.58   | 27    | 22.86  | 1.18   | 2.93  |
| Kidney parenchyma                    | 1  | 1.45   | 3         | 1.17   | 1         | 0.53   | 0         | 0.00   | 5     | 6.61   | 0.76   | -1.14 |
| Renal pelvis, other urinary          | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 1         | 2.68   | 1     | 1.77   | 0.57   | -0.54 |
| Ureter                               | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 0         | 0.00   | 0     | 0.59   | 0.00   | -0.42 |
| <b>Bone, joints</b>                  | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 0         | 0.00   | 0     | 0.24   | 0.00   | -0.17 |
| <b>Soft tissue including heart</b>   | 1  | 7.94   | 0         | 0.00   | 0         | 0.00   | 0         | 0.00   | 1     | 1.20   | 0.83   | -0.14 |
| <b>Kaposi sarcoma</b>                | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 0         | 0.00   | 0     | 0.45   | 0.00   | -0.32 |
| <b>Melanoma of skin</b>              | 4  | 5.75*  | 3         | 1.13   | 2         | 0.99   | 3         | 1.74   | 12    | 7.10   | 1.69   | 3.47  |
| <b>Eye, orbit</b>                    | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 1         | 11.23  | 1     | 0.42   | 2.37   | 0.41  |
| <b>Brain, central nervous system</b> | 0  | 0.00   | 1         | 0.87   | 1         | 1.23   | 0         | 0.00   | 2     | 2.87   | 0.70   | -0.62 |
| <b>Thyroid</b>                       | 0  | 0.00   | 1         | 2.65   | 0         | 0.00   | 0         | 0.00   | 1     | 0.93   | 1.07   | 0.05  |
| <b>Lymphatic, hematopoietic</b>      | 2  | 0.82   | 8         | 0.88   | 8         | 1.19   | 3         | 0.57   | 21    | 23.42  | 0.90   | -1.71 |
| Hodgkin lymphoma                     | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 0         | 0.00   | 0     | 0.65   | 0.00   | -0.46 |
| Non-Hodgkin lymphoma                 | 0  | 0.00   | 4         | 1.07   | 2         | 0.71   | 2         | 0.87   | 8     | 9.87   | 0.81   | -1.32 |
| Myeloma                              | 2  | 4.64   | 1         | 0.63   | 3         | 2.55   | 0         | 0.00   | 6     | 4.11   | 1.46   | 1.33  |
| Leukemia                             | 0  | 0.00   | 3         | 0.88   | 3         | 1.19   | 1         | 0.52   | 7     | 8.79   | 0.80   | -1.26 |
| Acute lymphocytic                    | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 0         | 0.00   | 0     | 0.22   | 0.00   | -0.16 |
| Chronic lymphocytic                  | 0  | 0.00   | 1         | 0.72   | 2         | 1.95   | 0         | 0.00   | 3     | 3.56   | 0.84   | -0.39 |
| Acute non-lymphocytic                | 0  | 0.00   | 2         | 1.78   | 1         | 1.20   | 0         | 0.00   | 3     | 2.90   | 1.03   | 0.07  |
| Chronic myeloid                      | 0  | 0.00   | 0         | 0.00   | 0         | 0.00   | 1         | 3.75   | 1     | 1.19   | 0.84   | -0.13 |

\*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.

**Breast**  
**Males, <65 Years of Age**

**Table 7.2.3:** Risk of subsequent primary cancers after cancer of the breast, males, <65 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   |
| <b>All subsequent cancers</b>        | 10   | 1.47  | 43        | 1.37   | 51        | 1.53*  | 47        | 1.07  | 151   | 115.28 | 1.31*  | 46.10 |
| All excluding same site              | 10   | 1.47  | 37        | 1.18   | 48        | 1.44*  | 46        | 1.05  | 141   | 115.06 | 1.23*  | 33.48 |
| <b>Buccal cavity, pharynx</b>        | 0  | 0.00  | 0         | 0.00   | 1         | 0.84   | 1         | 0.86  | 2     | 4.08   | 0.49   | -2.69 |
| Lip                                  | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.56   | 0.00   | -0.73 |
| Tongue                               | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.84   | 0.00   | -1.09 |
| Salivary gland                       | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.27   | 0.00   | -0.35 |
| Mouth                                | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 1.00   | 0.00   | -1.29 |
| Nasopharynx                          | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.16   | 0.00   | -0.21 |
| Tonsil                               | 0  | 0.00  | 0         | 0.00   | 1         | 7.50   | 0         | 0.00  | 1     | 0.45   | 2.20   | 0.70  |
| Oropharynx                           | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 1         | 26.83 | 1     | 0.14   | 7.38   | 1.12  |
| Hypopharynx                          | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.50   | 0.00   | -0.64 |
| <b>Digestive system</b>              | 4  | 2.79  | 7         | 1.08   | 10        | 1.51   | 6         | 0.70  | 27    | 23.05  | 1.17   | 5.10  |
| Esophagus                            | 0  | 0.00  | 1         | 1.80   | 1         | 1.90   | 0         | 0.00  | 2     | 1.81   | 1.10   | 0.24  |
| Stomach                              | 0  | 0.00  | 1         | 1.37   | 2         | 2.76   | 0         | 0.00  | 3     | 2.52   | 1.19   | 0.62  |
| Small intestine                      | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.37   | 0.00   | -0.48 |
| Colon                                | 3  | 5.75* | 2         | 0.82   | 6         | 2.28   | 5         | 1.38  | 16    | 9.21   | 1.74   | 8.77  |
| Rectum, rectosigmoid junction        | 0  | 0.00  | 1         | 0.77   | 1         | 0.78   | 0         | 0.00  | 2     | 4.39   | 0.46   | -3.08 |
| Anus, anal canal                     | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.20   | 0.00   | -0.26 |
| Liver                                | 1  | 14.02 | 1         | 3.17   | 0         | 0.00   | 0         | 0.00  | 2     | 1.09   | 1.83   | 1.17  |
| Gallbladder                          | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.15   | 0.00   | -0.20 |
| Bile ducts, other biliary            | 0  | 0.00  | 1         | 8.60   | 0         | 0.00   | 0         | 0.00  | 1     | 0.46   | 2.17   | 0.70  |
| Pancreas                             | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 1         | 1.03  | 1     | 2.68   | 0.37   | -2.16 |
| <b>Respiratory system</b>            | 0  | 0.00  | 8         | 1.12   | 6         | 0.85   | 14        | 1.70  | 28    | 24.03  | 1.17   | 5.12  |
| Nose, nasal cavity, ear              | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.18   | 0.00   | -0.24 |
| Larynx                               | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 1         | 1.58  | 1     | 2.18   | 0.46   | -1.52 |
| Lung, bronchus                       | 0  | 0.00  | 8         | 1.26   | 6         | 0.94   | 13        | 1.73  | 27    | 21.62  | 1.25   | 6.95  |
| <b>Male breast</b>                   | 0  | 0.00  | 6         | 93.03* | 3         | 47.12* | 1         | 12.37 | 10    | 0.22   | 44.51* | 12.62 |
| <b>Male genital system</b>           | 3  | 1.86  | 11        | 1.32   | 17        | 1.63   | 16        | 1.04  | 47    | 35.74  | 1.32   | 14.54 |
| Prostate                             | 3  | 1.91  | 10        | 1.22   | 17        | 1.65   | 16        | 1.05  | 46    | 35.33  | 1.30   | 13.78 |
| Testis                               | 0  | 0.00  | 1         | 11.27  | 0         | 0.00   | 0         | 0.00  | 1     | 0.20   | 5.09   | 1.04  |
| <b>Urinary system</b>                | 0  | 0.00  | 3         | 1.03   | 9         | 2.93*  | 4         | 0.96  | 16    | 10.77  | 1.49   | 6.75  |
| Urinary bladder                      | 0  | 0.00  | 2         | 1.05   | 8         | 3.84*  | 3         | 1.01  | 13    | 7.35   | 1.77   | 7.29  |
| Kidney parenchyma                    | 0  | 0.00  | 1         | 1.17   | 1         | 1.21   | 0         | 0.00  | 2     | 2.86   | 0.70   | -1.11 |
| Renal pelvis, other urinary          | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 1         | 4.68  | 1     | 0.56   | 1.78   | 0.57  |
| Ureter                               | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.19   | 0.00   | -0.24 |
| <b>Bone, joints</b>                  | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.10   | 0.00   | -0.14 |
| <b>Soft tissue including heart</b>   | 1  | 30.24 | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 1     | 0.45   | 2.23   | 0.71  |
| <b>Kaposi sarcoma</b>                | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.25   | 0.00   | -0.32 |
| <b>Melanoma of skin</b>              | 2  | 8.84  | 2         | 2.11   | 0         | 0.00   | 2         | 1.75  | 6     | 3.21   | 1.87   | 3.60  |
| <b>Eye, orbit</b>                    | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 1         | 17.27 | 1     | 0.17   | 5.78   | 1.07  |
| <b>Brain, central nervous system</b> | 0  | 0.00  | 1         | 2.31   | 0         | 0.00   | 0         | 0.00  | 1     | 1.34   | 0.75   | -0.44 |
| <b>Thyroid</b>                       | 0  | 0.00  | 1         | 5.83   | 0         | 0.00   | 0         | 0.00  | 1     | 0.49   | 2.02   | 0.65  |
| <b>Lymphatic, hematopoietic</b>      | 0  | 0.00  | 3         | 1.29   | 3         | 1.29   | 1         | 0.32  | 7     | 8.27   | 0.85   | -1.64 |
| Hodgkin lymphoma                     | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.31   | 0.00   | -0.41 |
| Non-Hodgkin lymphoma                 | 0  | 0.00  | 2         | 1.88   | 1         | 0.95   | 0         | 0.00  | 3     | 3.77   | 0.80   | -1.00 |
| Myeloma                              | 0  | 0.00  | 1         | 2.58   | 1         | 2.52   | 0         | 0.00  | 2     | 1.40   | 1.43   | 0.78  |
| Leukemia                             | 0  | 0.00  | 0         | 0.00   | 1         | 1.26   | 1         | 0.94  | 2     | 2.79   | 0.72   | -1.02 |
| Acute lymphocytic                    | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 0.08   | 0.00   | -0.11 |
| Chronic lymphocytic                  | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 0         | 0.00  | 0     | 1.17   | 0.00   | -1.51 |
| Acute non-lymphocytic                | 0  | 0.00  | 0         | 0.00   | 1         | 3.99   | 0         | 0.00  | 1     | 0.89   | 1.12   | 0.14  |
| Chronic myeloid                      | 0  | 0.00  | 0         | 0.00   | 0         | 0.00   | 1         | 6.92  | 1     | 0.37   | 2.68   | 0.81  |

\*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 7.2.4:** Risk of subsequent primary cancers after cancer of the breast, males, ≥65 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    |
| <b>All subsequent cancers</b>        | 28   | 1.06   | 90        | 0.97   | 63        | 1.07 | 23        | 0.85  | 204   | 205.66 | 0.99   | -2.59  |
| All excluding same site              | 26   | 0.98   | 86        | 0.93   | 62        | 1.06 | 22        | 0.81  | 196   | 205.27 | 0.95   | -14.51 |
| <b>Buccal cavity, pharynx</b>        | 1  | 1.49   | 2         | 0.90   | 2         | 1.56 | 2         | 3.65  | 7     | 4.73   | 1.48   | 3.55   |
| Lip                                  | 1  | 6.73   | 0         | 0.00   | 0         | 0.00 | 1         | 7.64  | 2     | 1.08   | 1.85   | 1.44   |
| Tongue                               | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 1         | 11.38 | 1     | 0.82   | 1.22   | 0.29   |
| Salivary gland                       | 0  | 0.00   | 1         | 4.49   | 0         | 0.00 | 0         | 0.00  | 1     | 0.51   | 1.95   | 0.76   |
| Mouth                                | 0  | 0.00   | 1         | 1.97   | 2         | 6.98 | 0         | 0.00  | 3     | 1.07   | 2.81   | 3.03   |
| Nasopharynx                          | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.14   | 0.00   | -0.22  |
| Tonsil                               | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.35   | 0.00   | -0.54  |
| Oropharynx                           | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.12   | 0.00   | -0.18  |
| Hypopharynx                          | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.48   | 0.00   | -0.75  |
| <b>Digestive system</b>              | 5  | 0.84   | 17        | 0.81   | 13        | 0.97 | 6         | 0.93  | 41    | 46.74  | 0.88   | -8.98  |
| Esophagus                            | 0  | 0.00   | 0         | 0.00   | 1         | 1.48 | 0         | 0.00  | 1     | 2.45   | 0.41   | -2.26  |
| Stomach                              | 1  | 1.37   | 4         | 1.58   | 2         | 1.25 | 1         | 1.28  | 8     | 5.64   | 1.42   | 3.70   |
| Small intestine                      | 0  | 0.00   | 0         | 0.00   | 1         | 5.98 | 0         | 0.00  | 1     | 0.58   | 1.72   | 0.66   |
| Colon                                | 2  | 0.76   | 8         | 0.85   | 4         | 0.65 | 3         | 0.98  | 17    | 21.30  | 0.80   | -6.74  |
| Rectum, rectosigmoid junction        | 1  | 0.97   | 4         | 1.13   | 3         | 1.38 | 1         | 1.03  | 9     | 7.72   | 1.17   | 2.01   |
| Anus, anal canal                     | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.24   | 0.00   | -0.38  |
| Liver                                | 0  | 0.00   | 0         | 0.00   | 1         | 2.11 | 0         | 0.00  | 1     | 1.64   | 0.61   | -1.01  |
| Gallbladder                          | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.45   | 0.00   | -0.71  |
| Bile ducts, other biliary            | 1  | 7.81   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 1     | 1.09   | 0.91   | -0.15  |
| Pancreas                             | 0  | 0.00   | 1         | 0.42   | 1         | 0.67 | 1         | 1.40  | 3     | 5.26   | 0.57   | -3.54  |
| <b>Respiratory system</b>            | 1  | 0.20   | 15        | 0.89   | 8         | 0.79 | 0         | 0.00* | 24    | 36.15  | 0.66*  | -19.03 |
| Nose, nasal cavity, ear              | 0  | 0.00   | 1         | 7.84   | 0         | 0.00 | 0         | 0.00  | 1     | 0.28   | 3.53   | 1.12   |
| Larynx                               | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 2.34   | 0.00   | -3.67  |
| Lung, bronchus                       | 1  | 0.22   | 14        | 0.90   | 8         | 0.85 | 0         | 0.00* | 23    | 33.43  | 0.69   | -16.34 |
| <b>Male breast</b>                   | 2  | 38.35* | 4         | 23.18* | 1         | 9.17 | 1         | 18.32 | 8     | 0.39   | 20.60* | 11.92  |
| <b>Male genital system</b>           | 10   | 1.15   | 34        | 1.10   | 24        | 1.23 | 11        | 1.26  | 79    | 67.88  | 1.16   | 17.41  |
| Prostate                             | 10   | 1.16   | 34        | 1.11   | 24        | 1.24 | 11        | 1.27  | 79    | 67.37  | 1.17   | 18.22  |
| Testis                               | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.07   | 0.00   | -0.11  |
| <b>Urinary system</b>                | 4  | 1.56   | 8         | 0.88   | 5         | 0.85 | 0         | 0.00  | 17    | 20.47  | 0.83   | -5.43  |
| Urinary bladder                      | 3  | 1.56   | 6         | 0.87   | 5         | 1.11 | 0         | 0.00  | 14    | 15.51  | 0.90   | -2.36  |
| Kidney parenchyma                    | 1  | 2.03   | 2         | 1.17   | 0         | 0.00 | 0         | 0.00  | 3     | 3.75   | 0.80   | -1.18  |
| Renal pelvis, other urinary          | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 1.20   | 0.00   | -1.89  |
| Ureter                               | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.41   | 0.00   | -0.64  |
| <b>Bone, joints</b>                  | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.13   | 0.00   | -0.20  |
| <b>Soft tissue including heart</b>   | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.75   | 0.00   | -1.18  |
| <b>Kaposi sarcoma</b>                | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.21   | 0.00   | -0.32  |
| <b>Melanoma of skin</b>              | 2  | 4.26   | 1         | 0.59   | 2         | 1.77 | 1         | 1.72  | 6     | 3.89   | 1.54   | 3.31   |
| <b>Eye, orbit</b>                    | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.25   | 0.00   | -0.39  |
| <b>Brain, central nervous system</b> | 0  | 0.00   | 0         | 0.00   | 1         | 2.31 | 0         | 0.00  | 1     | 1.54   | 0.65   | -0.84  |
| <b>Thyroid</b>                       | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.44   | 0.00   | -0.68  |
| <b>Lymphatic, hematopoietic</b>      | 2  | 1.06   | 5         | 0.74   | 5         | 1.14 | 2         | 0.93  | 14    | 15.15  | 0.92   | -1.80  |
| Hodgkin lymphoma                     | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.34   | 0.00   | -0.53  |
| Non-Hodgkin lymphoma                 | 0  | 0.00   | 2         | 0.75   | 1         | 0.56 | 2         | 2.25  | 5     | 6.10   | 0.82   | -1.72  |
| Myeloma                              | 2  | 5.78   | 0         | 0.00   | 2         | 2.57 | 0         | 0.00  | 4     | 2.72   | 1.47   | 2.01   |
| Leukemia                             | 0  | 0.00   | 3         | 1.12   | 2         | 1.16 | 0         | 0.00  | 5     | 6.00   | 0.83   | -1.57  |
| Acute lymphocytic                    | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.14   | 0.00   | -0.22  |
| Chronic lymphocytic                  | 0  | 0.00   | 1         | 0.94   | 2         | 2.92 | 0         | 0.00  | 3     | 2.39   | 1.26   | 0.96   |
| Acute non-lymphocytic                | 0  | 0.00   | 2         | 2.25   | 0         | 0.00 | 0         | 0.00  | 2     | 2.01   | 1.00   | -0.01  |
| Chronic myeloid                      | 0  | 0.00   | 0         | 0.00   | 0         | 0.00 | 0         | 0.00  | 0     | 0.81   | 0.00   | -1.27  |

\*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.

