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The Incidence and Prevalance of Cervical Cancer in Vietnamese Women (1993-1995): A Analysis of SEER Reported Cases

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Title Page
Master of Public Health Research Project

The Incidence and Prevalence of Cervical Cancer in Vietnamese Women (1993-1995): An Analysis of SEER Reported Cases

By

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Master of Public Health Program
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Submission Statement
Master of Public Health Research Project

This MPH Research Project report is submitted in partial fulfillment of the requirements for a Master of Public Health degree from Virginia Commonwealth University's School of Medicine. I agree that this research project report be made available for circulation in accordance with the program's policies and regulations pertaining to documents of this type. I also understand that I must receive approval from my Faculty Advisor in order to copy from or publish this document, or submit to a funding agency. I understand that any copying from or publication of this document for potential financial gain is not allowed unless permission is granted by my Faculty Advisor or (in the absence of my Faculty Advisor) the Director of the MPH Program.

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Master of Public Health
Research Project Agreement Form
Department of Epidemiology and Community Health

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Number of semester hours (3-6): 3 Semester: Summer Year: 2005

Please complete the following outline. **Do not exceed 2 pages (A-H).**

A. PROJECT TITLE: The Incidence and Prevalence of Cervical Cancer in Vietnamese Women (1993-1995): An Analysis of SEER Reported Cases

B. PURPOSE (state research question):
Are Vietnamese women more likely to have cervical cancer than Whites, Blacks, Hispanics, and other Asian groups?

C. SPECIFIC OBJECTIVES (list major aims of the study):
- To determine the cervical cancer incidence and prevalence among Vietnamese women.
- To determine if the incidence and prevalence among Vietnamese women is greater than Whites, Blacks, Hispanics, Chinese, Japanese, Filipino, Hawaiian, Korean, and Other Asians.

D. DESCRIPTION OF METHODS

D.1. Identify source(s) of data (eg, existing data set, data collection plans, etc): Data on demographics, stage at diagnosis, and histology were obtained on all patients with cervical cancer registered in the National Surveillance, Epidemiology, and End Results (SEER) database from 1993 to 1995. Exclusion included cases prior to 1993 and cases after 1995. A previous study had looked at the racial/ethnic patterns of cancer[3] and cervix in situ cases were not included after 1995.

D.2. State the type of study design (eg, cross-sectional, cohort, case-control, intervention, etc): This is a cross-sectional study.

D.3. Describe the study population and sample size: The study population will include: Vietnamese (n= 550), American Indian (n=1400), White (n=130,000), Black (n= 20,000), Hispanic (n= 17,000), Chinese (n=1500), Japanese (n=1300), Filipino (n=1500), Hawaiian (n=600), Korean (n=600), and Other Asian (n=500) between the ages of 25-85. The following original racial categories will be collapsed into the other Asian category because SEER did not code it prior to 1991: Thai, Micronesian, Chamorran, Guamanian, Polynesian, Tahitian, Samoan, Tongan, Melanesian, Fiji Islander, Other Asian, and Pacific Islander.

D.4 List variables to be included (If a qualitative study, describe types of information to be collected).
The study variables to be included are race, age, gender, tumor histology, and cancer stage.

D.5. Describe methods to be used for data analysis (If a qualitative study, describe general approach to compiling the information collected)
Comparison between racial/ethnic groups in the frequency distribution of cancer stage, age, race, and tumor histology will be evaluated with a χ^2 test. Age-adjusted incidence and prevalence will be calculated using statistical software (SEER*Stat 5.2; National Cancer Institute SEER Program; Bethesda, MD). Logistic regression will be used to compare unadjusted/adjusted odds ratios (OR). A statistical software package (Statistical Analysis System; SAS Institute; Cary, NC) will be used for χ^2 and logistic regression calculations. The significance level will be set at $p<0.05$.

E. ANTICIPATED RESULTS:

I anticipate that the incidence and prevalence of cervical cancer in Vietnamese women will be higher than any other racial/ethnic group.

F. SIGNIFICANCE OF PROJECT TO PUBLIC HEALTH:

Cervical cancer is the third most common reproductive cancer in the United States and most common reproductive cancer worldwide.[1] The Papanicolaou (pap) test is the single most effective tool available for the early detection of cervical cancer. When diagnosed at an early stage with appropriate treatment and follow-up, invasive cervical cancer is one of the most treatable cancers with a 5-year survival rate of 92%.[2] For pre-invasive cervical cancer, the overall 5-year survival rate is close to 100%.[2] Since the Pap test was first introduced in the 1940s, the death rate for cervical cancer has declined by nearly 75%.

However, the battle against cervical cancer is far from won. In 2005, approximately 10,370 women are will be diagnosed with cervical cancer and as many as 3,710 of these women will die from the disease.[2] The overall lifetime risk of developing invasive cervical cancer is less than 1%. The cervical cancer rate for all U.S. women is about 8 per 100,000, with the highest age-adjusted incidence rate in Vietnamese women (43 per 100,000).[3] Rates of 15 per 100,000 or higher occur among Alaska Native, Korean, and Hispanic women.[3]

At present, there is little data examining cervical cancer trends in the Asian sub-populations living in the United States, with only limited comparison to other ethnic groups. Although the Asian American/Pacific Islander (AAPI) population is one of the fastest growing and most diverse racial populations in the United States, Asian subgroups were not coded by the SEER program of the National Cancer Institute until 1988. In 2000, the AAPI population totaled 10.6 million people (constituting approximately 4% of the total U.S. population). By the year 2050, the AAPI population is projected to reach 41 million U.S. residents making up 11% of the total U.S. population.[4] With the AAPI population increasing and the highest age-adjusted incidence of cervical cancer occurring in Vietnamese women, it is important to disaggregate data on AAPI and compare the incidence, prevalence, and stage of diagnosis of Vietnamese women to other racial/ethnic groups.

References:
1. Surveillance, epidemiology, and end results. SEER Cancer Statistics Review 1975-2000. Incidence of cervix uteri cancer. Available at http://www.seer.cancer.gov. Accessed February 18, 2005.
2. American Cancer Society. Cancer Facts and Figures 2005. Available at http://www.cancer.org/downloads/STT/CAFF2005f4PWSecured.pdf.
3. Miller BA, Kolonel LN, Berstein L, et.al., eds. Racial/ethnic patterns of cancer in the United States 1988-1992, Bethesda, MD: National Cancer Institute, 1996.
4. U.S. Bureau of the Census. Resident population of the United States: Estimates, by, sex, race, and Hispanic origin, with median age. Available at http://www.census.gov/population/projections/nations/nsrh/nprh0610.txt.

G. IRB Status:

1) Do you plan to collect data through direct intervention or interaction with human subjects?
____ yes _X_ no

2) Will you have access to any existing identifiable private information? ____ yes _X_ no

If you answered "no" to both of the questions above, IRB review is not required.
If you answered "yes" to either one of these questions, your proposed study must be reviewed by the VCU Institutional Review Board (IRB). Please contact Dr. Turf or Dr. Buzzard for assistance with this procedure.

Please indicate your IRB status:
___ to be submitted (targeted date_____)
___ submitted (date of submission _____; VCU IRB # _____)
___ IRB exempt review approved (date_____)
___ IRB expedited review approved (date_____)
___ IRB approval not required

H. PROPOSED SCHEDULE: Start Date: 05/23/05 ____ Anticipated End Date: 08/08/05 ____

I. INDICATE WHICH OF THE FOLLOWING AREAS OF PUBLIC HEALTH KNOWLEDGE WILL BE DEMONSTRATED:

1. Biostatistics – collection, storage, retrieval, analysis and interpretation of health data; design and analysis of health-related surveys and experiments; and concepts and practice of statistical data analysis. _X_ yes ___no (if yes, briefly describe): A statistical software package (SPSS 13.0 (SPSS Inc. Chicago, IL)) will be used for χ^2 and logistic regression calculations. Age-adjusted incidence, prevalence, and unadjusted/adjusted odds ratio (OR) will be calculated using statistical software (SEER*Stat 5.2; National Cancer Institute SEER Program; Bethesda, MD).

2. Epidemiology – distributions and determinants of disease, disabilities and death in human populations; the characteristics and dynamics of human populations; and the natural history of disease and the biologic basis of health. _X_ yes ___no (if yes, briefly describe): Age-adjusted incidence, prevalence, and unadjusted/adjusted odds ratio (OR) will be demonstrated.

3. Environmental Health Sciences – environmental factors including biological, physical and chemical factors which affect the health of a community. ___yes _X_ no (if yes, briefly describe):

4. Health Services Administration – planning, organization, administration, management, evaluation and policy analysis of health programs. ___yes _X_ no (if yes, briefly describe):

5. Social/Behavioral Sciences – concepts and methods of social and behavioral sciences relevant to the identification and the solution of public health problems. ___yes _X_ no (if yes, briefly describe):

ACKNOWLEDGEMENTS

I would like to thank my preceptor, Dr. Resa M. Jones, as well as my advisor, Dr. Jack O. Lanier for their expertise and assistance. In addition, I would like to thank Dr. Jim Martin for assisting me with the International Classification of Diseases for Oncology (ICD-O) coding.

ABSTRACT

Background: Cervical cancer is the third most common reproductive cancer in the U.S. To date, one report concluded that U.S. Vietnamese women had the highest incidence rate (43.0/100,000). The current study examines whether U.S. Vietnamese women are more likely to have cervical cancer in comparison to Whites, Blacks, Hispanics, American Indians, and other Asian subgroups.

Methods: SEER data of cervical cancers diagnosed from 1993-1995 (n = 37,790) was utilized. Using SPSS, chi-square statistics assessed whether Vietnamese women were older and more likely to be married or diagnosed at a later stage. Logistic regression assessed the amount of risk race/ethnicity contributes to stage of diagnosis adjusting for age and martial status. SEER*Stat and U.S. Census data were used to compute age-adjusted incidence and prevalence rates per 100,000 woman-years for cervical cancer.

Results: After adjustment, Vietnamese women were more likely to have carcinoma in situ (OR=1.44, p = 0.014) compared to white women. The odds of distant stage diagnosis for Vietnamese women was 3.35 times that of whites (p = 0.093). Vietnamese women had greater odds of distant stage diagnosis than other Asian subgroups (OR = 1.43, p = 0.092). The overall age-adjusted incidence rate for invasive cervical cancer for Asian/Pacific Islanders is 6.7/100,000 (including Vietnamese) compared to 5.0/100,000 for whites. However, the overall incidence rate for Vietnamese women is 21.4/100,000 compared to 10.4/100,000 for whites.

Conclusions: Vietnamese race/ethnicity is associated with cervical cancer diagnosis. Asian subgroups are at varying risk of cervical cancer and should be assessed separately as to not obscure differences.

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BACKGROUND

Incidence, Mortality, and Survival

Cervical cancer is the most common reproductive cancer worldwide and the third most common reproductive cancer in the United States (U.S.)[1] Specifically, it is estimated that in 2005, approximately 10,370 women will be diagnosed with cervical cancer and as many as 3,710 of these women will die from the disease in the U.S.[2] Cervical cancer incidence begins to increase rapidly around age 20, reaches a peak around age 60, and declines slightly thereafter. The overall lifetime risk of developing cervical cancer is less than 1%.[2] When diagnosed at an early stage with appropriate treatment and follow-up, invasive cervical cancer is one of the most treatable cancers with a 5-year survival rate of 92%.[2] For pre-invasive cervical cancer, the overall 5-year survival rate is close to 100%.[2] Over the last 40 years, the incidence and mortality of invasive cervical cancer has decreased significantly in large part because of screening for, and treatment of, precancerous cervical lesions.[3]

The incidence and mortality of invasive cervical cancer exhibits different ethnic patterns.[4] From 1988 to 1992, the cervical cancer rate for all U.S. women was about 8.7 per 100,000, with the highest age-adjusted incidence rate in Vietnamese women (43 per 100,000).[4] For women aged 55 to 69, the rate was 10 times higher among Vietnamese women compared to whites (181.6 per 100,000 vs. 17.8 per 100,000).[4] According to the Centers for Disease Control and Prevention (CDC) report, death rates from cervical cancer increased for foreign-born women while continuing to decrease for U.S.-born women from 1985 through 1996.[6]

Pathology

Cervical cancer begins in the lining of the cervix, the lower part of the womb or uterus, which connects the body of the uterus to the vagina or birth canal.[5] Cervical cancer forms

slowly. First, normal epithelial cells change to precancerous abnormalities and then to cancer. These changes can take a number of years.[7] For most women, precancerous changes go away without any treatment. For others, these cells need to be treated to keep them from changing into cancer. Precancerous changes in the cervix are referred to as dysplasia, which is characterized by squamous cells in the epithelium becoming abnormal in size and shape and beginning to multiply.[5]

Risk Factors

Several risk factors have been established that increase a woman's likelihood of developing cervical cancer. Researchers have identified the human papillomavirus (HPV) as the main cause of cervical cancer.[5] HPVs are a group of more than 100 types of viruses called papillomaviruses.[7] Papillomaviruses cause warts and papillomas, non-cancerous (benign) tumors. Recent studies show that condoms do not protect well against HPV infection because HPV can be passed from person to person by skin-to-skin contact with any HPV-infected area of the body, such as skin of the genital or anal area not covered by the condom.[8] Even when there are no visible warts or symptoms, HPV can reside in skin and be passed to another person. Ten types of HPV are considered "high-risk" and cancer causing. However, about half of all cervical cancer cases are caused by two types; HPV 16 and HPV 18.[8] Approximately 12% to 46% of all American women harbor HPV, but only a minority develops cervical cancer.[5] In those infected with HPV, the risk for cervical cancer appears to be highest in women infected with HPV for more than six months.[5]

In addition to HPV, other factors increase the risk of developing cervical cancer. First, certain types of sexual behavior can increase a woman's risk of getting HPV. Women who have

had sex at an early age (<17 years old) and sex with uncircumcised males are at higher risk.[5] Sexual activity with multiple partners increases the likelihood of viral infections, such as HPV.[5,7] Subsequently, a woman who has never been sexually active has a very low risk for developing cervical cancer.

Second, smoking is a risk factor for cervical cancer. Compared to non-smokers, women who smoke are about twice as likely to get cervical cancer.[8] Studies have shown that smokers are at greater risk for progression from dysplasia to invasive cervical cancer because tobacco by-products have been found in the cervical mucus of women who smoke.[5,8] Researchers believe that these substances damage the DNA of cells in the cervix and may contribute to the development of cervical cancer.

Third, chlamydia, a relatively common kind of bacteria that infects the female reproductive system, increases the risk of cervical cancer.[7] Although the infection may cause symptoms, many women do not know they are infected unless blood samples taken at the time of their Pap test are analyzed for this type of bacteria. Recent studies suggest that women whose blood test results show past or current Chlamydia infection are at greater risk for cervical cancer than are women with a negative blood test.[8]

Fourth, long-term oral contraceptive (OC) use increases the risk of cancer of the cervix. Some research suggests a relationship between using OCs for five or more years and an increase in the risk of cervical cancer.[5] In one study, the risk was increased four-fold in women who used OCs longer than 10 years.[8]

Fifth, low socioeconomic status is a risk factor for cervical cancer.[8] Women who have no source of health care, no health insurance, or immigrated to the United States in the past 10 years have the lowest rates of screening (58-62% for cervical cancer).[2] These women do not have

ready access to adequate health care services, including Pap tests and treatment of precancerous cervical disease.

Six, diethylstilbestrol (DES) exposure is yet another possible risk factor. It is a hormonal drug that was prescribed between 1940 and 1971 for women who had increased risk for miscarriages.[5] Of every 1,000 women whose mother took DES when pregnant with them, one develops clear-cell adenocarcinoma of the vagina or cervix.[8] This risk appears to be greatest in women whose mothers took the drug during the first 16 weeks of pregnancy. The average age at diagnosis of DES-related clear-cell adenocarcinoma is 19 years. Because most DES daughters are now between 30 and 60, the number of new cases of DES-related cervical and vaginal clear-cell adenocarcinoma has been decreasing during the past two decades.[7]

Last, recent studies suggest that women whose mother or sisters have had cervical cancer are more likely to develop the disease themselves. In one study, 15% to 20% of the women with cervical cancer had at least one close relative with the disease.[5] This familial tendency is caused by an inherited condition that makes some women less able to fight off HPV infection or other viruses than others.[8]

Effective Screening Exists

The signs and symptoms of cervical cancer include unusual vaginal bleeding, spotting or discharge, abdominal pain, or bleeding during sex.[7] However, most women with dysplasia or carcinoma in situ have no signs or symptoms. Therefore, routine screening for cervical cancer is very important. The Papanicolaou (pap) test is the single most effective tool available for the early detection of cervical cancer. Because of its slow growth and the ability to be caught early on Pap smears, it can be detected and cured in nearly every case.[2] Specifically, a Pap smear can

detect dysplastic changes, which may indicate the presence of cervical intraepithelial neoplasia. With regular Pap tests, a woman's overall lifetime risk of developing invasive cervical cancer is less than 1%.[2] Since the Pap test was first introduced in the 1940's, the death rate for cervical cancer has declined by nearly 75%.

According to the American Cancer Society's Guidelines for the Early Detection of Cervical Cancer, women should begin cervical cancer testing (screening) about 3 years after they have vaginal intercourse or by the age of 21.[2] Follow-up testing should be done every year with the regular Pap test or every 2 years using the liquid-based Pap test. Women over the age 30 who have had 3 normal Pap test results in a row should get tested every two to three years with either the conventional (regular) or liquid-based Pap test.[2] Women over 70 years of age who have had three or more normal Pap tests in a row and no abnormal Pap test results in the last 10 years may choose to stop having cervical cancer testing.[2] Women with a history of cervical cancer, DES exposure before birth, HIV infection, or a weakened immune system should continue to have testing as long as they are in good health. Women who have had a total hysterectomy (removal of the uterus and cervix) may also choose to stop having cervical cancer testing, unless the surgery was done as a treatment for cervical cancer or pre-cancer. Women who have had a hysterectomy without removal of the cervix (simple hysterectomy) should continue to follow the guidelines stated above.[2]

Screening Rates

Although effective screening exists, screening rates could improve, especially among particular ethnic/racial groups. For example, according to the National Health Interview Survey, 82% of women 25 years of older have had had a Pap test in the past three years.[3] The Behavior

Risk Factor Surveillance System (BRFSS) reports that 11.6% of women aged 18-34, 10.0% of women aged 35-49, 13.0% of women aged 50-64, and 26.3% of women aged >65 have not had a pap smear within 3 years.[10] In the last decade, Black women have consistently reported higher cervical cancer screening rates than white women.[12] Although Hispanic women were still less likely to report a recent Pap smear as compared to Black and white women (76.9% vs. 85.2% and 81.9%, respectively), they have had had the largest percentage increase in Pap smear use of any group between 1987 and 2000.[12] In fact, Hispanic and Black women who participated in the BRFSS were more likely to receive a recent Pap smear compared to white women (90.9%, 91.2%, and 86.7%, respectively). Among Asians, Vietnamese and South Asians were less likely and Filipino women were more likely to report a recent Pap smear as compared to Japanese. One study in Santa Clara County, California found that only about 65% of Vietnamese-American women surveyed reported having a Pap smear in the past three years, compared with about 74% of Asians nationwide and almost 86% of the U.S. population.[11]

Potential Impact of Problem

At present, there is little data examining cervical cancer trends in the Asian subgroups (e.g. Vietnamese, Chinese, Japanese, Korean, Hawaiian, etc.) living in the United States, with only limited comparison to other ethnic groups. Although the Asian American/Pacific Islander (AAPI) population is one of the fastest growing and most diverse racial populations in the United States, Asian subgroups were not categorized separately by the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program until 1988.[1] The aggregation of the AAPI has potentially obscured large differences between Asian subgroups and Pacific Islanders. In 2000, the AAPI population totaled 10.6 million people (constituting approximately

4% of the total U.S. population).[9] By the year 2050, the AAPI population is projected to reach 41 million U.S. residents making up 11% of the total U.S. population.[9] With the AAPI population increasing and the highest age-adjusted incidence of cervical cancer occurring in Vietnamese women, it is important to disaggregate data on AAPI population and compare the incidence, prevalence, and stage of diagnosis of Vietnamese women to other racial/ethnic groups. The specific aims of this paper are two-fold: (1) to determine the age-adjusted cervical cancer incidence and prevalence among Vietnamese women; (2) to compare the incidence and prevalence of cervical cancer in Vietnamese women with other specific racial/ethnic groups (Whites, Blacks, Hispanics, Chinese, Japanese, Filipino, Hawaiian, Korean and Other Asians).

METHODS

Surveillance, Epidemiology, and End Results Program Data Collection

The data for this study was obtained from public-use data from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program on female genital cancer from 1973-2000. The SEER Program was initiated in 1973 to report population-based estimates of cancer incidence and mortality.[33] SEER is considered the standard for quality among cancer registries around the world. The program currently collects and publishes cancer incidence and survival data from 14 population-based cancer registries and three supplemental registries covering approximately 26% of the U.S. population, including the states of Iowa, Utah, Hawaii, Connecticut, New Mexico, and Alaska, and the metropolitan regions of Atlanta, Detroit, San Francisco-Oakland, Seattle (Puget Sound), Los Angeles, and San Jose-Monterey. Each year, studies are conducted in the SEER areas to evaluate the quality and completeness of the data being reported (SEER's case ascertainment is 98%).[33] After cancer is diagnosed by biopsy,

medical records are reviewed for demographic information, tumor characteristics, first course of therapy (including type of surgery, radiation, and reasons for no therapy), and survival.

For the purpose of this study, the original data set was limited to include only cervical cases recorded from January 1, 1993 to December 31, 1995 (n = 37,790). The decision to analyze data from 1993 through 1995 was based on the fact that (1) a previous study had looked at the racial/ethnic patterns of cancer from 1988-1992,[4] (2) Asian subgroups were not recorded before 1988,[34] and (3) cervix in situ cases were not recorded after 1995.[34] Institutional review board approval for analyses was not necessary because no personal information was included in the data making it impossible to identify individual women.

Although the variables were initially coded according to SEER Program criteria, the coding was changed to accommodate this study. The next section describes the SEER coding and how variables were recoded for the purpose of this study.

Data Coding

Race/ethnicity was coded by the SEER Program criteria to include White, Black, American Indian/Aleutian/Eskimo, Chinese, Japanese, Filipino, Hawaiian, Korean, Asian Indian/Pakistani, Vietnamese, Laotian, Hmong, Kampuchen, Thai, Micronesian, Chamorran, Guamanian, Polynesian, Tahitian, Samoan, Tongan, Melanesian, Fiji Islander, New Guinean, Other Asian including Asian not otherwise specified (NOS) and Oriental not otherwise specified (NOS), Pacific Islander, other, and unknown. The SEER criteria for coding Hispanics were based on Spanish surname and origin.[34] Because SEER did not code it prior to 1991,[34] Thai, Micronesian, Chamorran, Guamanian, Polynesian, Tahitian, Samoan, Tongan, Melanesian, Fiji Islander, other Asian, and Pacific Islander were collapsed into the other Asian category. Asian

Indian/Pakistani, Other Asian including Asian NOS and Oriental NOS, and Pacific Islander were aggregated into the "Other Asian" category to increase statistical power. For the purposes of this study, race was coded as white, Black, American Indian/Aleutian/Eskimo, Vietnamese, Hispanic, and Other Asian (e.g. Chinese, Japanese, Filipino, Hawaiian, Korean, and Other Asian).

Age at diagnosis is defined by SEER program criteria as a continuous variable. Because cervical cancer incidence begins to increase rapidly around age 20, reaches a peak around age 60, and declines slightly thereafter, age was collapsed into six age groups. These age groups include < 39, 40-49, 50-59, 60-69, 70-79, and >80 years of age.

Marital status was coded by SEER as single (never married), married (including common law), separated, divorced, widowed, and unknown. Because marital status was considered a proxy variable for sexual activity/behavior, marital status was collapsed into three categories: single (never married), married (including common law), and other (separated, divorced, widowed, or unknown).

Tumor stage at diagnosis was defined using the SEER historic staging scheme (in situ, localized, regional, and distant). This staging scheme was either obtained directly from the patients' records or defined using the detailed extent of disease information collected by SEER, which describes tumor size, clinical extension to other organs, and lymph node status. SEER defines in situ as a non-invasive neoplasm, "a tumor that has not penetrated the basement membrane nor extended beyond the epithelial tissue."[34] A localized tumor is defined as an invasive neoplasm that is confined entirely to the organ of origin[34] A regional tumor is a "neoplasm that has extended: 1) beyond the limits of the organ of origin directly into surrounding organs or tissues; 2) into the regional lymph nodes by way of the lymphatic system; or 3) by a combination of extension and regional lymph nodes."[34] A distant tumor is a

neoplasm that has spread to other parts of the body either by direct extension or by discontinuous metastasis to distant organs, tissues, or via the lymphatic system to distant lymph nodes.[34] Tumor stage is a proxy variable for late stage diagnosis due to lack of screening. For the purposes of this study, the SEER coding schemes for tumor stage was utilized.

The histology of the cervical carcinomas was identified using the International Classification of Disease for Oncology, 2nd edition (ICD-O-2) topography and morphology codes. ICD-O-2 is used to classify tumors diagnosed after 1992. Originally, SEER coded the histology into four categories: squamous cell carcinoma (SCC), adenocarcinoma (ACC), adenosquamous carcinoma (ASC), and other including otherwise specified (OS) and not otherwise specified tumors (NOS). For the current analyses, tumors were grouped into two categories (SCC and other which includes SCC, ACC, ASC, OS, and NOS) using a modification of the classification system proposed by Berg35 n conjunction with the ICD-O-2 coding system.[36]

Grade was a proxy variable for late stage diagnosis. Grading and differentiation are defined by SEER program criteria as: Grade 1 - well differentiated; Grade II – moderately differentiated, moderately well differentiated, intermediate differentiation; Grade III – poorly differentiated; Grade IV – undifferentiated/anaplastic; T-Cell, B-cell; Null cell; natural killer (NK) cell; and cell type not determined, not stated, or not applicable. In the final analysis, it was dropped because most of the carcinomas were of unknown grade (~90%).

Cancer-directed treatment was originally classified by SEER as four separate variables: no surgery, radiation, radiation to brain and/or central nervous system, or radiation sequence with surgery. These variables were combined into one variable, treatment. Further,, treatment was defined as no therapy, surgery only, radiation only, radiation and surgery combined, and

unknown therapy. However, treatment was dropped from the final analysis because a majority (84.8%) of the cases received surgery only.

Statistical Analysis

Using a statistical software package, SPSS 13.0, (SPSS Inc. Chicago, IL), frequency distributions of demographic and outcome variables were generated. Chi-square statistics were calculated to assess whether Vietnamese women were more likely to be diagnosed with cervical cancer: at a later age, at a later stage, and if they were more likely to be married than women in other racial/ethnic groups. Specifically, two comparisons were performed. In the first comparison, Vietnamese women were compared to white, Black, American Indian, Hispanic, and Other Asian. In the second comparison, Vietnamese women were compared to other Asians (i.e., Chinese, Japanese, Filipino, Hawaiian, Korean, and other Asian). Multivariate logistic regression was used to determine the association of race/ethnicity (independent variables) on cancer stage at diagnosis (dependent variable). Unadjusted and adjusted (adjusted for marital status and age at diagnosis) odds ratios for all variables were calculated. The SEER*Stat statistical software package (version 5.2.2) was used to calculate age-adjusted incidence and prevalence rates per 100,000 woman-years for invasive cervical carcinoma standardized to the 2000 U.S. population. Using the population counts from unmodified 2000 U.S. Census Bureau Data files (SF2), the overall incidence rates of all cervical cancer cases for whites, Blacks, American Indians/Alaskan Natives, Asian/Pacific Islanders, and Vietnamese women were determined.

RESULTS

The sample population was comprised of 37,790 cervical cancer cases. A descriptive summary of the SEER reported cases from 1993 to 1995 is shown in Table 1. The majority of the overall population was white (58.4%),. Further, only 0.6% of the sample was Vietnamese. Overall, 69.6% of the women were less than 39 years of age at diagnosis (mean age = 36.25, range = 12-102), 36.8% were married, 85.1% of the cancers were carcinoma in situ, 82.9% were SCC, and 84.8% received a treatment of surgery alone.

A comparison of age at diagnosis, tumor stage, and marital status by race/ethnicity is given in Table 2. All chi-square statistics were statistically significantly ($p<0.0001$). Vietnamese women had a lower proportion of women diagnosed at less than 39 years of age compared to the other racial/ethnic groups. Vietnamese women were also older with the highest proportion of women between ages 40-49 ($\chi^2=146.72$, $p<0.0001$). At least 40% of the white, Vietnamese, and other Asian women were married ($\chi^2= 618.55$, $p<0.0001$). Conversely, Vietnamese women had the lowest proportion (10.0%) of single women diagnosed with cervical cancer ($\chi^2=1072.68$, $p<0.0001$). Vietnamese women had the highest percentage of women diagnosed at localized (13.8%, $\chi^2=148.11$, $p<0.0001$) and regional stage (18.8%, $\chi^2=23.87$, $p<0.0001$). Similar comparisons assessing how Vietnamese women compared to all these racial/ethnic groups combined produced similar findings (see Table 3).

In Table 4, Vietnamese women are compared to the different Asian subgroups (i.e. Chinese, Japanese, Filipino, Hawaiian, Korean, and Other Asian). A lower proportion (21.3%) of Vietnamese women were diagnosed with cervical cancer before age 39 compared to women in the other Asian subgroups ($\chi^2= 75.74$, $p<0.0001$). In comparison to other Asian subgroups, Vietnamese women were more likely to be diagnosed between 40-59 years old. Vietnamese and

Korean women were less likely to be single compared to the other Asian subgroups, 10.0% and 9.7% respectively, (χ^2= 6.89, p<0.0001). Vietnamese women had the lowest proportion of women diagnosed with carcinoma in situ (65.0%) compared to the other Asian subgroups (χ^2= 28.61, p<0.0001). Although not statistically significant, Vietnamese women had the highest percentage (18.8%) of cervical cancers diagnosed at regional stage. Vietnamese women were not more likely than women in other Asian subgroups to be diagnosed with distant stage disease. Similar comparisons assessing how Vietnamese women differed from all the other Asian subgroups combined produced similar findings (see Table 5).

Table 6 provides the unadjusted and adjusted results of the multivariate logistic regressions for carcinoma in situ, localized, and distant stage diagnosis by race/ethnicity. In comparison to White women, Hispanic women had the highest odds ratio of having carcinoma in situ (OR = 1.55, 95% CI: 1.42-1.69, p < 0.0001) followed by Vietnamese women (OR = 1.44, 95% CI: 1.08-1.94, p = 0.014),) and other Asian women (OR = 1.38, 95% CI: 1.22-1.56, p<0.0001). Hispanics and women in other Asian subgroups were respectively 29% and 22% less likely to be diagnosed with localized cancer compared to white women. (Hispanics: OR = 0.71, 95% CI: 0.65-0.79, p<0.0001 and other Asian women: OR = 0.74, 95% CI: 0.64-0.85, p-value <0.0001). Although it was not statistically significant, the odds of distant stage diagnosis for Vietnamese women was 3.35 times that of whites (95% CI: 0.79-13.04, p = 0.093).

Table 7, provides the unadjusted and adjusted odd ratios for carcinoma in situ, localized, and distant stage diagnosis for Vietnamese women compared to other Asian subgroups combined. No differences existed in diagnosis of carcinoma in situ or localized disease by racial/ethnic group. However, although not statistically significant, Vietnamese women were more likely to be diagnosed at distant stage disease (OR= 1.43, 95% CI: 0.94-2.17, p = 0.092).

Table 8 depicts the age-adjusted incidence and prevalence rates per 100,000 woman-years for invasive cervical carcinoma in whites, Blacks, American Indian/Alaska Natives, Hispanics, and Asian/Pacific Islanders.[37-38] Although more whites were diagnosed with invasive cervical cancer between 1993 and 1995, Hispanics had the highest incidence rate (10.0 per 100,000) followed by Blacks (7.9 per 100,000) and Asian/Pacific Islanders (6.7 per 100,000). When standardized to the U.S. 2000 population, the incidence rate of invasive cervical cancer in Vietnamese women were 7.5 per 100,000. In the comparison of prevalence rates per 100,000 woman-years for invasive cervical cancer, it was highest for Hispanics (0.0245%) followed by Asian Pacific Islanders (0.0140%), Blacks (0.0125%), whites (0.0120%), and American Indian/Alaskan Natives (0.0056%).

Incidence rates per 100,000 women-years for all cervical cancers by race/ethnicity are given in Table 9. Among the different racial/ethnic groups, (i.e. whites, Blacks, American Indians, Hispanics, and Asian/Pacific Islanders [excluding Vietnamese]), the highest incidence rate of cervical cancer were among Asian/Pacific Islanders (18.8 per 100,000) followed by Hispanics (16.8 per 100,000). In contrast, American Indian/Alaskan Natives had the lowest incidence rate of 9.7 per 100,000 followed by whites and Blacks (10.4 and 10.3 per 100,000). The incidence rate for Vietnamese women alone was 21.4 per 100,000). Additional analyses calculating the incidence rates for all Asian subgroups separately, not shown in Table 9, found that rates for all cervical cancers combined were highest among Japanese (43.6 per 100,000), Hawaiian (34.9 per 100,000), and Filipino (23.5 per 100,000). Incidence rates were lower among Chinese (18.7 per 100,000), Vietnamese (21.4 per 100,000), and Korean (21.9 per 100,000).

DISCUSSION AND CONCLUSIONS

Vietnamese race/ethnicity is a predictor of cervical cancer diagnosis. Interesting differences exist with respect to race/ethnicity. Compared to other racial groups (e.g. whites, Blacks, American Indians, Hispanics, other Asians), Vietnamese women were older (mean = 49.25) and more likely to be married (59.7% versus 36.8% for all racial groups). Vietnamese women were less likely to be diagnosed with carcinoma in situ, a non-invasive type of cervical cancer, compared to all other racial/ethnic groups combined (i.e., whites, Blacks, Hispanic, American Indian/Aleutian/Eskimo, and other Asian subgroups, excluding Vietnamese) as well as compared to other Asian women combined. In comparison to individual Asian subgroups, Vietnamese women had the highest proportion of cervical cancers diagnosed at regional stage (18.8%). In addition, Vietnamese women had greater odds of carcinoma in situ (OR = 1.44, p = 0.014) and distant stage cervical cancer (OR = 3.35, p = 0.093) compared to white women. Assessing rates of invasive cervical cancer, Vietnamese women had higher incidence rates than whites, American Indians, and other Asian/Pacific Islanders. However, when assessing all Asian subgroups separately, Japanese and Hawaiian women had the highest overall incidence rates.

In general, the current findings support evidence that Vietnamese women have higher incidence rates than other racial/ethnic subgroups and are at increased odds of being diagnosed at different stages compared to other women. However, upon closer inspection, the differences may not be as pronounced as one previous report suggested.[4]

U.S. Asian subgroups differ in geographic and cultural origins, immigration patterns, and degree of acculturation. Vietnamese women participating in BRFSS had lower screening rates compared to other Asian subgroups. Further, one study in Santa Clara County, California found that only about 65% of Vietnamese-American women surveyed reported having a Pap smear in

the past three years, compared with about 74% of Asians nationwide and almost 86% of the U.S. population.[11] Thus, socio-demographic, lifestyle, and other health-related behaviors and beliefs influencing cancer screening have shown intergenerational differences within the Asian subgroups.[46-47, 51-53, 55] Because previous research has identified that certain traditional beliefs may be barriers to receiving timely screening,[46 54] the longer residence and the higher degree of U.S. acculturation[55] may contribute to their better screening patterns. However, because SEER data on nativity are not complete among the Asian subgroups, this information has not been studied.

Dependent on the degree of acculturation, screening rates can also be affected by actual and perceived barriers at the individual, cultural, and institutional levels. According to the National Center for Chronic Disease Prevention and Health Promotion, cultural sensitivity is important to increase screening.[13] For example, health education and screening programs should be culturally and linguistically appropriate in the Vietnamese language and address misconceptions.[14-17] Newly arrived immigrants should be informed of local health facilities and procedures. Interventions to promote cervical cancer screening among women who have recently immigrated should be two-pronged, focusing on both Vietnamese consumers and health care professional. Physicians should be educated to increase their rates of referrals and encourage screening.[18,23] Health professionals should overcome cultural barriers with regard to sexual health of Vietnamese women and not avoid discussion because of the sensitivity of the topic.[15] Nurses should prepare women for the Pap testing by explaining the procedure, using strategies to reduce anxiety such as draping the genital area completely, remaining with women during the test, and offering relaxation-breathing exercises. Nurses should educate women about

their risk, reinforcing the importance of regular cervical screening, and devise strategies (telephone or postcard reminders) to promote adherence to screening guidelines.

Several limitations should be kept in mind when interpreting these results. First, because of the small number of actual observed cases in the different racial/ethnic groups, caution must be exercised in interpreting these findings. Second, there are important limitations in using SEER public-use data. Specifically, although the data collected by SEER represents a fairly hetergeneous population, outcomes may be affected by differences health care access, health behavior attitudes, regional customs, socioeconomic status, or environmental exposures.[42] The population represented by SEER is comparable to the general U.S. population with respect to measures of poverty and education, but the SEER Vietnamese population tends to be more urban and has a higher proportion of foreign-born individuals.[33] Third, the reliability of racial classification in medical records has been shown to vary across racial groups[39] and the reliability of racial/ethnic classification is presumed to vary as well.[40, 43-45] For example, cancer patients in the San Francisco–Oakland area were misclassified by the SEER registry as Vietnamese even though they identified themselves as Chinese.[45] Similar problems may affect other Asian subgroups, but there have been no other published studies of misclassification in these populations. It is not to say that the SEER Program has not implemented measures to correct inaccuracies in racial/ethnic classifications. For example, when Hispanic ethnicity is not available in the medical records, ethnic classification is determined by matching names in the registry to the list of Spanish surnames compiled from the 1980 Census[41] or by using Spanish parentage, Spanish mother tongue, and Spanish or Mexican heritage.[41] However, individuals with Hispanic surnames may not always be of Hispanic ethnicity. In addition, name changes may be particularly problematic among women. Fourth, while standardized age-adjusted

incidence rates can be calculated for the major racial/ethnic groups, no population files for Asian subgroups exist, making it impossible to compare age-adjusted incidence rates standardized to U.S. population.

In spite of the cited limitations, the findings of this study support the notion that cervical cancer diagnosis among Vietnamese women is different compared to other racial/ethnic groups. In the U.S., in general, there is a perception that cervical cancer incidence among Asian/Pacific Islanders is lower compared to that of other racial/ethnic groups, especially Blacks and Hispanics. However, according to the findings of the current study, invasive cervical cancer incidence rates vary across Asian/Pacific Islander subgroups differs. Therefore, reporting statistics for Asian/Pacific Islanders as an overall group masks the disparities between Asian subgroups. Specifically, the aggregation of Asian subgroups obscures differences in stage of diagnosis, which could be explained by screening disparities in specific subgroups. These findings support the importance of reporting cancer statistics and results from analytic studies for specific Asian/Pacific Islander subgroups individually, which would enable more meaningful or applicable interpretations for public health practice as well as clinical settings. Further research into how immigration and acculturation experiences relate to early detection and cancer diagnosis is needed to identify specific subgroups (e.g., foreign-born) at increased risk of not receiving regular screening, late-stage diagnosis, and dying from this largely preventable cancer. Research should focus on geographic, biologic, and cultural factors that can influence the distribution of tumors and treatment across racial and ethnic subgroups.

TABLES

TABLE 1: Descriptive Summary of 1993-1995 SEER Reported Cases of Cervical Cancer

Variable	Total	
	N	%
Race/Ethnicity		
White	22,086	58.4
Black	3,580	9.5
American Indian/Aleutian/Eskimo	239	0.6
Vietnamese	240	0.6
Hispanic	5,915	15.7
Other Asian	1,999	5.3
Chinese	454	22.7*
Japanese	347	17.4*
Filipino	435	21.8*
Hawaiian	139	7.0*
Korean	236	11.8*
Other+	388	19.4*
Age at diagnosis (y)		
<39	26,314	69.6
40-49	5,965	15.8
50-59	2,346	6.2
60-69	1,653	4.4
70-79	1,093	2.9
>80	419	1.1
Marital Status		
Single (never married)	10,567	28.0
Married (including common law)	13,905	36.8
Other (Separated/Divorced/Widowed/Unknown)	13,318	35.2
Tumor Stage		
In situ	32,175	85.1
Localized	2,981	7.9
Regional	1,754	4.6
Distant	422	1.1
Histology		
Squamous Cell	31,311	82.9
Other (ACC, ASC, OS, NOS)‡	4,582	12.1

* Percent of subgroup within "Other Asian" group defined by SEER

\+ Other includes Thai, Micronesian, Chamorran, Guamanian, Polynesian, Tahitian, Samoan, Tongan, Melanesian, Fiji Islander, Asian Indian/Pakistani, Other Asian including Asian NOS, Oriental NOS, and Pacific Islander

‡ Note that ACC = adenocarcinoma, ASC = adenosquamous carcinoma, OS = otherwise specified, and NOS = not otherwise specified.

TABLE 2: Comparison of Age at Diagnosis, Marital Status, and Tumor Stage by Race/Ethnicity

Variable	*White* *n = 22,086*		*Black* *n = 3,580*		*American Indian/ Aleutian/Eskimo* *n = 239*		*Vietnamese* *n = 240*		*Hispanic* *n = 5,915*		*Other Asian* *n = 1,999*		χ^2
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	
Age at diagnosis (y)													
<39	15,760	71.4%	2,305	64.4%	172	72.0%	51	21.3%	3,976	67.2%	953	47.7%	761.57*
40-49	3,358	15.2%	594	16.6%	31	13.0%	80	33.3%	1,001	16.9%	466	23.3%	146.72*
50-59	1,249	5.7%	266	7.4%	11	4.6%	54	22.5%	435	7.4%	236	11.8%	229.00*
60-69	854	3.9%	193	5.4%	15	6.3%	34	14.2%	297	5.0%	198	9.9%	210.83*
70-79	623	2.8%	145	4.1%	9	3.8%	16	6.7%	155	2.6%	111	5.6%	71.36*
>80	242	1.1%	77	2.2%	1	0.4%	5	2.1%	51	0.9%	35	1.8%	42.70*
Marital Status													
Single (never married)	5,793	26.2%	1,791	50.0%	67	28.0%	24	10.0%	2,063	34.9%	374	18.7%	1072.68*
Married (including common law)	8,999	40.7%	820	22.9%	81	33.9%	139	57.9%	2,359	39.9%	1,061	53.1%	618.55*
Other (Separated, Divorced, Widowed, Unknown)	7,294	33.0%	969	27.1%	91	38.1%	77	32.1%	1,493	25.2%	564	28.2%	172.90*
Tumor Stage													
In situ	19,115	87.4%	2,853	81.5%	200	84.4%	156	65.0%	4,720	80.8%	1,473	75.2%	432.90*
Localized	1,648	7.5%	329	9.4%	20	8.4%	33	13.8%	647	11.1%	267	13.6%	148.11*
Regional	868	4.0%	253	7.2%	14	5.9%	45	18.8%	380	6.5%	190	9.7%	23.87*
Distant	230	1.1%	65	1.9%	3	1.3%	2	0.8%	92	1.6%	30	1.5%	23.87*

*p-value <0.0001

Table 3: Chi-Square Analyses to Compare Vietnamese Women and Other Race/Ethnicity

Variable	*Vietnamese n = 240*		*Other Race/Ethnicity n = 37,550*		χ^2	*p-value*
	n	*%*	*n*	*%*		
Age at diagnosis (y)						
<39	51	21.3%	26,263	69.9%	267.38	<0.0001
40-49	80	33.3%	5,885	15.7%	55.96	<0.0001
50-59	54	22.5%	2,292	6.1%	110.11	<0.0001
60-69	34	14.2%	1,619	4.3%	55.37	<0.0001
70-79	16	6.7%	1,077	2.9%	12.25	<0.0001
>80	5	2.1%	414	1.1%	2.09	0.148
Marital Status						
Single (never married)	24	10.0%	10,543	28.1%	38.69	<0.0001
Married (including common law)	139	57.9%	13,766	36.7%	46.33	<0.0001
Other (Separated, Divorced, Widowed, Unknown)	77	32.1%	13,241	35.3%	1.06	0.304
SEER Histological Stage						
In situ	156	65.0%	32,019	86.3%	80.47	<0.0001
Localized	33	13.8%	2,948	7.9%	11.63	0.001
Regional	45	18.8%	1,709	4.6%	0.17	0.680
Distant	2	0.8%	420	1.1%	0.17	0.680

TABLE 4: Comparison of Age at Diagnosis, Marital Status, and Tumor Stage by Asian Subgroups

Variable	*Vietnamese n = 240*		*Chinese n = 454*		*Japanese n = 347*		*Filipino n = 435*		*Hawaiian n=139*		*Korean n = 236*		*Other Asian n = 388*		χ^2
	n	*%*	*n*	*%*	*n*	*%*	*N*	*%*	*n*	*%*	*N*	*%*	*n*	*%*	
Age at diagnosis (y)															
<39	51	21.3%	195	43.0%	177	51.0%	191	43.9%	79	56.8%	111	47.0%	200	51.5%	75.74*
40-49	80	33.3%	118	26.0%	80	23.1%	102	23.4%	29	20.9%	45	19.1%	92	23.7%	16.25*
50-59	54	22.5%	46	10.1%	29	8.4%	64	14.7%	13	9.4%	38	16.1%	46	11.9%	34.39*
60-69	34	14.2%	51	11.2%	29	8.4%	42	9.7%	14	10.1%	25	10.6%	37	9.5%	6.16
70-79	16	6.7%	32	7.0%	22	6.3%	28	6.4%	3	2.2%	14	5.9%	12	3.1%	10.88
>80	5	2.1%	12	2.6%	10	2.9%	8	1.8%	1	0.7%	3	1.3%	1	0.3%	10.83
Marital Status															
Single (never married)	24	10.0%	68	15.0%	97	28.0%	73	16.8%	41	29.5%	23	9.7%	72	18.6%	6.89*
Married (including common law)	139	57.9%	242	53.3%	159	45.8%	241	55.4%	54	38.8%	147	62.3%	218	56.2%	31.19*
Other (Separated, Divorced, Widowed, Unknown)	77	32.1%	144	31.7%	91	26.2%	121	27.8%	44	31.7%	66	28.0%	98	25.3%	7.48
Tumor Stage															
In situ	156	65.0%	341	75.1%	272	78.4%	294	67.6%	104	74.8%	162	68.6%	300	77.3%	28.61*
Localized	33	13.8%	52	11.5%	40	11.5%	74	17.0%	22	15.8%	33	14.0%	46	11.9%	8.61
Regional	45	18.8%	43	9.5%	26	7.5%	52	12.0%	9	6.5%	34	14.4%	26	6.7%	8.01
Distant	2	0.8%	3	0.7%	5	1.4%	9	2.1%	3	2.2%	1	0.4%	9	2.3%	8.01

*p-value <0.0001

Table 5: Chi-Square Analysis to Compare Vietnamese Women and Other Race/Ethnicity

	Vietnamese n = 240		*Other Asian n = 1,999*			
Variable	*n*	*%*	*n*	*%*	χ^2	*p-value*
Age at diagnosis (y)						
<39	51	21.3%	953	47.7%	60.49	<0.0001
40-49	80	33.3%	466	23.3%	11.67	0.001
50-59	54	22.5%	236	11.8%	21.74	<0.0001
60-69	34	14.2%	198	9.9%	4.19	0.041
70-79	16	6.7%	111	5.6%	0.50	0.481
>80	5	2.1%	35	1.8%	0.14	0.713
Marital Status						
Single (never married)	24	10.0%	374	18.7%	11.12	0.001
Married (including common law)	139	57.9%	1,061	53.1%	2.02	0.155
Other (Separated, Divorced, Widowed, Unknown)	77	32.1%	564	28.2%	1.57	0.210
SEER Histological Stage						
In situ	156	66.1%	1,473	75.2%	28.61	< 0.0001
Localized	33	14.0%	267	13.6%	8.61	0.197
Regional	45	19.1%	190	9.7%	8.01	0.237
Distant	2	0.8%	30	1.5%	26.00	< 0.0001

Table 6: Unadjusted and Adjusted Odds Ratios and 95% CI for In Situ, Localized, and Distant Stage Diagnosis By Race/Ethnicity

	In situ					
		Unadjusted		*Adjusted*[*]		
Race/Ethnicity	***n***	***OR***	***95% CI***	***OR***	***95% CI***	***P-value***
White	19,115	1.00		1.00		
Black	2,853	1.58	1.44-1.74	1.37	1.23-1.52	<0.0001
American Indian/Aleutian/ Eskimo	200	1.29	0.91-1.83	1.38	0.93-2.04	0.106
Vietnamese	156	3.57	2.72-4.69	1.44	1.08-1.94	0.014
Hispanic	4,720	1.65	1.53-1.78	1.55	1.42-1.69	<0.0001
Other Asian	1,473	2.30	2.06-2.57	1.38	1.22-1.56	<0.0001
	Localized					
		Unadjusted		*Adjusted*[*]		
Race/Ethnicity	***n***	***OR***	***95% CI***	***OR***	***95% CI***	***P-value***
White	1,648	1.00		1.00		
Black	329	0.79	0.69-0.89	0.87	0.76-0.99	0.029
American Indian/Aleutian/ Eskimo	20	0.89	0.56-1.40	0.83	0.52-1.33	0.439
Vietnamese	33	0.50	0.35-0.73	1.00	0.68-1.45	0.979
Hispanic	647	0.65	0.59-0.72	0.71	0.65-0.79	<0.0001
Other Asian	267	0.52	0.45-0.59	0.78	0.68-0.90	0.0001
	Distant					
		Unadjusted		*Adjusted*[*]		
Race/Ethnicity	***n***	***OR***	***95% CI***	***OR***	***95% CI***	***p-value***
White	230	1.00		1.00		
Black*	65	0.56	0.43-0.74	0.77	0.57-1.01	0.082
American Indian/Aleutian/ Eskimo	3	0.83	0.26-2.61	0.90	0.28-2.91	0.867
Vietnamese	2	1.24	0.31-5.03	3.35	0.79-13.04	0.093
Hispanic	92	0.66	0.52-0.85	0.80	0.60-1.00	0.079
Other Asian	30	0.68	0.47-1.00	1.26	0.84-1.84	0.245

[*]Adjusted for age and marital status

Table 7: Unadjusted and Adjusted Odds Ratios and 95% CI for In Situ, Localized, and Distant Stage Diagnosis By Asian Subgroups

	In situ					
		Unadjusted		*Adjusted**		
Race/Ethnicity	***n***	***OR***	***95% CI***	***OR***	***95% CI***	***P-value***
Other Asian[+]	300	1.00		1.00		
Vietnamese	156	1.55	1.16-2.07	0.96	0.69-1.32	0.781
	Localized					
		Unadjusted		*Adjusted**		
Race/Ethnicity	***n***	***OR***	***95% CI***	***OR***	***95% CI***	***P-value***
Other Asian[+]	46	1.00		1.00		
Vietnamese	33	0.97	0.66-1.43	2.74	0.61-12.22	0.187
	Distant					
		Unadjusted		*Adjusted**		
Race/Ethnicity	***n***	***OR***	***95% CI***	***OR***	***95% CI***	***p-value***
Other Asian[+]	9	1.00		1.00		
Vietnamese	2	1.82	0.43-7.66	1.43	0.94-2.17	0.092

* Adjusted for age and marital status

[+] Other Asian includes Chinese, Japanese, Filipino, Hawaiian, Korean, Thai, Micronesian, Chamorran, Guamanian, Polynesian, Tahitian, Samoan, Tongan, Melanesian, Fiji Islander, Asian Indian/Pakistani, Other Asian including Asian NOS, Oriental NOS, and Pacific Islander

Table 8: Age-adjusted Incidence and Prevalence Rates per 100,000 Woman-Years for Invasive Cervical Carcinoma by Race/Ethnicity

Race/Ethnicity	*Incidence*		*Prevalence*	
	n	*Rate per 100,000*[*]	*n*	*Rate per 100,000*
White	4,166	5.0	3,405	0.0120
Black	727	7.9	501	0.0125
American Indian/Aleutian/Eskimo	39	3.5	29	0.0056
Hispanic	1,214	10.0	1,021	0.0245
Asian/Pacific Islander	615	6.7	519	0.0140
Vietnamese	84	7.5[+]		

[*]**All rates are age-adjusted to U.S. 2000 Census population excluding the rate for Vietnamese women**
[+]**Standardized to U.S. 2000 population**

Source: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence – SEER 11 Regs + AK Public –Use, Nov 2003 Sub for Expanded Races and Sub for Hispanics (1992-2001), National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Research, released April 2004, based on the November 2003 submission.

Table 9: Incidence Rates per 100,000 Woman-Years for Cervical Cancer by Race/Ethnicity (1993-1995)

Race/Ethnicity	*Incidence*	
	n	***Rate per 100,000****
White	22,086	10.4
Black	3,580	10.3
American Indian/Alaskan Native	239	9.7
Hispanic	5,915	16.8
Asian/Pacific Islander+	1,999	18.8
Vietnamese	240	21.4

* Standardized to 2000 U.S. Census population
\+ Asian/Pacific Islanders excluding Vietnamese women

APPENDIX

RECODED SEER PUBLIC ACCESS RECORD DESCRIPTION

CASES DIAGNOSED IN 1973-2002

USER FILE*

Submission: November 2004

Follow-up Cutoff Date: *December 31, 2002*

Documentation Version: *April 2005*

Diagnosis Years: *1973-2002*

* This documentation describes the data files in both the 1973_2002.seer9 and 1992_2002.sj_la_rg_ak directories. Refer to individual variable definitions to determine the differences between the directory files.
Cervix in situ cases after 1995 are not included.

COMPUTER RECORD FORMAT

ITEM NAME	ITEM #	POSITIONS	LENGTH
SEER registry	01	01-02	2
Case number	02	03-10	8
Record number	03	11-12	2
Type of reporting source	04	13-13	1
Place of birth	05	17-19	3
Year of birth	06	20-23	4
Age at diagnosis	07	24-26	3
Race/ethnicity	08	27-28	2
Spanish surname or origin	09	29-29	1
Sex	10	30-30	1
Marital status at diagnosis	11	31-31	1
Sequence number	12	32-33	2
Date of diagnosis	13	34-39	6
Primary site	14	40-43	4
Laterality	15	44-44	1
Histologic Type ICD-O-2	16	45-48	4
Behavior Code ICD-O-2	17	49-49	1
Grade	18	50-50	1
Diagnostic confirmation	19	51-51	1
Extent of disease (12 digit)	20	52-63	12
Site specific surgery (1983-1997)	21	64-65	2
Reason no surgery	22	66-66	1
Radiation	23	67-67	1
Radiation to Brain and/or CNS (1988-1997)	24	68-68	1
Radiation sequence with surgery	25	69-69	1
Vital status recode	26	70-70	1
Histologic Type ICD-O-3	27	71-74	4
Behavior Code ICD-O-3	28	75-75	1
Site recode	29	76-80	5
Race recode A	30	81-81	1
Race recode B	31	82-83	2
Age recode < 1 year olds	32	84-85	2
SEER historic stage A	33	86-86	1
SEER modified AJCC stage 3rd ed (1988+)	34	87-88	2
SEER Summary Stage 1977 (1988+)	35	89-89	1
SEER Summary Stage 2000 (1998+)	36	90-90	1
Survival time recode	37	91-94	4
Recode ICD-O-2 to 9	38	95-98	4
Site-type edit override	39	99-99	1
Histology edit override	40	100-100	1
Age-site edit override	41	101-101	1
Sequence number - dx conf override	42	102-102	1
Site-type-lat-seq override	43	103-103	1
Surgery- diagnostic conf override	44	104-104	1
Report source sequence overrride	45	105-105	1
Seq-ill defined site override	46	106-106	1
Leuk-Lymph dx confirmation override	47	107-107	1
AJCC stage 3rd edition (1988+)	48	108-109	2
Tumor Marker 1	49	112-112	1
Tumor Marker 2	50	113-113	1
ICD-O-2 Conversion flag	51	114-114	1

ITEM NAME	ITEM #	POSITIONS	LENGTH
Site-behavior override	52	115-115	1
Site-EOD-diagnosis date override	53	116-116	1
Site-laterality-EOD override	54	117-117	1
Site-laterality-morphology override	55	118-118	1
Recode ICD-O-2 to 10	56	119-122	4
ICCC site recode	57	123-125	3
SEER modified ICCC site recode	58	126-128	3
Site re with Kaposi and mesothelioma	59	129-133	5
Race recode Y	60	134-134	1
Race recode Z	61	135-135	1
Origin recode	62	136-136	1
COD to site recode	63	137-141	5
Tumor Marker 3	64	142-142	1
Number of primaries	65	143-144	2
Surgery of Primary Site (1998+)	66	145-146	2
Scope of Regional Lymph Node Surgery (1998+)	67	147-147	1
Number of Regional Lymph Nodes Examined	68	148-149	2
Surgery of Other Regional Site(s). Distant Site(s). or Distant Lymph Node(s)	69	150-150	1
Reconstruction–First Course	70	151-151	1
First malignant primary indicator	71	152-152	1
ICD-O Coding Scheme	72	153-153	1
ICD-O-3 Conversion flag	73	154-154	1
Behavior recode for Analysis	74	155-155	1
COD to site rec KM	75	156-160	5
State-county recode	76	161-165	5
Type of follow-up expected	77	166-166	1
Coding System for EOD	78	167-167	1
EOD–old 13 digit	79	168-180	13
EOD–old 2 digit	80	181-182	2
EOD–old 4 digit	81	183-186	4

FIELD DESCRIPTIONS

ITEM NUMBER/NAME:	01	SEER registry
LENGTH:		2
FIELD DESCRIPTION:		01 San Francisco-Oakland SMSA (1973) 02 Connecticut (1973) 20 Metropolitan Detroit (1973) 21 Hawaii (1973) 22 Iowa (1973) 23 New Mexico (1973) 25 Seattle (Puget Sound) (1974) 26 Utah (1973) 27 Metropolitan Atlanta (1975) 29 Alaska* 31 San Jose-Monterey* 35 Los Angeles* 37 Rural Georgia* (Year in parentheses refers to first diagnosis year data reported to SEER.) *Note: The yr1992_2001.sj_la_rg_ak irectory files contain cases for Alaska, San Jose-Monterey, Los Angeles and Rural Georgia registries beginning in 1992. Cases have been collected by SEER for these registries prior to 1992 but have been excluded from the public-use file.

ITEM NUMBER/NAME:	02	Case number
LENGTH:		8
FIELD DESCRIPTION:		All numeric All records for each person are assigned a unique number by the SEER Registry. SEER registry and case number are needed to uniquely identify a patient, i.e., case numbers are not unique across registries.

ITEM NUMBER/NAME:	03	Record number
LENGTH:		2
FIELD DESCRIPTION:		All numeric Each record for a person has been assigned a unique number that is independent of the contents of the record.

FIELD DESCRIPTIONS

ITEM NUMBER/NAME:	04	Type of reporting source
LENGTH:		1
FIELD DESCRIPTION:		1 Hospital inpatient/outpatient or clinic 3 Laboratory (hospital or private) 4 Private medical practitioner 5 Nursing/convalescent home/hospice 6 Autopsy only (only diagnosis of this primary made at autopsy) 7 Death certificate only (only report of this primary is from a death certificate)
ITEM NUMBER/NAME:	05	Place of birth
LENGTH:		3
FIELD DESCRIPTION:		SEER Place of birth Code — See http://seer.cancer.gov/manuals/AppendB.pdf for list of SEER Place of birth codes and definitions.
ITEM NUMBER/NAME:	06	Year of birth
LENGTH:		4
FIELD DESCRIPTION:		year — 1850 - forward 9999 (unknown year)
ITEM NUMBER/NAME:	07	Age at diagnosis
LENGTH:		3
FIELD DESCRIPTION:		000-130 := actual age in years

ITEM NUMBER/NAME: 08 Race/ethnicity

LENGTH: 2

FIELD DESCRIPTION:

01	White
02	Black
03	American Indian, Aleutian, or Eskimo
04	Chinese
05	Japanese
06	Filipino
07	Hawaiian
08*	Korean
09*	Asian Indian, Pakistani
10*	Vietnamese
11*	Laotian
12*	Hmong
13*	Kampuchean
14***	Thai
20**	Micronesian, NOS
21**	Chamorran
22**	Guamanian, NOS
25**	Polynesian, NOS
26**	Tahitian
27**	Samoan
28**	Tongan
30**	Melanesian, NOS
31**	Fiji Islander
32**	New Guinean
96**	Other Asian, incl. Asian, NOS and Oriental, NOS
97**	Pacific Islander
98	Other
99	Unknown

*Code began to be used for 1988+ diagnoses. For cases prior to 1988 it was only used if the person also had a diagnosis of an independent primary after 1987.
**Code began to be used for 1991+ diagnoses. For cases prior to 1991 it was only used if the person also had a diagnosis of an independent primary after 1990.
***Code began to be used for 1994+ diagnoses. For cases prior to 1994 it was only used if the person had a diagnosis of an independent primary after 1993.

ITEM NUMBER/NAME:	09	Spanish surname or origin
LENGTH:		1
FIELD DESCRIPTION:		0 Non-Spanish/Non-Hispanic 1* Mexican 2* Puerto Rican 3* Cuban 4* South or Central American (except Brazil) 5* Other specified Spanish/Hispanic Origin (includes European) 6 Spanish/Hispanic, NOS (there is evidence other than surname or maiden name that the person is Hispanic, but he/she cannot be assigned to any category of 1-5) 7** Spanish Surname Only (only evidence of person's Hispanic origin is surname or maiden name) 9 Unknown whether Spanish/Hispanic or not *Code began to be used for 1988+ diagnoses. For cases prior to 1988 it was only used if the person also had a diagnosis of an independent primary after 1987. **Code began to be used for 1994+ diagnoses. For cases prior to 1994 it was only used if the person also had a diagnosis of an independent primary after 1993.

ITEM NUMBER/NAME:	10	Sex
LENGTH:		1
FIELD DESCRIPTION:		1 Male 2 Female

ITEM NUMBER/NAME:	11	Marital status at diagnosis
LENGTH:		1
FIELD DESCRIPTION:		1 Single (never married) 2 Married 3 Separated 4 Divorced 5 Widowed 9 Unknown

ITEM NUMBER/NAME:	12	Sequence number
LENGTH:		2
FIELD DESCRIPTION:		00 One primary only 01 First of 2 or more primaries 02 Second of 2 or more primaries 03 Third of 3 or more primaries 04 Fourth of 4 or more primaries . . . 10 Tenth of 10 or more primaries 11 Eleventh of 11 or more primaries . . 60 Only one state registry-defined neoplasm . . 99 Unspecified sequence number

ITEM NUMBER/NAME:	13	Date of diagnosis
LENGTH:		6
FIELD DESCRIPTION:		MMYYYY where 1. MM := month — 01-12. 99 (unknown month) 2. YYYY := year — 1973 - forward

ITEM NUMBER/NAME:	14	Primary site
LENGTH:		4
FIELD DESCRIPTION:		All four characters of Topography code (eliminate decimal point) as defined in the Topography Section of the *International Classification of Diseases for Oncology*, Second Edition (ICD-O-2: 1992). Cases diagnosed 1977-1991 were coded using the *International Classification of Diseases for Oncology*, 1976 Edition (ICD-O-1976). Prior to 1977 diagnoses, cases were coded using the *Manual of Tumor Nomenclature and Coding*, 1968 (MOTNAC). All cases 1973-1991 were machine converted to ICD-O-2 codes without complete hand review.

FIELD DESCRIPTIONS

ITEM NUMBER/NAME:	15	Laterality
LENGTH:		1
FIELD DESCRIPTION:		0 Not a paired organ 1 Right: origin of primary 2 Left: origin of primary 3 Only one organ involved. right or left origin unspecified 4 Bilateral involvement. lateral origin unknown: stated to be single primary Both ovaries involved simultaneously. single histology Bilateral retinoblastomas Bilateral Wilms's tumors 9 Paired organ, but no information concerning laterality See http://seer.cancer.gov/manuals/primsite.laterality.pdf for a list of sites for which SEER requires information on laterality.

ITEM NUMBER/NAME: 16 Histologic Type ICD-O-2

LENGTH: 4

FIELD DESCRIPTION:

NOTE: ALL CASES DIAGNOSED 1973-91 HAVE BEEN CONVERTED TO THE *INTERNATIONAL CLASSIFICATION OF DISEASES FOR ONCOLOGY*, SECOND EDITION (ICD-O-2, 1992).

The SEER program has used several different, but related, coding systems for morphology over time. One should be extremely careful when doing any analysis of trends related to morphology. It is suggested that these analyses start with diagnoses no earlier than 1977 and that special attention be paid to the changes for 1986-91 cases due to the use of the *International Classification of Disease for Oncology, Field Trial Edition, March 1988* and for 1992- cases due to the use of ICD-O-2.

Analyses of morphology data are usually limited to microscopically confirmed cases only.

HISTOLOGY CODING

FOR CASES DIAGNOSED 1973-85:

Histologic types are defined in the morphology section of the *International Classification of Diseases for Oncology*, 1976 Edition (ICD-O, 1976). However prior to the introduction of ICD-O, 1976, morphology was coded using the *Manual of Tumor Nomenclature and Coding*, 1968 (MOTNAC). With the introduction of ICD-O, 1976, all cases previously coded using MOTNAC were machine converted without hand review using the conversion table, *Conversion of Morphology Sections (neoplasms) of 1968 Manual of Tumor Nomenclature and Coding (MOTNAC) and 1965 Systematized Nomenclature of Pathology (SNOP) to 1976 International Classification of Diseases for Oncology*, developed by Constance Percy. The morphology codes of ICD-O, 1976, are more specific than those of MOTNAC. Thus, less detailed information on morphology is available for cases diagnosed 1973-76. For example, when using MOTNAC large cell carcinoma is included with carcinoma, not otherwise specified (NOS); when using ICD-O, 1976, large cell carcinoma is a separate entity having its own code. All have been machine converted to ICD-O-2.

ITEM NUMBER/NAME: 16 Histologic Type ICD-O-2 (cont'd)

FIELD DESCRIPTION:

HISTOLOGY CODING (cont'd)

FOR CASES DIAGNOSED 1973-85:

In addition, the following special morphology codes were used by the SEER Program:

Breast — All years

- 8522/3 Infiltrating duct carcinoma and lobular carcinoma
- 8523/3 Infiltrating duct carcinoma and lobular carcinoma in situ
- 8524/3 Intraductal carcinoma and lobular carcinoma
- 8522/2 Intraductal carcinoma and lobular carcinoma in situ
- 8543/3 Paget's disease with intraductal carcinoma

All sites — Introduced for coding in approximately 1982

- 9616/3 Lennert's lymphoma
- 9624/3 Malignant lymphoma, large cell, cleaved, diffuse
- 9634/3 Malignant lymphoma, large cell, non-cleaved, diffuse
- 9723/3 True histiocytic lymphoma

FOR CASES DIAGNOSED 1986-91:

Histologic types are defined in the morphology section of the *International Classification of Diseases for Oncology, Field Trial Edition, 1986* (ICD-O FT). (This volume is no longer available. It was replaced by the *International Classification of Diseases for Oncology, Field Trial Edition, March 1988* (ICD-O FT 1988). Pages i-vi, 23 of the latter volume list the differences between the two Field Trials, present a summary of the changes to ICD-O, 1976, and define the symbols used in the morphology section. These were converted to ICD-O-2.

FOR CASES DIAGNOSED 1992-2000:

Histologic types are defined in the morphology section of ICD-O-2. See pages 137+ in ICD-O-2 for additions and changes.

FOR CASES DIAGNOSED 2001-2002:

All ICD-O-3 histologies diagnosed in 2001-2002 were converted to ICD-O-2.

ITEM NUMBER/NAME:	17	Behavior Code ICD-O-2
LENGTH:		1
FIELD DESCRIPTION:		Behavior codes are also defined in ICD-O-2, 1992. Note: For bladder only, all in situs (/2) are converted to invasives (/3) before inclusion on this file. Cervix in situ not required after 1995. FOR CASES DIAGNOSED 2001-2002: All cases diagnosed in 2001-2002 were converted from ICD-O-3 to ICD-O2.

ITEM NUMBER/NAME:	18	Grade
LENGTH:		1
FIELD DESCRIPTION:		Grading and differentiation codes of 1-4, 9 are defined in ICD-O-2: 1992. Grade information may be incomplete for cases diagnosed before 1977. In the early 1980's, additional codes specifying T-cell, B-cell, or null cell involvement in lymphomas and leukemias (histologies M9590-9940) were introduced by the SEER Program. Because the reporting requirements and medical terminology have changed over time, care should be exercised when analyzing this information. Code 1 Grade I; grade i; grade 1; well differentiated; differentiated, NOS 2 Grade II; grade ii; grade 2; moderately differentiated; moderately well differentiated; intermediate differentiation 3 Grade III; grade iii; grade 3; poorly differentiated; differentiated 4 Grade IV; grade iv; grade 4; undifferentiated; anaplastic 5 T-cell; T-precursor 6 B-cell; Pre-B; B-Precursor 7 Null cell; Non T-non B; 8 N K cell (natural killer cell) 9 cell type not determined, not stated or not applicable

ITEM NUMBER/NAME: 19 Diagnostic confirmation

LENGTH: 1

FIELD DESCRIPTION:

Microscopically Confirmed

1 Positive histology
2 Positive exfoliative cytology, no positive histology
4 Positive microscopic confirmation, method not specified

Not Microscopically Confirmed

5* Positive laboratory test/marker study
6 Direct visualization without microscopic confirmation
7 Radiography and other imaging techniques without microscopic confirmation
8 Clinical diagnosis only (other than 5, 6, or 7)

Confirmation unknown

9 Unknown whether or not microscopically confirmed

*Used for 1988+ diagnoses only; prior to 1988 these cases are included in code '8' (clinical diagnosis only)

ITEM NUMBER/NAME: 20 Extent of Disease (12-digit)

LENGTH: 12

FIELD DESCRIPTION: SSSEELPNEXPE Where

SSS	-	size of tumor
EE	-	clinical extension of tumor
L	-	lymph node involvement
PN	-	# of positive nodes examined
EX	-	number nodes examined
PE	-	pathological extension for 1995+ prostate cases only

See http://seer.cancer.gov/manuals/EOD10Dig.pub.pdf for list of valid EOD codes for each site. Coded only for 1988+ cases.

ITEM NUMBER/NAME: 21 Site specific surgery (1983-1997)

LENGTH: 2

FIELD DESCRIPTION: numeric

The actual coding schemes for individual sites and time periods can be viewed at http://seer.cancer.gov/manuals/AppendD.pdf. The discussion below summarizes the information available by site and time period.

This field specifies information on surgery during first course of therapy whether it was cancer-directed or not. (Prior to 1988 SEER did no collect information on surgical procedures if not cancer-directed.) The Reason for No Cancer-directed Surgery field must be used to distinguish among no cancer-directed surgery performed: cancer-directed surgery recommended, unknown if performed: and unknown if cancer-directed surgery performed.

FOR CASES DIAGNOSED 1973-82:
All cases were coded using the following nonspecific scheme:

No Cancer-Directed Surgery/Unknown[1]

00 No surgical procedure
09 Unknown if surgery done

Type of Cancer-Directed Surgery

90 Surgery, NOS

[1]Code '09' must be used in conjunction with Reason for No Cancer-directed Surgery to distinguish "No cancer directed surgery" from "Unknown if cancer-directed surgery performed" and "Cancer-directed surgery recommended but unknown if given." Code '00' is only used for cases diagnosed only at autopsy.

ITEM NUMBER/NAME: 22 Reason for no surgery

LENGTH: 1

FIELD DESCRIPTION:

0 Surgery performed

No surgery

1* Surgery not recommended
2* Contraindicated due to other conditions; Autopsy Only case
6 Unknown reason for no surgery
7* Patient or patient's guardian refused

Unknown if surgery performed

8 Recommended, unknown if done
9 Unknown if surgery performed; Death Certificate Only case

*Codes not used prior to 1988. Code '2' used only for Autopsy Only cases prior to 1988

ITEM NUMBER/NAME: 23 Radiation

LENGTH: 1

FIELD DESCRIPTION:

0 None
1 Beam radiation
2 Radioactive implants
3 Radioisotopes
4 Combination of 1 with 2 or 3
5 Radiation, nos--method or source not specified
6 Other radiation (73-87 cases only)
7 Refused
8 Recommended, unknown if administered
9 Unknown

ITEM NUMBER/NAME:	24	Radiation to Brain and/or CNS (1988-1997)
LENGTH:		1
FIELD DESCRIPTION:		0 None 1 Radiation 7 Refused 8 Recommended, unknown if administered 9 Unknown This variable was only collected for years 1988-1997, for lung and leukemia cases only.

ITEM NUMBER/NAME:	25	Radiation sequence with surgery
LENGTH:		1
FIELD DESCRIPTION:		0 No radiation and/or cancer-directed surgery 2 Radiation prior to surgery 3 Radiation after surgery 4 Radiation before and after surgery 5 Intraoperative radiation 6 Intraoper rad w other rad before/after surg 9 Sequence unknown, but both were given

ITEM NUMBER/NAME:	26	Vital status recode
LENGTH:		1
FIELD DESCRIPTION:		1 Alive 4 Dead Note: Any patient that dies after the follow-up cut-off date is recoded to alive as of the cut-off date.

ITEM NUMBER/NAME:	27	Histologic Type ICD-O-3
LENGTH:		4
FIELD DESCRIPTION:		All ICD-O-2 histologies for 1973-2000 were converted to ICD-O-3.

ITEM NUMBER/NAME:	28	Behavior Code ICD-O-3 (1973+)
LENGTH:		1
FIELD DESCRIPTION:		All ICD-O-2 behaviors for 1973-2000 were converted to ICD-O-3..

ITEM NUMBER/NAME: 29 Site recode

LENGTH: 5

FIELD DESCRIPTION: For publications SEER has defined major site groups based on primary site and ICD-O-3 morphology. See http://seer.cancer.gov/siterecode/icdo3_d01272003/ for SEER Site Recode Definitions.

ITEM NUMBER/NAME: 30 Race recode A

LENGTH: 1

FIELD DESCRIPTION: SEER collapses the information available on race for publication. These codes and definitions based on Race/ethnicity are:

1	White (Race code 01)
2	Black (Race code 02)
3	Other (Race code 03-98)
9	Unknown (Race code 99)

Note: See population documentation on which race variable to use when merging with different versions of population data.

ITEM NUMBER/NAME: 31 Race recode B

LENGTH: 2

FIELD DESCRIPTION:

01	White Non-Hispanic
11	White Hispanic
02	Black
03	American Indian
04	Chinese
05	Japanese
06	Filipino
07	Hawaiian
08	Other
09	Unknown

FIELD DESCRIPTIONS

ITEM NUMBER/NAME:	32	Age recode
LENGTH:		2
FIELD DESCRIPTION:		00 Age 00 01 Ages 01-04 02 Ages 05-09 03 Ages 10-14 04 Ages 15-19 05 Ages 20-24 06 Ages 25-29 07 Ages 30-34 08 Ages 35-39 09 Ages 40-44 10 Ages 45-49 11 Ages 50-54 12 Ages 55-59 13 Ages 60-64 14 Ages 65-69 15 Ages 70-74 16 Ages 75-79 17 Ages 80-84 18 Ages 85+ To obtain five-year age groups that correspond to the population data combine codes 00 and 01.

ITEM NUMBER/NAME: 33 SEER historic stage A

LENGTH: 1

FIELD DESCRIPTION:

0 In situ — A noninvasive neoplasm: a tumor which has not penetrated the basement membrane nor extended beyond the epithelial tissue. Some synonyms are intraepithelial (confined to epithelial tissue). noninvasive and noninfiltrating.

1 Localized — An invasive neoplasm confined entirely to the organ of origin. It may include intraluminal extension where specified. For example for colon. intraluminal extension limited to immediately contiguous segments of the large bowel is localized. if no lymph nodes are involved. Localized may exclude invasion of the serosa because of the poor survival of the patient once the serosa is invaded.

2 Regional — A neoplasm that has extended 1) beyond the limits of the organ of origin directly into surrounding organs or tissues: 2) into regional lymph nodes by way of the lymphatic system: or 3) by a combination of extension and regional lymph nodes.

4 Distant — A neoplasm that has spread to parts of the body remote from the primary tumor either by direct extension or by discontinuous metastasis (e.g.. implantation or seeding) to distant organs. issues. or via the lymphatic system to distant lymph nodes.

8 Localized/Regional - Only used for Prostate cases.

9 Unstaged — Information is not sufficient to assign a stage.

All lymphomas and leukemias are considered unstaged (code `9').

This field is produced by collapsing the detailed extent of disease information collected by SEER. Over time several different extent of disease schemes have been used. Thus caution should be exercised when doing trend analyses with this field. For example for prostate a coding artefact between cases before and after 1983 caused a shift of some cases from localized to unstaged.

Note 1: For bladder only. all cases originally staged as in situ were converted to localized before inclusion on this file.

Note 2: For Prostate cases. there will be no stage values of 1 or 2. All localized or regional cases will be collapsed into value 8.

FIELD DESCRIPTIONS

ITEM NUMBER/NAME: 34 SEER modified AJCC stage 3rd ed (1988-)

LENGTH: 2

FIELD DESCRIPTION:

00	-	In Situ	31	-	IIIA
10	-	I	32	-	IIIB
11	-	IA	33	-	IIIC
12	-	IB	39	-	III, NOS
13	-	IC	40	-	IV
18	-	In Situ and I combined for bladder only	41	-	IVA
			42	-	IVB
19	-	I, NOS	49	-	IV, NOS
			88	-	Recode scheme not yet available
20	-	II			
21	-	IIA	90	-	Unstaged
22	-	IIB	98	-	Not applicable
23	-	IIC	99	-	Error condition
29	-	II, NOS			
30	-	III			

Coded only for 1988- cases with the following ICD-O site codes:

Colon	C180:C189
Rectum	C199,C209
Lung and Bronchus	C340:C349
Breast	C500:C509
Cervix	C530:C539
Corpus uteri	C559,C530:C539
Ovary	C569
Vagina	C529
Vulva	C519
Oth fem gen	C510:C512,C589
Prostate	C619
Bladder	C670:C679

For staging criteria refer to
http://seer.cancer.gov/manuals/historic/comp_stage1.1.pdf

ITEM NUMBER/NAME:	35	SEER Summary Stage 1977 (1988–)
LENGTH:		1
FIELD DESCRIPTION:		0 In situ 1 Localized only 2 Regional by direct extension only 3 Regional involved only lymph nodes 4 Regional by both direct extension and lymph 5 Regional, NOS 7 Distant site(s)/node(s) involved 9 Unknown/unstaged/unspecified/DCO Coded only for 1988– cases.

ITEM NUMBER/NAME:	36	SEER Summary Stage 2000 (1998–)
LENGTH:		1
FIELD DESCRIPTION:		0 In situ 1 Localized only 2 Regional by direct extension only 3 Regional lymph nodes involved only 4 Regional by both direct extension and lymph 5 Regional, NOS 7 Distant site(s)/node(s) involved 9 Unknown/unstaged/unspecified/DCO Coded only for 1998– cases.

ITEM NUMBER/NAME: 37 Survival time recode

LENGTH: 4

FIELD DESCRIPTION:

YYMM where
1. YY:= number of completed years
2. MM:= number of completed months

9999 := unknown — Survival Time Recode cannot be calculated for this case

The Survival Time Recode is calculated using the date of diagnosis and one of the following: date of death, date last known to be alive, or follow-up cutoff date used for this file (see title page for date for this file). Thus a person diagnosed in May 1976 and who died in May 1980 has a Survival Time Recode of 04 years and 00 months.

EXAMPLE:

Assume December 1985 is used as a follow-up cutoff date, then:
1. If a person was known to be alive in April of 1986, December 1985 is used to compute Survival Time Recode.
2. A person known to have died in May 1987 is considered alive and Survival Time Recode computed using December 1985 as date of last contact.
3. If the last information on a person is that s/he was alive in April 1980, then April 1980 is used.

ITEM NUMBER/NAME: 38 Recode ICD-O-2 to 9

LENGTH: 4

FIELD DESCRIPTION: The primary site and morphology as coded in ICD-O-2 are converted to ICD-9 codes using the *Conversion of Malignant Neoplasms by Topography and Morphology from the International Classification of Disease for Oncology, Second Edition (ICD-0-2) to International Classification of Diseases, 9th Revision (ICD-9) and the International Classification of Diseases, 9th Revision,* Clinical Modification, Fourth Edition (ICD-9-CM) 4th Ed., 1992 edited by Constance Percy.

ITEM NUMBER/NAME: 39 Site-type edit override

LENGTH:1 1

FIELD DESCRIPTION:

blank Not Reviewed
1 Reviewed: The coding of an unusual combination of primary site and histologic type has been reviewed.

ITEM NUMBER/NAME:	40	Histology edit override
LENGTH:		1
FIELD DESCRIPTION:		blank Not Reviewed 1 Unusual Histology behavior combination reviewed. 2 Unusual Diagnostic Confirmation/Behavior combination reviewed. 3 Both scenarios above reviewed.

ITEM NUMBER/NAME:	41	Age-site edit override
LENGTH:		1
FIELD DESCRIPTION:		blank Not Reviewed 1 Reviewed

ITEM NUMBER/NAME:	42	Sequence number-dx confirmation override
LENGTH:		1
FIELD DESCRIPTION:		blank Not Reviewed 1 Reviewed

ITEM NUMBER/NAME:	43	Site-type-lat-seq override
LENGTH:		1
FIELD DESCRIPTION:		blank Not Reviewed 1 Reviewed

ITEM NUMBER/NAME:	44	Surgery -diagnostic conf override
LENGTH:		1
FIELD DESCRIPTION:		blank Not Reviewed 1 Reviewed

ITEM NUMBER/NAME:	45	Report source sequence override
LENGTH:		1
FIELD DESCRIPTION:		blank Not Reviewed 1 Reviewed

ITEM NUMBER/NAME: 46 Seq-ill defined site override

LENGTH: 1

FIELD DESCRIPTION:
blank Not Reviewed
1 Reviewed

ITEM NUMBER/NAME: 47 Leuk-Lymph dx confirmation override

LENGTH: 1

FIELD DESCRIPTION:
blank Not Reviewed
1 Reviewed

ITEM NUMBER/NAME: 48 AJCC Stage 3rd Edition (1988+)

LENGTH: 2

FIELD DESCRIPTION:

00	-	In Situ	31	-	IIIA
10	-	I	32	-	IIIB
11	-	IA	33	-	IIIC
12	-	IB	39	-	III, NOS
13	-	IC	40	-	IV
18	-	In Situ and I combined for bladder only	41	-	IVA
			42	-	IVB
19	-	I, NOS	49	-	IV, NOS
20	-	II	88	-	Recode scheme not yet available
21	-	IIA			
22	-	IIB	90	-	Unstaged
23	-	IIC	98	-	Not applicable
29	-	II, NOS	99	-	Error condition
30	-	III			

Coded only for 1988+ cases with the following ICD-O site codes:

Colon	C180:C189
Rectum	C199,C209
Lung and Bronchus	C340:C349
Breast	C500:C509
Cervix	C530:C539
Corpus uteri	C559,C530:C539
Ovary	C569
Vagina	C529
Vulva	C519
Oth fem gen	C510:C512,C589
Prostate	C619
Bladder	C670:C679

For staging criteria refer to
http://seer.cancer.gov/manuals/historic/comp_stage1.1.pdf

FIELD DESCRIPTIONS

ITEM NUMBER/NAME:	49	Tumor Marker 1
LENGTH:		1
FIELD DESCRIPTION:		For Breast Cases (ERA 1990−) and Prostate Cases (PAP 1998−) 0 None Done 1 Positive 2 Negative 3 Borderline: undetermined whether positive or negative 8 Ordered, but results not in chart 9 Unknown or no information For Testicular Cancer Cases (AFP 1998−) 0 None Done (SX) 2 Within normal limits (S0) 4 Range 1 (S1) <1.000 ng/ml 5 Range 2 (S2) 1.000 - 10.000 ng/ml 6 Range 3 (S3) >10.000 ng/ml 8 Ordered, but results not in chart 9 Unknown or no information For All Other Cases 9 Not applicable All sites except Breast diagnosed 1990-1997 are coded 9. All sites diagnosed before January 1, 1990 are coded 9.

ITEM NUMBER/NAME:	50	Tumor Marker 2
LENGTH:		1
FIELD DESCRIPTION:		For Breast Cases (PRA 1990+) and Prostate Cases (PSA 1998+) 0 None Done 1 Positive 2 Negative 3 Borderline; undetermined whether positive or negative 8 Ordered, but results not in chart 9 Unknown or no information For Testicular Cancer (hCG 1998+) 0 None Done (SX) 2 Within normal limits (S0) 4 Range 1 (S1) <5,000 mIU/ml 5 Range 2 (S2) 5,000 - 50,000 mIU/ml 6 Range 3 (S3) to >50,000 mIU/ml 8 Ordered, but results not in chart 9 Unknown or no information For All Other Cases 9 Not applicable All sites except Breast diagnosed 1990-1997 are coded 9. All sites diagnosed before January 1, 1990 are coded 9.

ITEM NUMBER/NAME:	51	ICD-O-2 Conversion flag
LENGTH:		1
FIELD DESCRIPTION:		0 Primary site and morphology originally coded in ICD-O-2 1 Primary site and morphology converted without review 2 Primary site converted with review; morphology machine converted without review 3 Primary site machine converted without review, morphology converted with review 4 Primary site and morphology converted with review 5 Morphology converted from ICD-O-3 without review 6 Morphology converted from ICD-O-3 with review

ITEM NUMBER/NAME:	52	Site-behavior override
LENGTH:		1
FIELD DESCRIPTION:		blank Not Reviewed 1 Reviewed

ITEM NUMBER/NAME:	53	Site-EOD-diagnosis date override
LENGTH:		1
FIELD DESCRIPTION:		blank Not Reviewed 1 Reviewed

ITEM NUMBER/NAME:	54	Site-laterality-EOD override
LENGTH:		1
FIELD DESCRIPTION:		blankNot Reviewed 1 Reviewed

ITEM NUMBER/NAME:	55	Site-laterality-morphology override
LENGTH:		1
FIELD DESCRIPTION:		blankNot Reviewed 1 Reviewed

ITEM NUMBER/NAME:	56	Recode ICD-O-2 to ICD-10
LENGTH:		4
FIELD DESCRIPTION:		The primary site and morphology as coded in ICD-O-2 are converted to ICD-10 codes using the *Conversion of Malignant Neoplasms by Topography and Morphology from the International Classification of Disease for Oncology, Second Edition (ICD-O-2) to International Classification of Diseases and Related Health Problems, 10th Revision*, 1998 edited by Constance Percy.

ITEM NUMBER/NAME:	57	ICCC site recode
LENGTH:		3
FIELD DESCRIPTION:		For publications, the International Classification of Childhood Cancer (ICCC) has been defined based on primary site and ICD-O-2 morphology. See http://seer.cancer.gov/iccc/iarciccc.html for ICCC site recode definitions.

ITEM NUMBER/NAME:	58	SEER modified ICCC site recode
LENGTH:		3
FIELD DESCRIPTION:		For publications, SEER has modified the International Classification of Childhood Cancer (ICCC). See http://seer.cancer.gov/ICCC/seericcc.html for SEER modified ICCC site recode definitions.

ITEM NUMBER/NAME:	59	Site recode with Kaposi Sarcoma and mesothelioma
LENGTH:		5
FIELD DESCRIPTION:		For publications, SEER has defined major site groups based on primary site and ICD-O-3 morphology including Kaposi Sarcoma and mesothelioma. See http://seer.cancer.gov/siterecode/icdo3_d01272003/ for SEER Site recode with Kaposi Sarcoma and mesothelioma definitions.

ITEM NUMBER/NAME:	60	Race recode Y
LENGTH:		1
FIELD DESCRIPTION:		1 White 2 Black 3 American Indian 4 Asian/Pacific Islander 9 Unknown Note: See population documentation on which race variable to use when merging with different versions of population data.

FIELD DESCRIPTIONS

ITEM NUMBER/NAME:	61	Race recode Z
LENGTH:		1
FIELD DESCRIPTION:		1 White 4 Non-White 9 Unknown Note: See population documentation on which race variable to use when merging with different versions of population data.

ITEM NUMBER/NAME:	62	Origin recode
LENGTH:		1
FIELD DESCRIPTION:		0 Non-Hispanic 1 Hispanic 9 Unknown Note: See population documentation on which race variable to use when merging with different versions of population data.

ITEM NUMBER/NAME:	63	Cause of Death to SEER Site Recode
LENGTH:		5
FIELD DESCRIPTION:		See the following Internet address for specific details: http://seer.cancer.gov/codrecode/1969+_d09172004/index.html

ITEM NUMBER/NAME:	64	Tumor Marker 3
LENGTH:		1
FIELD DESCRIPTION:		For Testis Cases (LDH 1998+) 0 None Done (SX) 2 Within normal limits (S0) 4 Range 1 (S1) <1.5 x upper limit of normal for LDH assay 5 Range 2 (S2) 1.5 - 10 x upper limit of normal for LDH assay 6 Range 3 (S3) >10 x upper limit of normal for LDH assay 8 Ordered, results not in chart 9 Unknown or no information All sites except testis diagnosed 1998+ are coded 9 All diagnosis before 1998 are coded 9.

FIELD DESCRIPTIONS

ITEM NUMBER/NAME:	65	Number of primaries
LENGTH:		2
FIELD DESCRIPTION:		01-14 Note: Based on the total number of records/tumors in SEER, not necessarily this database file. This value is the same across all records for a person.
ITEM NUMBER/NAME:	66	Surgery of Primary Site (1998+)
LENGTH:		2
FIELD DESCRIPTION:		See http://seer.cancer.gov/manuals/AppendC.pdf for a list of valid codes.
ITEM NUMBER/NAME:	67	Scope of Regional Lymph Node Surgery (1998+)
LENGTH:		1
FIELD DESCRIPTION:		See http://seer.cancer.gov/manuals/AppendC.pdf for a list of valid codes.
ITEM NUMBER/NAME:	68	Number of Regional Lymph Nodes Examined (1998+)
LENGTH:		2
FIELD DESCRIPTION:		See http://seer.cancer.gov/manuals/AppendC.pdf for a list of valid codes.
ITEM NUMBER/NAME:	69	Surgery of Other Regional Site(s), Distant Site(s), or Distant Lymph Node(s) (1998+)
LENGTH:		1
FIELD DESCRIPTION:		See http://seer.cancer.gov/manuals/AppendC.pdf for a list of valid codes.
ITEM NUMBER/NAME:	70	Reconstruction-First Course (1998+)
LENGTH:		1
FIELD DESCRIPTION:		See http://seer.cancer.gov/manuals/AppendC.pdf for a list of valid codes.
ITEM NUMBER/NAME:	71	First malignant primary indicator
LENGTH:		1
FIELD DESCRIPTION:		0 = no 1 = yes Based on all the tumors in SEER. Tumors not reported to SEER are assumed malignant.

FIELD DESCRIPTIONS

ITEM NUMBER/NAME:	72	ICD-O Coding Scheme
LENGTH:		1
FIELD DESCRIPTION:		2 = Originally coded in ICD-O-2 (1973-2000) 3 = Originally coded in ICD-O-3 (2001-2002)
ITEM NUMBER/NAME:	73	ICD-O-3 Conversion flag
LENGTH:		1
FIELD DESCRIPTION:		0 = Morphology originally coded in ICD-O-3 1 = Morphology converted without review 3 = Morphology converted with review
ITEM NUMBER/NAME:	74	Behavior Recode for Analysis
LENGTH:		1
FIELD DESCRIPTION:		2 = In situ 3 = Malignant 4 = Only malignant in ICD-O-3 5 = No longer reportable in ICD-O-3
ITEM NUMBER/NAME:	75	COD to site rec km
LENGTH:		1
FIELD DESCRIPTION:		See the following Internet address for specific details for COD to SEER site recode with Kaposi sarcoma and mesothelioma: http://seer.cancer.gov/codrecode/COD_1969+_d09172004/index.html
ITEM NUMBER/NAME:	76	State-county recode
LENGTH:		5
FIELD DESCRIPTION:		State county combination where the first two characters represent the state FIPS code. The last three digits represent the FIPS county code.
ITEM NUMBER/NAME:	77	Type of follow-up expected
LENGTH:		1
FIELD DESCRIPTION:		1 = "Autopsy only" or "Death certificate only" case 2 = Active follow-up case 3 = In situ cancer of cervix uteri only 4 = Case not originally in active follow-up, but in active follow-up now (SF only)

ITEM NUMBER/NAME:	78	Coding System for EOD
LENGTH:		1
FIELD DESCRIPTION:		0 2-Digit Nonspecific Extent fo Disease (1973-82) 1 2-Digit Site-Specific Extent of Disease (1973-82) 2 13-Digit (expanded) Site Specific Extent of Disease (1973-82) 3 4-Digit Extent of Disease (1983-87) 4 10-Digit Extent of Disease. 1988 (1988–)

Indicates the type of SEER EOD code applied to the tumor. Should be used whenever EOD coding is applied.

ITEM NUMBER/NAME:	79	EOD–OLD 13 Digit
LENGTH:		13
FIELD DESCRIPTION:		Detailed site-specific codes for EOD used by SEER for selected sites of cancer for tumors diagnosed 1973-1982, except death-certificate-only cases. For specific details reference the following website: http://seer.cancer.gov/manuals/historic/EOD_1977.pdf

ITEM NUMBER/NAME:	80	EOD–OLD 2 Digit
LENGTH:		2
FIELD DESCRIPTION:		Site-specific codes for EOD used by SEER for tumors diagnosed from January1, 1973, to December 31, 1982, for cancer sites that did not have a 13-digit scheme. For specific details, reference the following website: http://seer.cancer.gov/manuals/historic/EOD_1977.pdf

ITEM NUMBER/NAME:	81	EOD–Old 4 Digit
LENGTH:		4
FIELD DESCRIPTION:		Codes for site-specific EOD used by SEER for tumors diagnosed from January 1, 1987, for all cancer sites. For specific details, reference the following website: http://seer.cancer.gov/manuals/historic/EOD_1984.pdf

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