Cancer in Utah

Incidence and Mortality Trends 2006 - 2015



A publication of the Utah Cancer Registry, December 2018

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Preface

This biennial report is compiled by the Utah Cancer Registry (UCR), Utah's statewide, population-based cancer registry, as part of its activities to report cancer trends and disseminate cancer information for the state. UCR collects and manages data used to monitor trends in cancer incidence and mortality, evaluate cancer prevention and control measures, and facilitate cancer research. UCR performs this cancer surveillance function on behalf of the Utah Department of Health. UCR has operated at the University of Utah since 1966. Cancer is a reportable disease as stated in Utah Administrative Code Rule R384-100. Reportable cases include in situ and invasive neoplasms (with certain exceptions) as well as benign and borderline malignant brain and central nervous system tumors.

Cancer surveillance in Utah is possible only with the cooperation of health care providers throughout the state who report cancer case data to UCR. UCR relies on the expertise of hospital tumor registrars who classify and code cases for submission to the registry. We thank these professionals for their contributions to cancer surveillance in Utah.

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Executive Summary

Cancer is a major cause of illness in Utah and is the second leading cause of death in the state. In 2015, 10,241 Utahns were diagnosed with invasive cancer and 3,091 Utahns died from cancer.

The most common invasive cancers diagnosed among Utahns in 2015 were breast cancers, prostate cancers, and melanomas of the skin. During the period 2006 to 2015, the rate of melanoma diagnosis in Utah was higher that the other states in U.S. Incidence of melanoma has increased in Utah between 2006 and 2015 while melanoma mortality remained essentially unchanged over this period.

Utah has a notably low proportion of its population who are smokers. This report documents that new diagnoses and deaths from smoking-related cancers continue to be lower in Utah compared to the rest of the U.S. Whereas Utah's lung cancer mortality rate was less than half the rate elsewhere in the U.S., lung cancer was responsible for more cancer deaths than cancer of any other site in 2015. Colorectal cancers and breast cancers were the second and third leading causes of cancer death in the state, respectively.

This report includes a chapter focusing on cancer incidence among adolescents and young adults (AYA) aged 15 to 39 years in Utah. This age group experiences generally low cancer incidence, but has different patterns of types of cancer compared to other age groups. The incidence of AYA cancers has risen 1.4% per year over the past ten years in Utah. The 2006 to 2015 incidence of cancer in adolescents and young adults in Utah is significantly higher (10%) than the incidence in the same age group in the remaining U.S. states. Melanoma of the skin and thyroid cancer are among the most frequently diagnosed cancers in this age group, and higher incidence of these two cancers contributes much of the excess cancer incidence for AYAs in Utah.

The Hispanic population in Utah has grown rapidly in the past decade. However, because the Utah Hispanic population includes relatively fewer people in the older age groups that experience higher cancer incidence, Hispanics represent only 7.1% of new cancers in the state. The rate of cancer among Hispanics is 12% lower than the incidence of cancer among non-Hispanic whites. The Hispanic population has lower incidence of breast cancer, prostate cancer, and melanoma compared to non-Hispanic whites, but higher incidence of stomach, liver, and cervical cancers.

Cancer remains a significant public health concern in Utah. Cancer incidence and deaths from smoking-related cancers in Utah are lower than the rest of the nation, yet lung cancer remains the leading cause of cancer death in Utah. The increasing incidence of melanoma is a concern for Utahns. Breast and prostate cancers are among the largest sources of cancer diagnosis and death among Utahns.

1. The burden of cancer in Utah

In 2015, 10,241 new invasive cancers were diagnosed in Utah. The cancer sites with the largest number of new invasive diagnoses, in order, were breast cancer with 1,512 cases, prostate with 1,441 cases, melanoma of the skin with 1,055 cases, colorectal with 712 cases, and lung with 638 cases (Figure 1.1 and Appendix C, Table C1). An additional 2,029 in situ cancers were diagnosed in Utah residents in 2015. In situ cancers are frequently diagnosed for melanoma (899) and breast cancer (282). Benign brain or central nervous system tumors accounted for 506 diagnoses in 2015.

In 2015, cancer was the second most common cause of death in Utah and accounted for 18% of deaths in the state (3,091 deaths). Lung cancer was the leading cause of cancer deaths in Utah, with 471 deaths in 2015 (Figure 1.1). Other cancers accounting for relatively large numbers of deaths were colorectal cancer (277 deaths), breast cancer (268 deaths), and pancreatic cancer (228 deaths).

In 2015, 5,049 Utah women were diagnosed with cancer and 1,439 women died due to cancer. Breast cancer was the most common invasive cancer diagnosis, with 1,505 cases representing 29.8% of invasive cancer diagnoses among women (Table 1.1). Melanoma was the second most common invasive cancer diagnosis among women with 9.2% of all diagnoses.

Breast cancer was the most common cause of cancer death among women, with 268 deaths, representing 18.6% of all cancer deaths in women. Lung cancer (205 deaths, 14.2%) and colorectal cancer (137 deaths, 9.5%) were the second and third most common causes of cancer deaths among women, respectively. Although melanoma diagnoses were common among Utah women, there were only 20 deaths from melanoma among women.

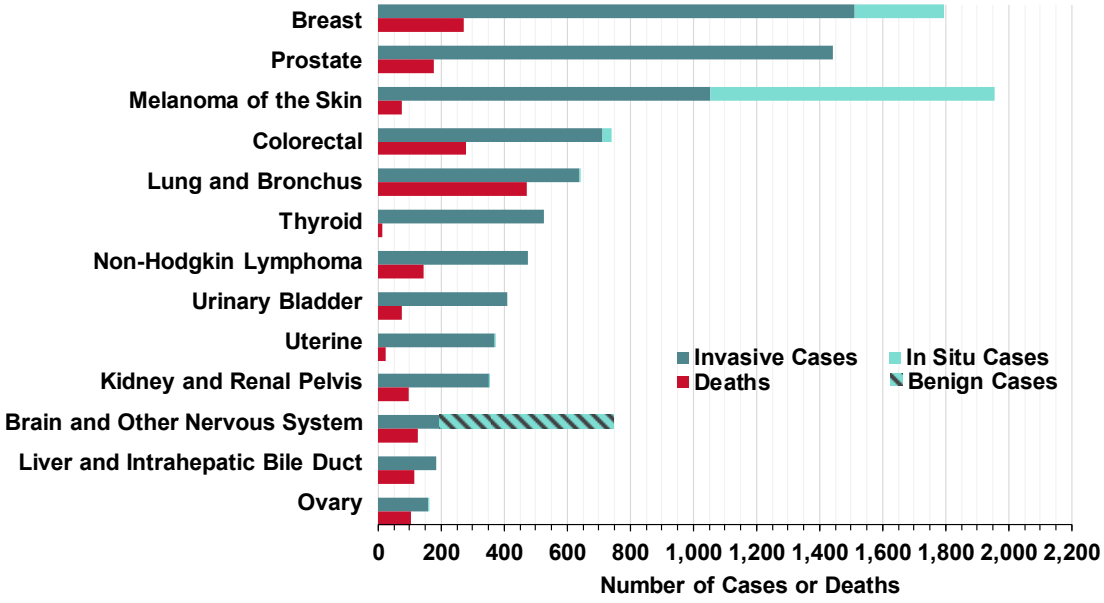


Figure 1.1 New cancers and cancer deaths for common sites, Utah 2015

Table 1.1 The ten most common incident cancers among Utah women, 2015

Cancer Type	Invasive Cases	In situ Cases	Deaths
Breast	1,505	282	268
Melanoma of the Skin	464	343	20
Thyroid	399	0	^
Colorectal	355	12	137
Uterine	373	^	57
Lung and Bronchus	297	^	205
Non-Hodgkin Lymphoma	207	0	63
Ovary	158	^	105
Pancreas	141	0	107
Leukemia	136	0	62

^ Number suppressed due to small cell size.

Among men in Utah, there were 5,192 invasive cancer diagnoses and 1,652 cancer deaths in 2015. Prostate cancer was the most frequently diagnosed invasive cancer for men, with 1,441 cases representing 27.8% of invasive cancer diagnoses. Melanoma was the second most commonly diagnosed invasive cancer among men, with 591 cases representing 11.4% of the total.

Lung cancer was the leading cause of cancer death among Utah men, representing 16.1% of all cancer deaths among men with 266 deaths in 2015. The second most common cause of cancer death among Utah men was prostate cancer, with 178 deaths representing 10.8% of cancer deaths. Colorectal cancer (140 deaths, 8.5%), pancreatic cancer (121 deaths, 7.3%), and leukemia (115 deaths, 7.0%) were the next most common causes of cancer deaths among men in the state. Additional details of the burden of cancer in Utah, including counts and incidence rates for cancers of other sites, can be found in Appendix C, Tables C1 and C2.

Table 1.2 The ten most common incident cancers among Utah men, 2015

Cancer Type	Invasive Cases	In situ Cases	Deaths
Prostate	1,441	0	178
Melanoma of the Skin	591	556	53
Lung and Bronchus	341	^	266
Colorectal	357	15	140
Urinary Bladder	328	0	59
Non-Hodgkin Lymphoma	267	0	80
Kidney and Renal Pelvis	221	^	62
Oral Cavity and Pharynx	199	20	37
Leukemia	187	0	115
Pancreas	130	^	121

^ Number suppressed due to small cell size.

2. Cancer in adolescents and young adults (AYA) aged 15 to 39 years

Cancers among adolescents and young adults (AYA) aged 15 to 39 years in Utah have not previously been described in detail. Although AYA experience generally low cancer incidence compared to older populations (Figure 2.1), the patterns of types of cancer occurring in AYA differ from other age groups (1) and merit separate consideration. Utah is a relatively young state, with AYA representing 38% of the total Utah population compared to 34% of the remaining U.S. population. There were total of 934 incident cancers among Utah AYA in 2015.

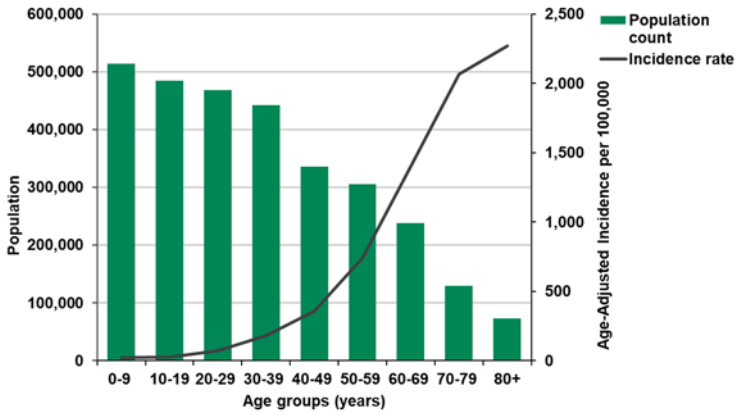


Figure 2.1 Age distribution of the Utah population and cancer incidence by age, 2015

Incidence of invasive cancers in Utah AYA rose at an average rate of 1.5% per year over the period 2006 to 2015 (Figure 2.2). This is significantly higher than the average rate of 0.5% per year in the U.S. Utah's 2006 to 2015 AYA invasive cancer incidence of 79.0 per 100,000 (Appendix C, Table C3) is significantly higher than the incidence rate of 71.9 among AYA in the other U.S. states.

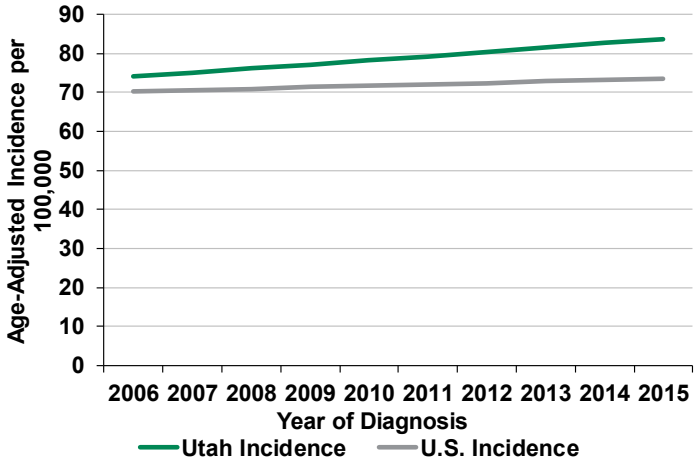


Figure 2.2 Invasive cancer incidence trends among adolescents and young adults ages 15 to 39 years in Utah and the U.S., 2006 to 2015

The cancer sites with highest incidence of invasive cancer in Utah AYA are breast cancer, with incidence of 18.0 per 100,000 females per year in 2006 to 2015, thyroid cancer, 15.6 per 100,000 population, melanoma, 12.7 per 100,000, and testis, 12.6 per 100,000 males (Table 2.1). The 2006 to 2015 AYA incidence of melanoma and thyroid cancers exceed the age-standardized incidence of cancers of these sites in the remainder of the U.S. These differences account for most of the overall difference in Utah AYA cancer incidence compared to the U.S. Invasive thyroid cancer and melanoma incidence rates in the Utah population of all ages also significantly exceed U.S. rates (Appendix C, Table C2).

Thyroid cancer among Utah AYA has increased by 5.3% per year from 2006 to 2015 and thyroid cancer detections have increased by 4.5% for the past 10 years across the entire U.S. (2). The increase in incidence and lack of change in the already high 5-year survival rate of 98.1% in thyroid cancers, among other factors, as been described as a situation of overdiagnosis (2). The U.S. Preventive Services Task Force does not recommend thyroid cancer screenings for asymptomatic persons (3). Screenings are encouraged among persons with previous radiation exposure to the face, neck, or chest during childhood or adolescence, a low-iodine diet, an inherited genetic syndrome, or a close family member with thyroid cancer (3).

Table 2.1 The five most common incident cancers among adolescents and young adults aged 15 to 39 years in Utah, 2006 to 2015

	Invasive		In situ	
	Cases	Incidence per 100,000	Cases	Incidence per 100,000
Thyroid	1,589	15.6	0	0.0
Melanoma of the Skin	1,272	12.7	489	4.9
Female Breast	809	18.0	99	2.2
Testis	690	12.6	^	0.1
Colorectal	404	4.2	17	0.2

^ Number suppressed due to small cell size.

Utah's large proportion of non-Hispanic whites and the high elevation above sea level where most Utahns reside may be contributing factors to the excess of melanomas among Utah AYA. These issues are addressed further in Chapter 7. Special attention should be paid to AYA melanomas because their pathology may be markedly different from adult melanomas. This difference in pathology may influence treatment and outcomes (4). Public health education and cancer prevention activities in Utah that encourage sun safety should include the Utah AYA population.

3. Cancer in Hispanics and Non-Hispanic Whites

Utah's Hispanic/Latino population is growing rapidly and was estimated at 13.7% of the population in 2015 (5). The majority of Utahns are non-Hispanic whites who comprised 78.9% of the state's 2015 population. Other race groups each represent 3% or fewer of the state population, and estimates of cancer incidence in these small populations may be unreliable. Therefore, when considering cancer by race and ethnicity, this report describes cancer in two groups of Utahns, non-Hispanic whites and Hispanics of all races.

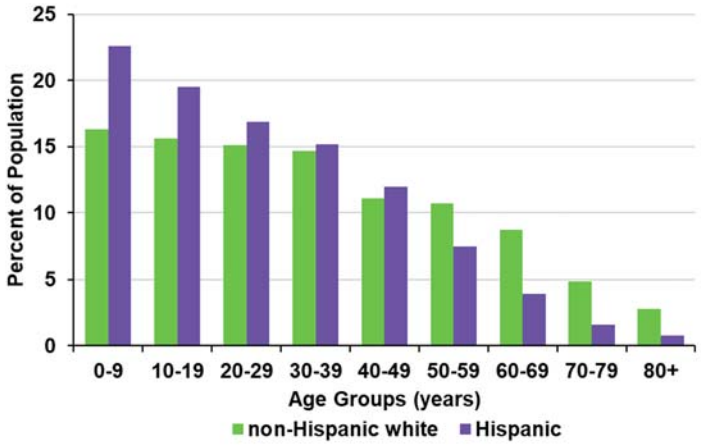


Figure 3.1 Age distribution of the Utah Hispanic and non-Hispanic white populations, 2015

Hispanics in Utah are a younger population than non-Hispanic whites (Figure 3.1). With low proportions of Hispanics in the age groups at which cancer incidence is high, the number of invasive cancer diagnoses in 2015 represented by Hispanics, 696, is only 7.1% of cases in the state, smaller than the proportion of Hispanics in the overall population. After taking into account age, the 2006 to 2015 Hispanic invasive cancer incidence rate of 362.8 per 100,000 per year was significantly lower than the non-Hispanic white incidence of 414.4 per 100,000 (Appendix C, Table C4).

Invasive cancer sites exhibiting the largest differences in incidence rates between Hispanics and non-Hispanic whites in Utah are shown in Table 3.1. Hispanics had significantly lower age-adjusted incidence rates for several cancer sites including melanoma, prostate, breast, oral cavity, bladder, and leukemia. The 2006 to 2015 incidence for stomach, cervical, and liver cancers were significantly higher among Hispanics compared to non-Hispanic whites. Stomach, cervical, and liver cancers are recognized to have higher incidence among Hispanics compared to non-Hispanics throughout the U.S. (6). Hepatitis C infection, which is known to have high prevalence among Hispanic immigrants, is thought to contribute to the higher liver cancer incidence among Hispanics (7). Higher stomach cancer incidence in Hispanics has been suggested to be related to different prevalence of H. Pylori infection and differences in diet (6). Factors influencing cervical cancer incidence are discussed in Chapter 5. Incidence rates for other cancers among Hispanics in Utah are shown in Appendix C, Table C4.

Table 3.1 Differences in invasive cancer incidence rates between Hispanic and non-Hispanic white populations in Utah, 2006 to 2015

Cancer Site	Hispanic		Non-Hispanic White		
	Incidence per 100,000	95% CI	Incidence per 100,000	95% CI	Percent difference
Melanoma of the Skin*	7.9	(6.4-9.6)	38.7	(37.8-39.5)	-80
Urinary Bladder*	9.6	(7.7-11.7)	17.6	(17.0-18.2)	-45
Leukemia*	8.1	(6.7-9.7)	14.1	(13.6-14.7)	-43
Oral Cavity and Pharynx*	5.6	(4.4-7.1)	8.7	(8.3-9.1)	-36
Prostate*	118.8	(109.1-129.0)	149.4	(147.0-151.9)	-20
Female Breast*	96.7	(89.6-104.1)	115.7	(113.6-117.8)	-16
Non-Hodgkin Lymphoma	18.2	(15.8-20.8)	19.6	(19.0-20.2)	-7.1
Lung and Bronchus	30.6	(27.2-34.3)	27.7	(26.9-28.4)	11
Colorectal*	37.6	(34.1-41.4)	32.2	(31.5-33.1)	17
Kidney and Renal Pelvis*	16.9	(14.7-19.4)	12.8	(12.4-13.4)	32
Cervical*	8.2	(6.6-10.2)	4.7	(4.3-5.2)	74
Stomach*	10.2	(8.3-12.3)	3.8	(3.6-4.1)	168
Liver*	11.7	(9.8-13.8)	3.9	(3.6-4.1)	200

* Indicates that the rates are significantly different between Hispanics and non-Hispanic whites

The 2006 to 2015 cancer mortality rate of 111.4 per 100,000 per year for Hispanics was significantly lower than the cancer mortality rate of 130.4 per 100,000 per year for non-Hispanic whites. Cancer sites with lower cancer mortality among Hispanics in Utah include breast, prostate, and lung (Table 3.2). Mortality from stomach and liver cancers was significantly higher among Hispanics than non-Hispanic whites by 4.0 and 3.9 deaths per 100,000 per year, respectively. Cancer mortality rates for Hispanics and non-White Hispanics for other cancer sites are shown in Appendix C, Table C5.

Table 3.2 Differences in cancer mortality rates between Hispanic and non-Hispanic white populations in Utah, 2006 to 2015

Cancer Site	Hispanic		Non-Hispanic White		Percent Difference
	Mortality per 100,000	95% CI	Mortality per 100,000	95% CI	
Female Breast*	12.6	(9.9-15.6)	21.8	(20.9-22.7)	-42
Prostate	16.2	(12.2-20.9)	23.4	(22.3-24.5)	-31
Lung and Bronchus*	17.3	(14.7-20.2)	20.6	(20.0-21.2)	-16
Pancreas	10.1	(8.1-12.3)	9.5	(9.1-9.9)	6
Kidney and Renal Pelvis	4.4	(3.2-5.9)	3.4	(3.2-3.7)	29
Liver*	6.6	(5.1-8.4)	2.7	(2.4-2.9)	144
Stomach*	5.8	(4.3-7.5)	1.8	(1.6-2.0)	222

* Indicates that the rates are significantly different between Hispanics and non-Hispanic whites

4. Cancer in urban and rural Utah

Utah is a geographically large state of 84,899 square miles, with a population of approximately 3 million in 2015. Roughly 85% of the population lives in six counties along the Wasatch Front that contain urban areas of 65,000 or more people.

Residence in a rural area may contribute to disparities in the impact of cancer on the population (8, 9). To describe possible differences in Utah, counties were classified according to the Rural Urban Continuum Codes (RUCC) (10). In 2015, residents of urban counties in Utah experienced 8,952 invasive cancers while residents of rural counties had 1,289. The invasive cancer incidence rates for 2006 to 2015 of 408.2 per 100,000 per year for urban and 401.6 for rural counties were similar (Table 4.1).

Certain cancer sites exhibited different incidence in rural compared to urban counties. The 2006 to 2015 age-adjusted incidence of prostate, breast, and thyroid cancers were significantly higher in urban counties. Lung cancer, cervical cancer, and leukemia each had higher incidence in rural counties compared to urban.

Table 4.1 Differences in invasive cancer incidence rates between urban and rural counties in Utah, 2006 to 2015

Cancer Site	Rural		Urban		Percent Difference
	Incidence per 100,000	95% CI	Incidence per 100,000	95% CI	
Testis	5.9	(4.7-7.4)	7.1	(6.6-7.6)	-17
Thyroid*	15.1	(13.7-16.6)	18.1	(17.6-18.7)	-17
Stomach	3.9	(3.2-4.7)	4.5	(4.2-4.9)	-13
Prostate*	133.6	(127.6-139.8)	148.8	(146.3-151.4)	-10
Female Breast*	104.4	(99.1-110.0)	114.6	(112.5-116.7)	-8.9
Non-Hodgkin Lymphoma	18.0	(16.4-19.6)	19.6	(19.0-20.2)	-8.2
Uterine	24.6	(22.1-27.3)	25.7	(24.7-26.6)	-4.3
Melanoma of the Skin	35.2	(33.0-37.5)	35.0	(34.1-35.8)	0.6
Hodgkin Lymphoma	2.6	(2.0-3.3)	2.5	(2.3-2.7)	4.0
Urinary Bladder	17.7	(16.1-19.4)	16.9	(16.3-17.5)	4.7
Colorectal*	35.9	(33.7-38.2)	32.2	(31.4-33.0)	11
Lung and Bronchus*	30.7	(28.7-32.9)	27.5	(26.7-28.2)	11
Leukemia*	15.7	(14.3-17.3)	13.3	(12.8-13.8)	18
Cervical*	6.6	(5.2-8.1)	4.9	(4.5-5.4)	35

* Indicates that the rates are significantly different between rural and urban counties

5. Female breast and cervical cancer

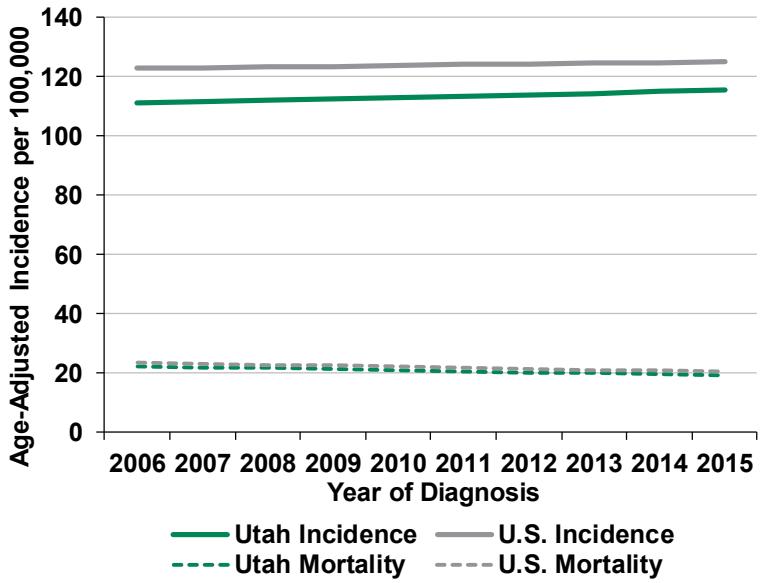


Figure 5.1 Invasive breast cancer incidence and mortality rates for Utah and the U.S., 2006 to 2015

Breast cancer is the most commonly diagnosed cancer among women in Utah and is the leading cause of cancer death among women in the state. The incidence rates of invasive breast cancer in Utah and in the remainder of the U.S. were relatively stable over the years 2006 to 2015 (Figure 5.1). In Utah, a 0.4% annual percent increase in incidence was observed and a slight negative trend, -0.2% annual percent change, was found for breast cancer mortality. The incidence of invasive breast cancer in Utah for the period 2006 to 2015 was 113.3 per 100,000 per year and was lower than the U.S. incidence of 124.0 per 100,000 per year (Appendix C2)

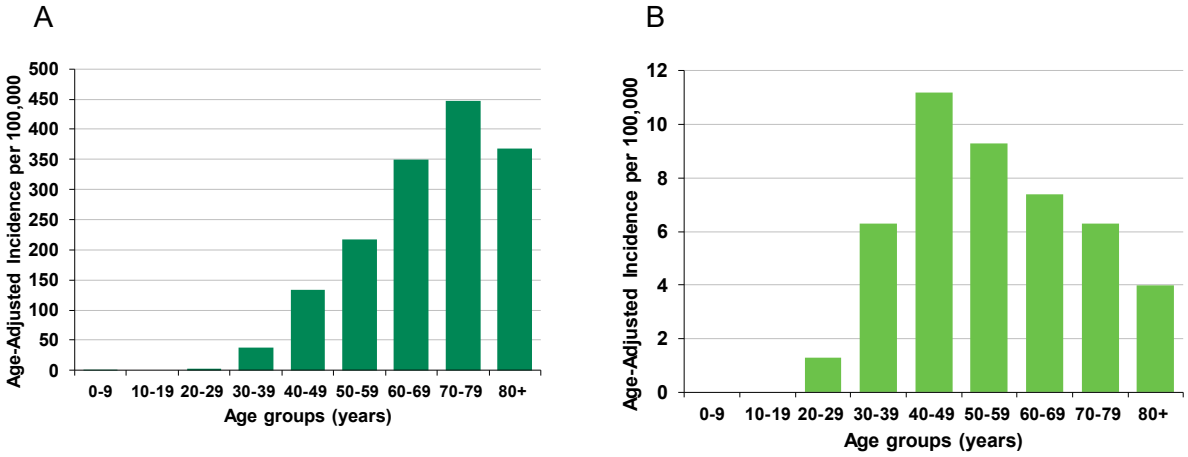


Figure 5.2 Incidence rates for invasive A) breast and B) cervical cancer in Utah women by age group, 2006 to 2015

The incidence of invasive breast cancer, like many cancers, increases with age (Figure 5.2). The invasive breast cancer incidence from 2011 to 2015 was highest among women aged 70 to 79 years with a incidence of 446.8 cases per 100,000.

When compared by ethnicity, the 2006 to 2015 incidence of 115.7 invasive breast cancers per 100,000 per year among non-Hispanic white women was higher than the incidence of 96.7 100,000 per year in Hispanic women (Appendix C4). Breast cancer mortality was also higher among non-Hispanic white women (21.8 per 100,000 per year) than among Hispanic women (12.6 per 100,000 per year).

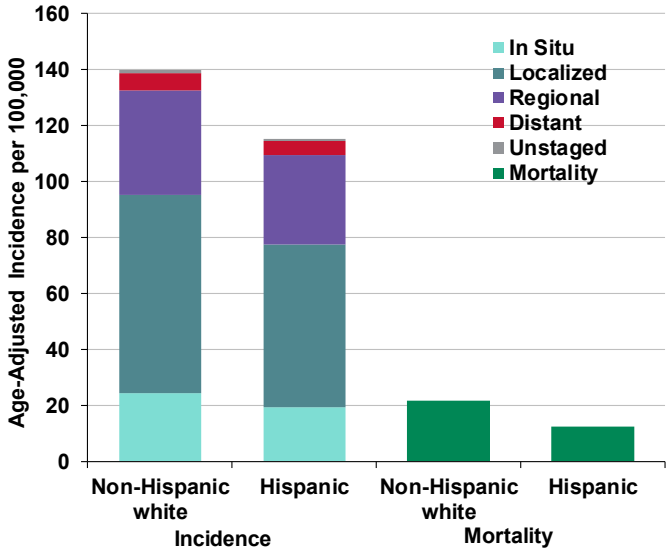


Figure 5.3 Breast cancer incidence by stage at diagnosis and breast cancer mortality for non-Hispanic white and Hispanic women in Utah, 2006 to 2015

The stage at diagnosis for breast cancer has a major influence on survival. Of all female breast cancers in Utah, 15.8% were in situ at diagnosis, 51.7% local, 27.0% regional, 4.6% distant, and 1.0% unstaged at diagnosis. The predominance of local stage at diagnosis and the relatively small proportion diagnosed at distant stage was observed for both non-Hispanic white women and Hispanic women (Figure 5.3).

During the period 2006 to 2015, trends for breast cancer incidence by stage at diagnosis in Utah were relatively flat, with less than one percent annual percent change in in situ, local, or regional stages (Figure 5.4). Incidence of distant stage at diagnosis increased by 1% per year, while incidence of unstaged breast cancer decreased by 0.6% per year. In the past, cases unstaged at diagnosis had poor prognosis, but the incidence of unstaged cancer has decreased as use of advanced imaging technologies that may obtain additional information needed for staging has become more widespread (11). A possible explanation for the Utah trends in distant and unstaged breast cancer diagnoses is that tumors that in past decades would have lacked information to assign a stage, but were actually distant, are now being staged.

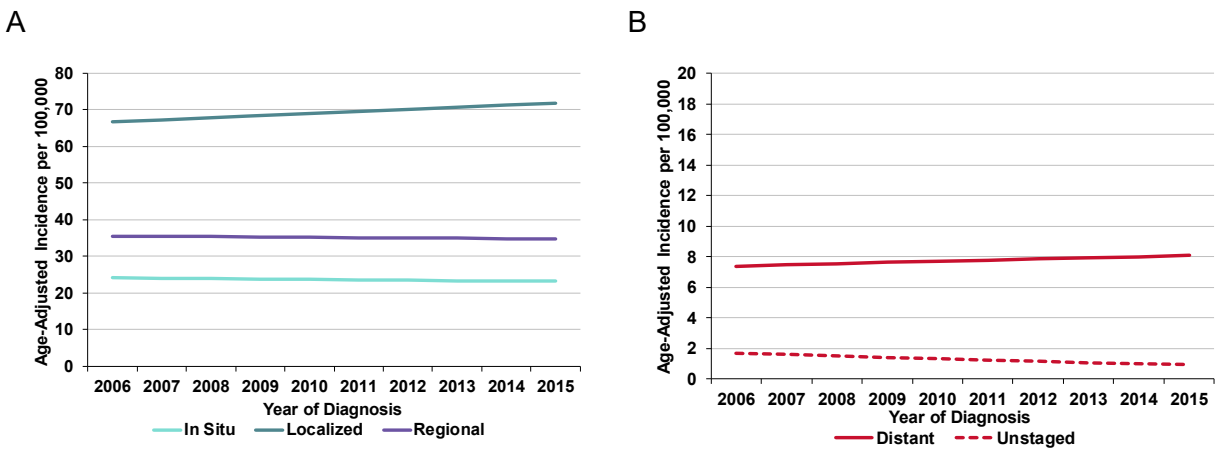


Figure 5.4 Breast cancer incidence trends by stage at diagnosis: A) in situ, local, regional and B) distant or unstaged, Utah 2006 to 2015

The incidence of invasive cervical cancer in Utah during 2006 to 2015 was 5.1 cases per 100,000 women per year and was significantly lower than the U.S. incidence of 7.8 per 100,000 per year in that time period. The incidence of invasive cervical cancer diagnoses was highest among women aged 40 years to 49 years at 11.2 cases per 100,000 (Figure 5.2). This age of peak incidence is younger than the age at which incidence peaks for many cancers. The incidence of cervical cancer has been declining, with annual percent change of -1.2% per year in Utah and a similar trend for the U.S. (Figure 5.5). Utah's cervical cancer ten-year mortality rate of 1.3 deaths per 100,000 per year was significantly lower than the U.S. cervical cancer mortality rate of 2.3 per 100,000 per year from 2006 to 2015.

As also noted in Chapter 3, the incidence of invasive cervical cancer among Utah Hispanic women (8.2 cases per 100,000 per year) was significantly higher than the incidence among non-Hispanic whites (4.7 cases per 100,000) (Figure 5.6). The mortality rate from cervical cancer among Hispanic women of 1.8 deaths per 100,000 per year was higher, but not significantly, than the mortality rate among non-Hispanic white women, 1.2 deaths per 100,000.

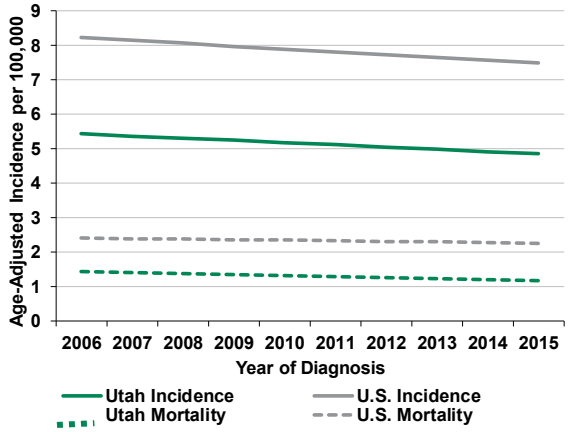


Figure 5.5 Invasive cervical cancer incidence and cervical cancer mortality trends in Utah compared to the U.S., 2006 to 2015

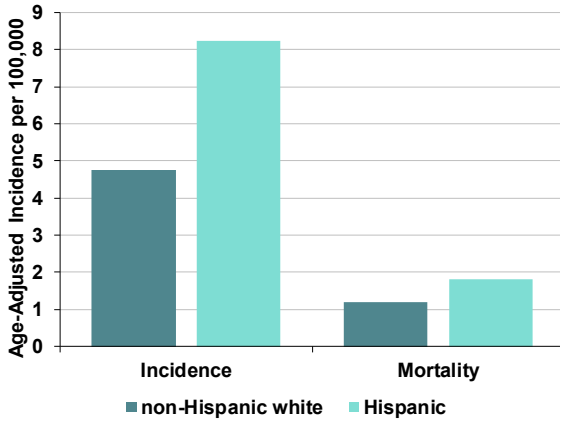


Figure 5.6 Invasive cervical cancer incidence and cervical cancer mortality rates for non-Hispanic white and Hispanic women in Utah, 2006 to 2015

Infection with human papilloma virus (HPV) is a major cause of cervical cancer. HPV infection is linked to the abnormal growth of cervical cells that can lead to cervical cancer. HPV prevalence is documented to be higher in the U.S. Hispanic population compared to non-Hispanic whites (6). Cervical cancer is a target of cancer prevention efforts because screening by Pap smears can detect cervical cancers at pre-cancerous or early stages and HPV vaccination can prevent cervical cancers (12, 13). Trends for in situ cervical cancers in Utah cannot be evaluated because the Utah Cancer Registry, like most state cancer registries, does not collect data on in situ cervical cancer.

6. Prostate cancer

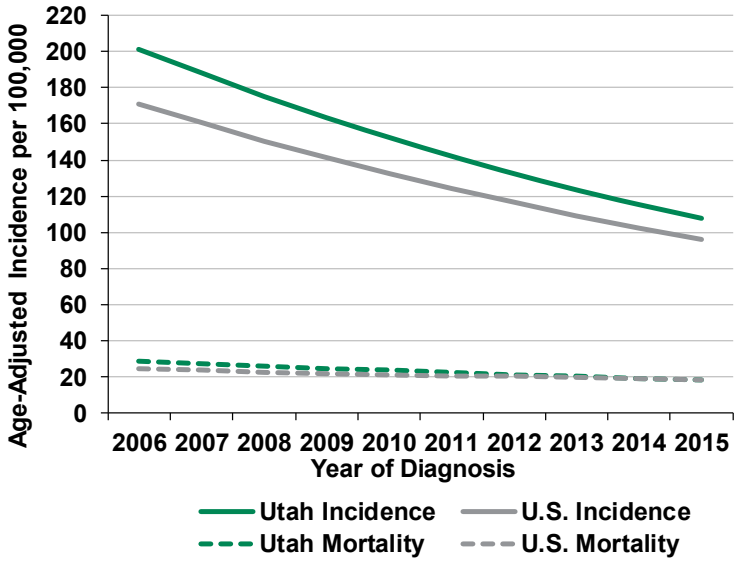


Figure 6.1 Invasive prostate cancer incidence and prostate cancer mortality trends in Utah compared to the U.S., 2006 to 2015

Prostate cancer is the most frequent invasive cancer diagnosis for men in Utah and is the second leading cause of cancer mortality among men. The incidence of invasive prostate cancer diagnoses in Utah men declined steeply from 183.4 per 100,000 in 2006 to 113.7 per 100,000 in 2015, in keeping with national trends. Invasive prostate cancer incidence in Utah was a significant 1.4 times higher than the U.S. incidence over the period 2006 to 2015. Prostate cancer mortality in Utah declined between 2006 and 2015 with an annual percent change of -4.8% per year (Figure 6.1).

When stage at diagnosis is considered, the largest declines in prostate cancer incidence rates in Utah were for those diagnosed at local/regional stage (Figure 6.2), with a steep decline from 2010 to 2013. Distant stage prostate cancer accounted for a relatively small proportion of cases but the incidence of distant prostate cancer diagnoses in Utah increased by 3.4% per year from 2006 to 2015.

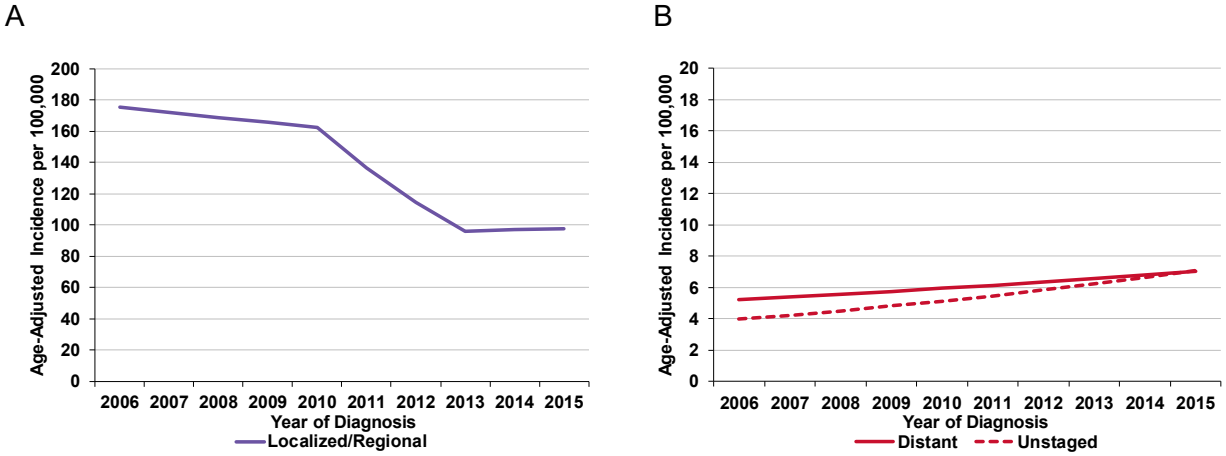


Figure 6.2 Prostate cancer incidence trends by stage at diagnosis: A) localized/regional and B) distant or unstaged stage at diagnosis, Utah 2006 to 2015

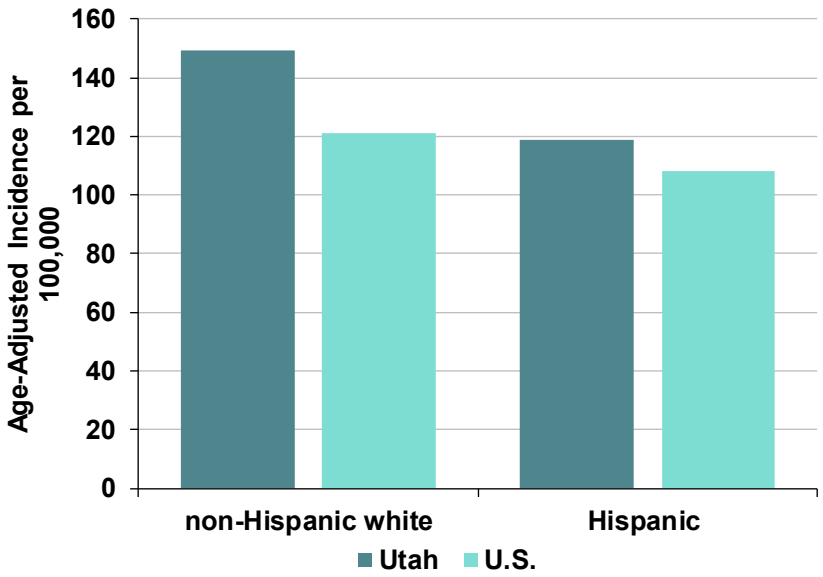


Figure 6.3 Invasive prostate cancer incidence rates by ethnicity in Utah compared to the U.S., 2006 to 2015

The incidence of prostate cancer among non-Hispanic white Utahns was 1.2 times higher than incidence among non-Hispanic whites in the remainder of the U.S. (Figure 6.3). The prostate cancer incidence for Hispanics in Utah did not differ significantly from the incidence among Hispanics in the U.S.

Widespread use of a blood test for prostate specific antigen or PSA screening is believed to be the cause of an increase in prostate cancer incidence observed in the U.S. beginning in the 1990s (14). The reversal of the trend to a decrease in prostate cancer diagnoses in Utah and the U.S. was concurrent with changes in recommendations in 2010 regarding screening using PSA(15). Assessments of new data in 2011 and 2012 led the U.S. Preventive Services Task Force to conclude that evidence did not support a benefit of screening in terms of mortality reduction (16); reduced use of screening related to the changed recommendations is thought to drive the recent trend of decreasing prostate cancer incidence (17-19).

7. Melanoma of the skin

Melanoma of the skin is a cancer of particular concern in Utah because Utah has been described as having the highest melanoma incidence of any state in the U.S. (20, 21). The overall incidence of in situ and invasive melanomas from 2006 to 2015 in Utah has been consistently higher than the incidence in the U.S. (Figure 7.1). Importantly, despite increasing incidence, melanoma mortality in both Utah and the U.S. is trending slightly down, with annual percent change at -0.8 % per year for the period 2006 - 2015 in Utah.

Melanoma diagnoses are more common in non-Hispanic white populations than other racial and ethnic groups in the U.S. (22); this difference is also apparent in Utah (Figure 7.2). The overall incidence rate for invasive melanoma in Utah for 2006 to 2015, not taking into account race and ethnicity, is 70% higher that the remainder of the U.S. (Appendix C, Table C2). When rates are calculated within ethic groups, invasive melanoma incidence among non-Hispanic whites in Utah is 50% higher compared to non-Hispanic whites in the remainder of the U.S. (Appendix C, Table C4). Among Hispanics, the invasive melanoma incidence for Utah exceeds the rest of the U.S. by 80%.

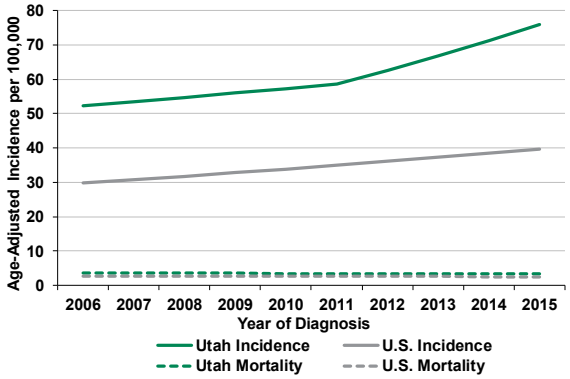


Figure 7.1 Incidence trends for invasive and in situ melanoma and for melanoma mortality, Utah and the U.S., 2006 to 2015

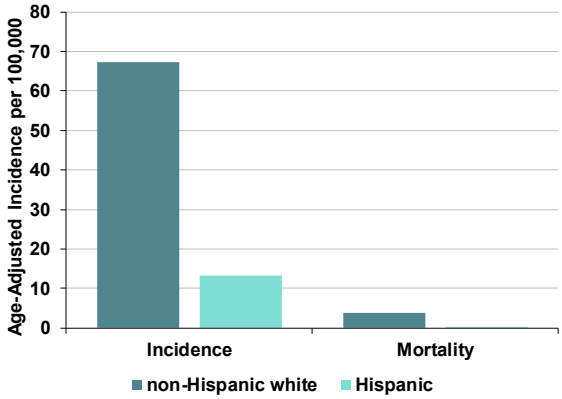


Figure 7.2 Incidence and mortality rate of invasive and in situ melanoma by ethnicity in Utah, 2006 to 2015

Examination of melanoma incidence by stage at diagnosis (Figure 7.3), reveals that the increase in melanoma diagnoses in Utah is limited to in situ and local stage. The incidence of regional, distant, and unstaged cancers over the period 2006 to 2015 was essentially unchanged. The increase in diagnosis of in situ and local stage may represent increasing melanoma awareness and early detection in Utah.

Utah's high elevation above sea level and large number of sunny days may contribute to increased skin cancer incidence by exposing Utah residents to more ultraviolet energy from the sun's rays. Intermittent sun exposure increases risk for melanoma (23). However, the relationship between melanoma and total ultraviolet sun exposure related to residence in different geographic areas is not consistent (24). Thus, sunny climate and elevation may contribute to, but not completely account for, high melanoma incidence in Utah. Reporting practices to central cancer registries should also be considered, as collection of melanoma diagnoses by central cancer registries throughout the U.S. is challenging and may have varying completeness among registries (25-27).

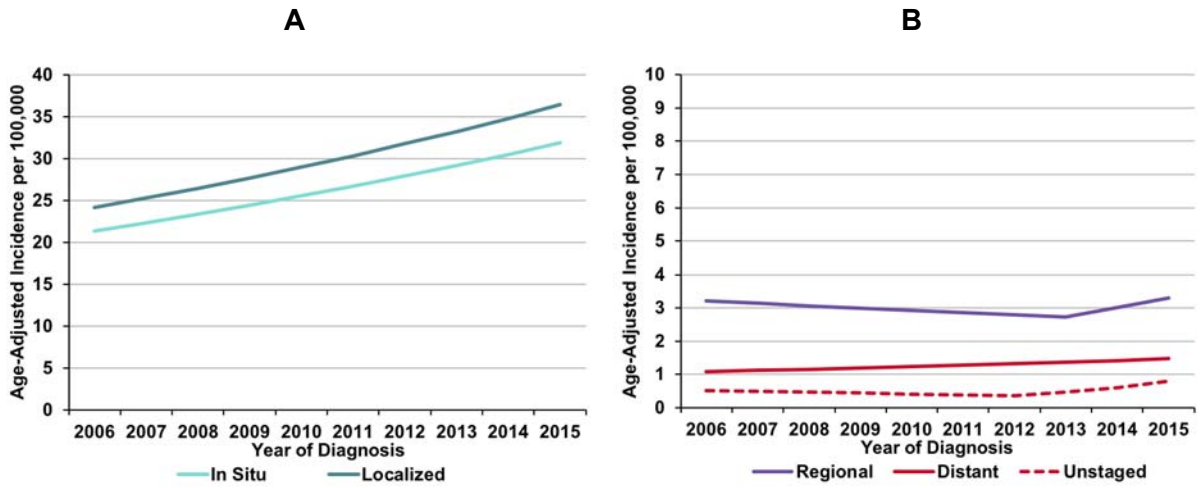


Figure 7.3 Melanoma incidence trends by stage at diagnosis: A) in situ, local and B) regional, distant or unstaged, Utah 2006 to 2015

These data indicate that sun protection and melanoma awareness should continue to be important public health messages for Utah residents. According to the U.S. Surgeon General, reducing sun exposure, wearing sunscreen and sun-protective clothing, seeking shade, and avoiding tanning beds can reduce the risk of developing skin cancer (28).

8. Smoking-related cancers in Utah and the U.S.

In Utah in 2015, 8.9% of adults reported being current smokers (29). In contrast, the proportion was almost double, 16.8%, for adults in the U.S. (29, 30). Smoking is an important cause of lung cancer and has been recognized to increase risk of cancer of many other sites, including oral cavity and oropharynx, kidney and renal pelvis, colon and rectum, liver, pancreas, cervix, urinary bladder, esophagus, stomach, and leukemia (31). Although lung cancer was a leading cause of cancer in the state, Utah's lung cancer mortality rate was 55% lower than the remainder of U.S. (Figure 8.1). Incidence and mortality for cancers of the pancreas, oral cavity and pharynx, urinary bladder, esophagus, and stomach were also significantly lower in Utah than other U.S. regions.

As public health information campaigns and smoking cessation research have had increasing impact over the past 50 years , the proportion of U.S. adults who are current smokers has decreased. Incidence of smoking-related cancers is trending downward nationally (32-34). Because of Utah's low smoking prevalence, the current cancer incidence and mortality rates for smoking-related cancers in Utah likely provides an indication of what can be expected in other U.S. states in the future. Utah's experience predicts that lung cancer death can be expected to continue to be a significant burden throughout the U.S. despite the decline in smoking.

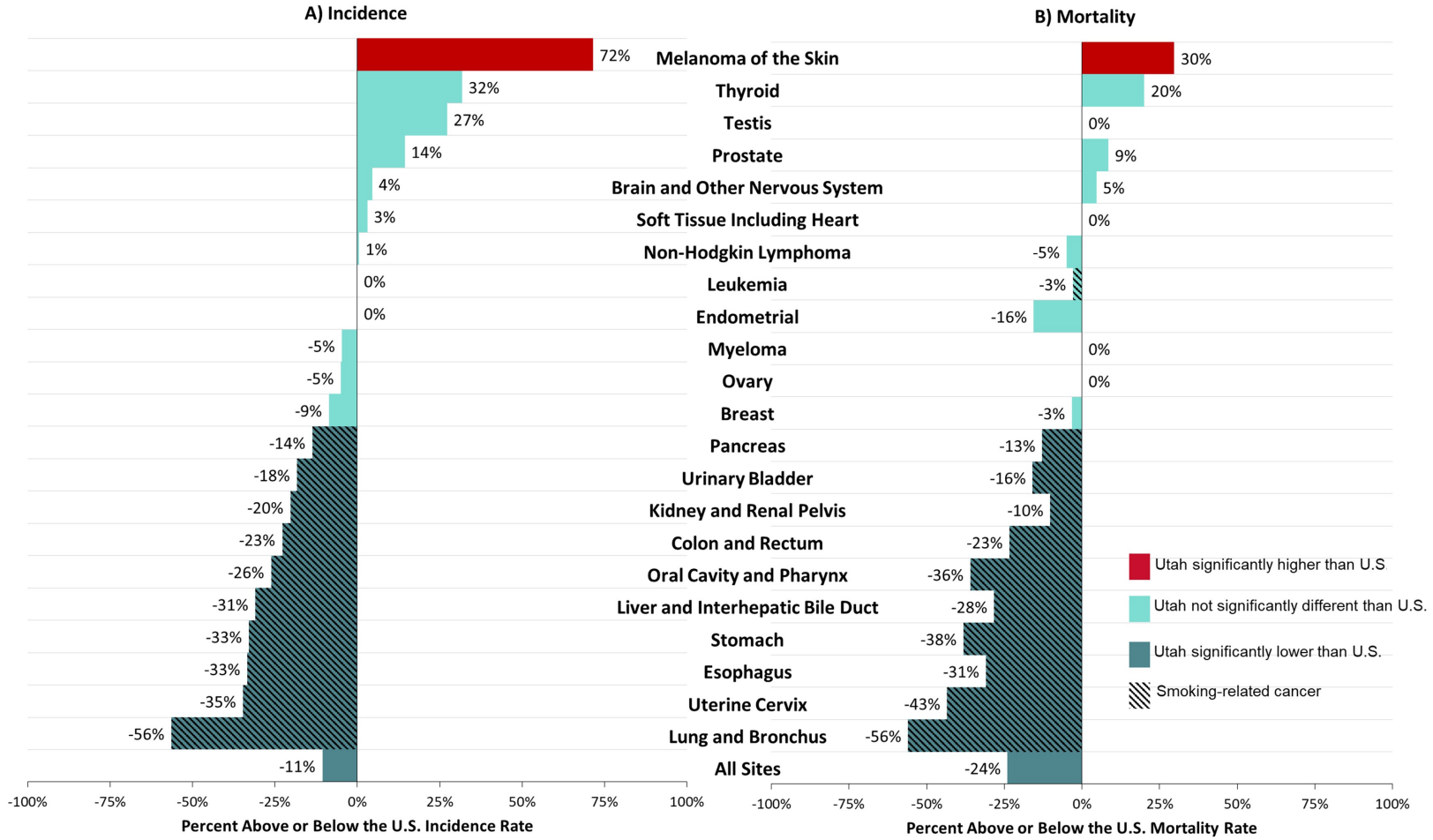


Figure 8.1 Incidence and mortality for common cancers, Utah compared to U.S., 2006 to 2015

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Appendix A. Definitions and Abbreviations

Age-adjusted or age-standardized

Age-adjustment or age-standardization are applied to allow disease rates to be compared between populations with different age distributions. Age-standardized rates and age-adjusted rate differences provided in this report are based on the 2010 U.S. standard population.

Annual percent change or annual average percent change

The annual percent change indicates the percent increase or decrease in cancer incidence or mortality rates per year over a stated time period. It is calculated by fitting a straight line to the natural logarithm of the incidence or mortality rate for each year.

AYA

Adolescents and young adults aged 15 to 39 years.

Benign

A tumor or growth that does not exhibit potential to invade beyond the tissue of origin.

CiNA

Cancer in North America. A research database compiled by the North American Association of Central Cancer Registries that was accessed for this report.

CI

Confidence interval. The range of possible variation due to chance around an estimate. A value falling outside the 95% confidence interval is unlikely to be different due to chance.

Distant stage

Cancer that has spread from the original (primary) site to distant organs or distant lymph nodes. Also known as distant metastasis.

Incident or incidence

Incident disease refers to newly diagnosed disease. Surveillance of cancer is based on incidence, that is to say the number of newly diagnosed or incident cases in a specified year, in a defined population at risk for the disease, in a specified time period.

HPV

Human papilloma virus. A virus implicated in cervical cancer causation and certain other cancers.

In situ

Cancer with malignant appearance of the cells, that is to say potential to invade, but the cancerous growth or tumor is confined to the layer of cells in which it began, and has not spread to surrounding tissue.

Invasive

Cancer that has spread beyond the layer of tissue in which it developed and is growing into surrounding tissues. Includes local, regional, and distant stage cancers.

Local stage

Cancer that is invasive but is confined entirely to the organ in which it began, without evidence of spread.

Mortality

The occurrence of deaths from a disease, in this report deaths from cancer, in a specified time period within a defined population.

Neoplasm

An abnormal growth of cells. Neoplasms may be benign or malignant.

NAACCR

North American Association of Central Cancer Registries.

Primary

Cancer in the part of the body where the cancer first began. Recurrence of the same cancer or spread of the cancer to another body site is not considered a new cancer and is not counted as a primary cancer for cancer surveillance purposes.

Regional stage

Cancer that has spread beyond the original (primary) site to nearby lymph nodes or organs and tissues.

SEER

Surveillance, Epidemiology, and End Results Program. The Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute includes Utah and a number other central cancer registries in the United States..

Stage

A measure of cancer progression, detailing the degree to which the cancer has advanced. Stage at diagnosis is reported to cancer registries. Stage is based on the size of the tumor, whether lymph nodes contain cancer, and whether the cancer has spread from the original site to other parts of the body.

UCR

Utah Cancer Registry. The Utah Cancer Registry is the population-based, central cancer registry for the state of Utah.

UDOH

Utah Department of Health.

Unstaged

Cancer for which there is not enough information to indicate a stage at diagnosis.

Appendix B. Data and Methods

Compiling cancer surveillance data

Reports of all newly diagnosed, that is to say incident, cases of reportable neoplasms diagnosed among Utah residents are collected from health care providers state-wide by the Utah Cancer Registry (UCR) as authorized by the Utah Administrative Code Rule R384-100, the Cancer Reporting Rule (35). Reportable cancer diagnoses are primary, malignant cancers. Both invasive and in situ tumors are reportable, except in situ cervical cancers. Basal cell and squamous cell carcinomas of the skin are excluded from reporting. Benign tumors are reportable only if occurring in the central nervous system. Cancer case reports received from providers are consolidated, edited, and reviewed for quality assurance by the UCR staff. Annually, UCR and 18 other registries that participate in the U.S. National Cancer Institute Surveillance Epidemiology and End Results (SEER) Program submit de-identified data that become the SEER research data set (36). The 18 SEER registries represent approximately 28% of the US population. Central cancer registries from throughout the U.S. report data to the North American Association for Central Cancer Registries (NAACCR) Cancer in North America (CiNA) research data set (37). Both of these data sets were accessed for this report. Because of the time needed to receive reports from providers and to compile, edit, and quality assure cancer case data, there is a delay of over two years between the end of the calendar year of cancer diagnoses and the data becoming available in the SEER and CiNA research data sets. Therefore, this report is based on cancer diagnoses through the end of 2015.

Data accessed for this report

Data describing incident cancers and cancer mortality (deaths) were accessed from the SEER and CiNA datasets (36, 37) using the SEER*Stat statistical application software (38). Cases diagnosed from January 1, 2006 to December 31, 2015 were included. Cancers in this report are grouped following the conventions of the SEER program (39), using primary site and histology codes defined in the International Classification of Diseases for Oncology (ICD-O), Third Edition (40).

Mortality data are provided to SEER by the National Center for Health Statistics (NCHS) of the U.S. Centers for Disease Control and Prevention (CDC). Mortality data presented in this report were for deaths from January 1, 2006 through December 31, 2015.

The population denominator for cancer incidence and mortality is the current population of the geographic area in the same year as the cancer case diagnosis or death. The population counts are provided for SEER and CiNA by the U.S. Census Bureau's Population Estimates Program, in collaboration with the National Center for Health Statistics. These population data are based on the Decennial Census population from 2010, and estimates for other years.

Statistical analysis

Counts of incident cancers and cancer mortality were reported for the most recent complete year available, 2015, for the population of Utah. Incidence rates cases were presented for all reportable invasive cancer diagnoses, unless otherwise noted. Cancer incidence and mortality rates were estimated for Utah and for the remainder of the U.S., excluding Utah. All cancer incidence and mortality rates reported are per 100,000 population and are age-standardized to the 2010 U.S. standard population. Rates were calculated using the SEER*Stat statistical application software (38).

Cancer incidence and mortality rates for specific cancer sites were summarized over the ten-year period 2006 to 2015 for trends and for comparisons e.g. between geographic regions and between ethnic groups. A ten-year period was used in order to have sufficient numbers to generate reliable 95% confidence intervals. We identified rates that were significantly different using the rate ratio option in the SEER*Stat program. We estimated percent difference between rates in two populations as the ratio of the two rates minus one times 100.

Incidence and mortality trends were analyzed using JoinPoint analysis, a statistical method that describes changing trends over successive segments of time by selecting the best fitting point or points where the rate of increase or decrease changes significantly (41). Rates were calculated utilizing SEER*Stat software and analyzed using the JoinPoint Regression Program. The program estimates annual percent change statistic for each segment and estimates statistical significance of the trend. On trend graphs in this report, a change in slope of the line is shown only if a significant change was detected by JoinPoint.

Appendix C. Detailed tables for cancer case counts, incidence, and mortality

Table C1. New cancer cases and deaths from cancer in Utah by cancer site and sex, 2015[a]

Cancer Site		Males and Females			Females			Males		
		New Cases		Deaths	New Cases		Deaths	New Cases		Deaths
		Invasive	In Situ		Invasive	In Situ		Invasive	In Situ	
All Sites	All Sites	10,241	2,029[b]	3,091	5,049	1,162[b]	1,439	5,192	867[b]	1,652
Bones and Joints	Bones and Joints	39	0	12	16	0	~	23	0	~
Brain and Other Nervous System	Brain and Other Nervous System	193	506[b]	124	72	355[b]	47	121	151[b]	77
Breast	Breast	1,512	282	268	1,505	282	268	7	0	~
Digestive System	Esophagus	67	0	60	10	0	~	57	0	51
	Stomach	116	^	40	44	^	12	72	0	28
	Small Intestine	76	0	13	37	0	~	39	0	~
	Colorectal	712	27	277	355	12	137	357	15	140
	Anus, Anal Canal and Anorectum	48	23	~	39	9	~	9	14	~
	Liver	150	0	85	42	0	20	108	0	65
	Intrahepatic Bile Duct	34	0	30	19	0	16	15	0	14
	Gallbladder	20	0	16	15	0	~	5	0	~
	Other Biliary	26	0	~	12	0	~	14	0	~
	Pancreas	271	^	228	141	0	107	130	^	121
	Retroperitoneum	16	0	~	10	0	~	6	0	~
	Peritoneum, Omentum and Mesentery	12	0	~	^	0	~	^	0	~
	Other Digestive Organs	23	0	12	5	0	~	18	0	~
Endocrine System	Thyroid	527	0	12	399	0	~	128	0	~
	Other Endocrine Including Thymus	10	184	~	5	99	~	5	85	~
Eye and Orbit	Eye and Orbit	23	^	~	10	0	~	13	^	~
Female Genital System	Cervical	64	0	13	64	0	13	0	0	0
	Uterine	373	^	57	373	^	57	0	0	0
	Ovary	158	^	105	158	^	105	0	0	0
	Vagina	6	^	~	6	^	~	0	0	0
	Vulva	25	33	~	25	33	~	0	0	0
	Other Female Genital Organs	17	^	~	17	^	~	0	0	0
Leukemia	Leukemia	323	0	177	136	^	62	187	^	115
Lymphoma	Hodgkin Lymphoma	67	0	~	34	0	~	33	0	~
	Non-Hodgkin Lymphoma	474	0	143	207	0	63	267	0	80
Male Genital System	Prostate	1,441	0	178	0	0	0	1,441	0	178
	Testis	107	0	~	0	0	0	107	0	~
	Penis	11	5	~	0	0	0	11	5	~
	Other Male Genital Organs	~	0	~	0	0	0	6	0	~
Miscellaneous	Miscellaneous	139	0	269	70	48	116	69	0	153
Myeloma	Myeloma	164	0	84	78	0	46	86	0	38
Oral Cavity and Pharynx	Oral Cavity and Pharynx	289	31	48	90	11	11	199	20	37
Respiratory System	Nose, Nasal Cavity and Middle Ear	23	0	~	10	0	~	13	0	~
	Larynx	31	~	12	^	^	~	28	^	10
	Lung and Bronchus	638	^	471	297	^	205	341	^	266
	Pleura	^	0	~	0	0	~	^	0	~
	Trachea, Mediastinum and Other Respiratory	^	0	~	0	0	~	^	0	~
Skin excluding Basal and Squamous	Skin Melanoma	1,055	899	73	464	343	20	591	556	53
	Other Non-Epithelial Skin	59	0	19	19	0	~	40	0	16
Soft Tissue Including Heart	Soft Tissue Including Heart	86	0	39	32	0	13	54	0	26
Urinary System	Urinary Bladder	408	0	73	80	0	14	328	0	59
	Kidney and Renal Pelvis	351	^	96	130	^	34	221	^	62
	Ureter	11	^	~	^	^	~	^	^	~
	Other Urinary Organs	~	^	~	^	0	~	^	^	~

[a] Data Source: SEER Research Data (36)
[b] In situ column includes tumors with benign behavior for brain and other nervous system
^ Statistic suppressed due to small cell size (<5 cases) or allows inference of a small cell
~ Statistic suppressed due to small cell size (<10 deaths) or allows inference of a small cell

Table C2. Invasive cancer incidence and mortality rates by cancer site in Utah and the U.S., 2006-2015[a]

Cancer Site		Incidence					Mortality				
		Utah		U.S.[b]		Percent	Utah		U.S.[b]		Percent
		Rate[c]	95% CI[d]	Rate[c]	95% CI[d]	Diff.[e]	Rate[c]	95% CI[d]	Rate[c]	95% CI[d]	Diff.[e]
All Sites	All Sites	407.5	(404.8-410.1)	455.6	(455.4-455.8)	-10.6	129.1	(127.6-130.6)	169.9	(169.8-170.0)	-24.0
Bones and Joints	Bones and Joints	1.2	(1.1-1.4)	1.0	(0.9-1.0)	27.8	0.4	(0.3-0.5)	0.4	(0.4-0.4)	0.0
Brain And Central Nervous System	Brain and Central Nervous System	7.0	(6.7-7.3)	6.7	(6.6-6.7)	4.9	4.5	(4.3-4.8)	4.3	(4.3-4.3)	4.7
Breast	Breast, Female	113.3	(111.3-115.2)	124.0	(123.9-124.2)	-8.7	21.0	(20.2-21.9)	21.7	(21.7-21.8)	-3.2
Digestive System	Esophagus	3.2	(3.0-3.4)	4.8	(4.7-4.8)	-32.6	2.9	(2.7-3.2)	4.2	(4.1-4.2)	-31.0
	Stomach	4.5	(4.2-4.8)	6.7	(6.7-6.7)	-33.5	2.1	(1.9-2.3)	3.4	(3.3-3.4)	-38.2
	Small Intestine	2.6	(2.4-2.8)	2.3	(2.3-2.3)	13.6	0.3	(0.2-0.4)	0.4	(0.4-0.4)	-25.0
	Colorectal	32.6	(31.9-33.4)	42.2	(42.1-42.3)	-22.7	11.8	(11.3-12.2)	15.4	(15.3-15.4)	-23.4
	Anus, Anal Canal and Anorectum	1.3	(1.2-1.5)	1.8	(1.8-1.8)	-28.1	0.2	(0.1-0.2)	0.2	(0.2-0.2)	0.0
	Liver	4.7	(4.4-4.9)	6.8	(6.7-6.8)	-31.0	3.1	(2.9-3.3)	4.6	(4.6-4.6)	-32.6
	Intrahepatic Bile Duct	0.8	(0.7-1.0)	0.9	(0.9-0.9)	-4.6	1.2	(1.0-1.3)	1.4	(1.4-1.4)	-14.3
	Gallbladder	0.9	(0.8-1.1)	1.1	(1.1-1.1)	-17.7	0.4	(0.3-0.5)	0.6	(0.6-0.6)	-33.3
	Other Biliary	1.2	(1.1-1.4)	1.7	(1.7-1.8)	-28.6	0.4	(0.3-0.5)	0.4	(0.4-0.4)	0.0
	Pancreas	10.8	(10.4-11.2)	12.5	(12.4-12.5)	-13.3	9.5	(9.1-9.9)	10.9	(10.9-11.0)	-12.8
	Retroperitoneum	0.5	(0.4-0.6)	0.4	(0.4-0.4)	33.9	~		0.1	(0.1-0.1)	~
	Peritoneum, Omentum and Mesentery	0.6	(0.5-0.7)	0.6	(0.6-0.6)	0.4	0.2	(0.2-0.3)	0.3	(0.2-0.3)	-33.3
	Other Digestive Organs	0.5	(0.5-0.7)	0.5	(0.5-0.5)	12.6	0.3	(0.2-0.4)	0.3	(0.3-0.3)	0.0
Endocrine System	Thyroid	17.8	(17.2-18.3)	13.5	(13.4-13.5)	31.8	0.6	(0.5-0.7)	0.5	(0.5-0.5)	20.0
	Other Endocrine Including Thymus	0.6	(0.5-0.7)	0.8	(0.7-0.8)	-19.4	0.3	(0.2-0.3)	0.3	(0.3-0.3)	0.0
Eye and Orbit	Eye and Orbit	1.1	(1.0-1.3)	0.9	(0.8-0.9)	30.7	0.1	(0.1-0.2)	0.1	(0.1-0.1)	0.0
Female Genital System	Cervical	5.1	(4.7-5.6)	7.8	(7.8-7.9)	-34.6	1.3	(1.1-1.5)	2.3	(2.3-2.4)	-43.5
	Uterine	25.5	(24.6-26.5)	25.5	(25.5-25.6)	0.0	3.8	(3.4-4.1)	4.5	(4.4-4.5)	-15.6
	Ovary	11.3	(10.7-11.9)	11.9	(11.9-12)	-5.0	7.6	(7.1-8.2)	7.6	(7.6-7.6)	0.0
	Vagina	0.5	(0.4-0.7)	0.7	(0.7-0.7)	-28.6	0.1	(0.0-0.2)	0.2	(0.2-0.2)	-50.0
	Vulva	1.9	(1.7-2.2)	2.6	(2.5-2.6)	-26.9	0.2	(0.2-0.4)	0.5	(0.5-0.5)	-60.0
	Other Female Genital Organs	0.9	(0.8-1.1)	7.8	(7.8-7.9)	-10.0	0.2	(0.1-0.3)	0.3	(0.3-0.3)	-33.3
Leukemia	Leukemia	13.6	(13.2-14.1)	13.6	(13.5-13.6)	0.5	6.7	(6.4-7.1)	6.9	(6.8-6.9)	-2.9
Lymphoma	Hodgkin Lymphoma	2.5	(2.3-2.7)	2.7	(2.7-2.8)	-7.9	0.3	(0.2-0.4)	0.4	(0.4-0.4)	-25.0
	Non-Hodgkin Lymphoma	19.4	(18.8-20.0)	19.3	(19.2-19.3)	0.5	5.8	(5.5-6.1)	6.1	(6.0-6.1)	-4.9
Male Genital System	Prostate	146.6	(144.3-149)	128.2	(128.0-128.4)	14.4	22.9	(21.9-23.9)	21.1	(21.1-21.2)	8.5
	Testis	7.0	(6.5-7.4)	5.5	(5.5-5.6)	27.3	0.2	(0.1-0.3)	0.2	(0.2-0.3)	0.0
	Penis	0.7	(0.6-0.9)	0.9	(0.9-0.9)	-22.2	~		0.2	(0.2-0.2)	~
	Other Male Genital Organs	0.3	(0.2-0.4)	0.2	(0.2-0.2)	50.0	~		0	(0.0-0.0)	~
Miscellaneous	Miscellaneous	6.4	(6.1-6.7)	9.4	(9.3-9.4)	-31.9	10.8	(10.3-11.2)	12.5	(12.5-12.6)	-13.6
Myeloma	Myeloma	6.1	(5.8-6.5)	6.4	(6.4-6.5)	-4.7	3.4	(3.2-3.7)	3.4	(3.3-3.4)	0.0
Oral Cavity and Pharynx	Oral Cavity and Pharynx	8.5	(8.1-8.9)	11.5	(11.4-11.5)	-26.0	1.6	(1.4-1.8)	2.5	(2.5-2.5)	-36.0
Respiratory System	Nose, Nasal Cavity and Middle Ear	0.6	(0.5-0.8)	0.7	(0.7-0.7)	-5.8	0.1	(0.1-0.2)	0.1	(0.1-0.1)	0.0
	Larynx	1.7	(1.5-1.9)	3.6	(3.6-3.6)	-53.1	0.4	(0.3-0.5)	1.1	(1.1-1.1)	-63.6
	Lung and Bronchus	27.9	(27.2-28.7)	63.9	(63.8-64.0)	-56.2	20.4	(19.8-21.1)	46.4	(46.4-46.5)	-56.0
	Pleura	^		0.0	(0.0-0.0)	^	^		0.1	(0.1-0.1)	~
	Trachea, Mediastinum and Other Respir.	0.2	(0.1-0.2)	0.2	(0.2-0.2)	-19.5	0.1	(0.0-0.1)	0.1	(0.1-0.1)	0.0
Skin excluding Basal and Squamous	Skin Melanoma	35.0	(34.2-35.8)	20.4	(20.3-20.4)	71.9	3.5	(3.2-3.7)	2.7	(2.6-2.7)	29.6
	Other Non-Epithelial Skin	2.5	(2.3-2.7)	1.7	(1.6-1.7)	51.8	0.9	(0.7-1.0)	0.9	(0.9-0.9)	0.0
Soft Tissue Including Heart	Soft Tissue Including Heart	3.4	(3.2-3.7)	3.3	(3.3-3.3)	4.0	1.3	(1.2-1.5)	1.3	(1.3-1.3)	0.0
Urinary System	Urinary Bladder	17.0	(16.4-17.5)	20.8	(20.8-20.9)	-18.7	3.7	(3.4-3.9)	4.4	(4.4-4.4)	-15.9
	Kidney and Renal Pelvis	13.0	(12.6-13.5)	16.3	(16.2-16.3)	-19.9	3.5	(3.2-3.7)	3.9	(3.9-3.9)	-10.3
	Ureter	0.4	(0.3-0.5)	0.6	(0.6-0.6)	-30.5	0.1	(0.1-0.2)	0.1	(0.1-0.1)	0.0
	Other Urinary Organs	0.3	(0.2-0.3)	0.3	(0.3-0.3)	-15.2	0.1	(0.0-0.1)	0.1	(0.1-0.1)	0.0

[a] Data Source: SEER Research Data (36) and Cancer in North America (37)
[b] Remainder of U.S. after excluding Utah
[c] Rate per 100,000 population per year, age-standardized
[d] CI: confidence interval
[e] Percent difference comparing Utah to remainder of U.S. Caluclated as rate ratio minus one times 100.
^ Statistic suppressed due to small cell size (<5 cases) or allows inference of a small cell
~ Statistic suppressed due to small cell size (<10 deaths) or allows inference of a small cell

Table C3. Invasive cancer incidence rates in adolescents and young adults (AYA) in Utah and the U.S., 2006-2015[a]

Cancer Site		Incidence per 100,000 Population				
		Utah		U.S.[b]		Percent
		Rate[c]	95% CI[d]	Rate[c]	95% CI[d]	Difference[e]
All Sites	All Sites	79.0	(77.3-80.8)	71.9	(71.7-72.0)	9.9
Bones and Joints	Bones and Joints	1.2	(1.0-1.4)	0.9	(0.8-0.9)	34.9
Brain And Central Nervous System	Brain and Central Nervous System	3.5	(3.1-3.9)	3.1	(3.0-3.1)	14.2
Breast	Breast, Female	18.0	(16.8-19.3)	21.6	(21.5-21.7)	-16.5
Digestive System	Esophagus	0.2	(0.1-0.3)	0.1	(0.1-0.2)	13.4
	Stomach	0.5	(0.4-0.7)	0.7	(0.7-0.7)	-27.9
	Small Intestine	0.3	(0.2-0.5)	0.3	(0.3-0.3)	18.0
	Colorectal	4.2	(3.8-4.7)	4.0	(4.0-4.1)	5.1
	Anus, Anal Canal and Anorectum	0.1	(0.1-0.2)	0.2	(0.2-0.2)	-30.6
	Liver	0.3	(0.2-0.5)	0.3	(0.3-0.3)	-3.1
	Intrahepatic Bile Duct	0.1	(0.0-0.2)	0.1	(0.1-0.1)	31.0
	Gallbladder	0.1	(0.0-0.1)	0.0	(0.0-0.1)	46.1
	Other Biliary	^		0.1	(0.1-0.1)	^
	Pancreas	0.3	(0.2-0.5)	0.5	(0.5-0.5)	-36.1
	Retroperitoneum	0.1	(0.0-0.2)	0.1	(0.1-0.1)	-2.0
	Peritoneum, Omentum and Mesentery	^		0.0	(0.0-0.0)	^
	Other Digestive Organs	^		0.0	(0.0-0.0)	^
Endocrine System	Thyroid	15.6	(14.9-16.4)	10.8	(10.7-10.8)	45.2
	Other Endocrine Including Thymus	0.3	(0.2-0.4)	0.3	(0.3-0.3)	-7.9
Eye and Orbit	Eye and Orbit	0.2	(0.2-0.4)	0.2	(0.2-0.2)	40.3
Female Genital System	Cervical	3.7	(3.2-4.3)	6.5	(6.5-6.6)	-43.1
	Uterine	4.2	(3.6-4.8)	3.5	(3.4-3.5)	20.0
	Ovary	2.6	(2.1-3.1)	2.8	(2.8-2.9)	-7.1
	Vagina	^		0.1	(0.1-0.1)	^
	Vulva	0.2	(0.1-0.4)	0.4	(0.4-0.4)	-50.0
	Other Female Genital Organs	0.3	(0.1-0.4)	0.3	(0.2-0.3)	0.0
Leukemia	Leukemia	3.1	(2.8-3.4)	3.3	(3.3-3.3)	-6.3
Lymphoma	Hodgkin Lymphoma	3.6	(3.2-3.9)	3.7	(3.7-3.8)	-4.6
	Non-Hodgkin Lymphoma	3.7	(3.3-4.1)	3.9	(3.9-4.0)	-6.8
Male Genital System	Prostate	0.3	(0.2-0.5)	0.3	(0.2-0.3)	0.0
	Testis	12.6	(11.7-13.6)	10.4	(10.4-10.5)	21.2
	Penis	^		0.1	(0.1-0.1)	^
	Other Male Genital Organs	^		0.0	(0.0-0.0)	^
Miscellaneous	Miscellaneous	0.4	(0.3-0.5)	0.6	(0.5-0.6)	-28.9
Myeloma	Myeloma	0.2	(0.1-0.3)	0.3	(0.3-0.3)	-25.2
Oral Cavity and Pharynx	Oral Cavity and Pharynx	1.2	(1.0-1.4)	1.5	(1.4-1.5)	-18.9
Respiratory System	Nose, Nasal Cavity and Middle Ear	0.2	(0.1-0.3)	0.1	(0.1-0.2)	1.9
	Larynx	0.1	(0.1-0.2)	0.1	(0.1-0.1)	-4.5
	Lung and Bronchus	0.7	(0.5-0.8)	1.2	(1.1-1.2)	-44.0
	Pleura	^		0.0	(0.0-0.0)	^
	Trachea, Mediastinum and Other Respiratory	0.2	(0.1-0.3)	0.1	(0.1-0.1)	14.8
Skin excluding Basal and Squamous	Skin Melanoma	12.7	(12.0-13.4)	6.8	(6.7-6.8)	87.3
	Other Non-Epithelial Skin	0.7	(0.6-0.9)	0.5	(0.4-0.5)	64.7
Soft Tissue Including Heart	Soft Tissue Including Heart	1.8	(1.5-2.1)	1.6	(1.5-1.6)	13.9
Urinary System	Urinary Bladder	0.7	(0.5-0.8)	0.7	(0.6-0.7)	0.1
	Kidney and Renal Pelvis	1.7	(1.5-2.0)	2.3	(2.2-2.3)	-23.5
	Ureter	^		0.0	(0.0-0.0)	^
	Other Urinary Organs	^		0.0	(0.0-0.0)	^

[a] Data Source: SEER Research Data (36) and Cancer in North America (37)
[b] Remainder of U.S. after excluding Utah
[c] Rate per 100,000 population per year, age-standardized
[d] CI: confidence interval
[e] Percent difference comparing Utah to remainder of U.S. Caluclated as rate ratio minus one times 100.
^ Statistic suppressed due to small cell size (<5 cases) or allows inference of a small cell

Table C4. Invasive cancer incidence rates by ethnicity and cancer site in Utah and the U.S., 2006-2015[a]

Cancer Site		Utah				U.S.			
		Hispanic		Non-Hispanic white		Hispanic		Non-Hispanic white	
		Rate[b]	95% CI[c]	Rate[b]	95% CI[c]	Rate[b]	95% CI[c]	Rate[b]	95% CI[c]
All Sites	All Sites	362.8	(351.9-373.9)	414.4	(411.6-417.3)	352.8	(352.1-353.5)	470.1	(469.8-470.4)
Bones and Joints	Bones and Joints	0.8	(0.5-1.3)	1.3	(1.1-1.5)	0.9	(0.9-0.9)	1	(1.0-1.0)
Brain And Other Nervous System	Brain and Other Nervous System	5.5	(4.4-6.7)	7.4	(7.1-7.8)	5.2	(5.1-5.3)	7.5	(7.5-7.6)
Breast	Breast, Female	96.7	(89.6-104.1)	115.7	(113.6-117.8)	92.7	(92.2-93.1)	129.3	(129.1-129.5)
Digestive System	Esophagus	2	(1.3-3.0)	3.3	(3.1-3.6)	2.9	(2.8-3.0)	5.1	(5.1-5.1)
	Stomach	10.2	(8.3-12.3)	3.8	(3.6-4.1)	10.2	(10.0-10.3)	5.5	(5.5-5.5)
	Small Intestine	2.3	(1.4-3.4)	2.7	(2.5-2.9)	1.7	(1.7-1.8)	2.2	(2.2-2.2)
	Colorectal	37.6	(34.1-41.4)	32.2	(31.5-33.1)	36.7	(36.5-36.9)	41.8	(41.8-41.9)
	Anus, Anal Canal and Anorectum	1	(0.5-1.8)	1.4	(1.2-1.5)	1.3	(1.3-1.4)	2	(1.9-2.0)
	Liver	11.7	(9.8-13.8)	3.9	(3.6-4.1)	11.9	(11.7-12.0)	5.4	(5.4-5.4)
	Intrahepatic Bile Duct	1	(0.5-1.9)	0.8	(0.7-0.9)	1.1	(1.0-1.1)	0.9	(0.8-0.9)
	Gallbladder	1.8	(1.1-2.8)	0.8	(0.7-1.0)	2	(2.0-2.1)	0.9	(0.9-1.0)
	Other Biliary	2.1	(1.3-3.3)	1.2	(1.0-1.4)	2.3	(2.3-2.4)	1.7	(1.6-1.7)
	Pancreas	13.6	(11.4-16.1)	10.7	(10.2-11.1)	11.1	(11.0-11.2)	12.3	(12.3-12.4)
	Retroperitoneum	0.6	(0.3-1.2)	0.5	(0.4-0.6)	0.4	(0.4-0.4)	0.4	(0.4-0.4)
	Peritoneum, Omentum and Mesentery	0.3	(0.1-0.7)	0.6	(0.5-0.7)	0.4	(0.4-0.5)	0.6	(0.6-0.6)
	Other Digestive Organs	0.6	(0.2-1.2)	0.5	(0.4-0.7)	0.6	(0.5-0.6)	0.5	(0.4-0.5)
Endocrine System	Thyroid	17.2	(15.4-19.2)	18.3	(17.7-18.9)	12.3	(12.1-12.4)	14.5	(14.5-14.6)
	Other Endocrine Including Thymus	1	(0.6-1.6)	0.6	(0.5-0.7)	0.6	(0.6-0.6)	0.7	(0.7-0.8)
Eye and Orbit	Eye and Orbit	0.6	(0.3-1.2)	1.2	(1.1-1.4)	0.5	(0.5-0.6)	1	(1.0-1.0)
Female Genital System	Cervical	8.2	(6.6-10.2)	4.7	(4.3-5.2)	10.3	(10.1-10.4)	7.2	(7.2-7.3)
	Uterine	22.1	(19.0-25.7)	25.5	(24.5-26.4)	21.6	(21.4-21.9)	26.3	(26.2-26.4)
	Ovary	9.7	(7.6-12.2)	11.5	(10.9-12.2)	10.5	(10.4-10.7)	12.5	(12.4-12.6)
	Vagina	1	(0.3-2.1)	0.5	(0.4-0.7)	0.7	(0.6-0.7)	0.7	(0.6-0.7)
	Vulva	^		2.1	(1.8-2.3)	1.7	(1.6-1.7)	2.9	(2.8-2.9)
	Other Female Genital Organs	1.2	(0.6-2.3)	0.9	(0.7-1.1)	0.9	(0.8-0.9)	1.1	(1.1-1.1)
Leukemia	Leukemia	8.1	(6.7-9.7)	14.1	(13.6-14.7)	10.8	(10.7-10.9)	14.2	(14.2-14.3)
Lymphoma	Hodgkin Lymphoma	3.1	(2.3-4.1)	2.6	(2.4-2.8)	2.4	(2.4-2.5)	3	(3.0-3.0)
	Non-Hodgkin Lymphoma	18.2	(15.8-20.8)	19.6	(19.0-20.2)	17.3	(17.2-17.5)	20.2	(20.1-20.2)
Male Genital System	Prostate	118.8	(109.1-129.0)	149.4	(147.0-151.9)	108.2	(107.6-108.8)	121.0	(120.8-121.2)
	Testis	5.3	(4.3-6.5)	7.5	(7.0-8.1)	4.6	(4.5-4.7)	6.8	(6.7-6.9)
	Penis	1.9	(0.8-3.4)	0.7	(0.5-0.8)	1.4	(1.3-1.4)	0.8	(0.8-0.8)
	Other Male Genital Organs	^		0.3	(0.2-0.4)	0.2	(0.2-0.2)	0.2	(0.2-0.2)
Miscellaneous	Miscellaneous	7.8	(6.2-9.8)	6.2	(5.9-6.6)	8.2	(8.1-8.3)	9.5	(9.4-9.5)
Myeloma	Myeloma	6.6	(5.1-8.3)	6	(5.7-6.4)	6.3	(6.2-6.4)	5.7	(5.7-5.7)
Oral Cavity and Pharynx	Oral Cavity and Pharynx	5.6	(4.4-7.1)	8.7	(8.3-9.1)	7.1	(7.0-7.2)	12.4	(12.4-12.5)
Respiratory System	Nose, Nasal Cavity and Middle Ear	0.6	(0.2-1.2)	0.6	(0.5-0.8)	0.6	(0.6-0.6)	0.7	(0.7-0.7)
	Larynx	1.2	(0.7-1.8)	1.7	(1.6-1.9)	2.6	(2.6-2.7)	3.7	(3.7-3.8)
	Lung and Bronchus	30.6	(27.2-34.3)	27.7	(26.9-28.4)	32.6	(32.4-32.8)	68	(67.9-68.1)
	Pleura	^		^		^		^	
	Trachea, Mediastinum and Other Respiratory	^		0.2	(0.1-0.2)	0.2	(0.2-0.2)	0.2	(0.2-0.2)
Skin excluding Basal and Squamous	Skin Melanoma	7.9	(6.4-9.6)	38.7	(37.8-39.6)	4.4	(4.3-4.5)	25.9	(25.8-26.0)
	Other Non-Epithelial Skin	1.2	(0.6-2.0)	2.7	(2.4-2.9)	0.9	(0.9-1.0)	1.8	(1.8-1.8)
Soft Tissue Including Heart	Soft Tissue Including Heart	2.6	(1.8-3.5)	3.5	(3.3-3.8)	3	(2.9-3.0)	3.3	(3.3-3.4)
Urinary System	Urinary Bladder	9.6	(7.7-11.7)	17.6	(17.0-18.2)	11.4	(11.2-11.5)	23.3	(23.2-23.4)
	Kidney and Renal Pelvis	16.9	(14.7-19.4)	12.8	(12.4-13.4)	16	(15.9-16.2)	16.5	(16.4-16.5)
	Ureter	^		0.4	(0.3-0.5)	0.3	(0.3-0.4)	0.6	(0.6-0.7)
	Other Urinary Organs	^		0.3	(0.2-0.3)	0.2	(0.2-0.2)	0.3	(0.3-0.3)

[a] Data Source: SEER Research Data (36) and Cancer in North America (37)
[b] Rate per 100,000 population per year, age-standardized
[c] CI: confidence interval
^ Statistic suppressed due to small cell size (<5 cases) or allows inference of a small cell

Table C5. Cancer mortality rates by ethnicity and cancer site in Utah and the U.S., 2006-2015[a]

Cancer Site		Utah				U.S.			
		Hispanic		Non-Hispanic white		Hispanic		Non-Hispanic white	
		Rate[b]	95% CI[c]	Rate[b]	95% CI[c]	Rate[b]	95% CI[c]	Rate[b]	95% CI[c]
All Sites	All Sites	111.4	(104.8-118.3)	130.4	(128.8-132.1)	118.0	(117.5-118.4)	173.8	(173.7-174.0)
Bones and Joints	Bones and Joints	^	(^-^)	0.4	(0.3-0.5)	0.4	(0.4-0.4)	0.5	(0.4-0.5)
Brain And Other Nervous System	Brain and Other Nervous System	2.5	(1.7-3.6)	4.8	(4.5-5.2)	2.9	(2.8-2.9)	4.9	(4.9-4.9)
Breast	Breast, Female	12.6	(9.9-15.6)	21.8	(20.9-22.7)	14.5	(14.3-14.7)	21.7	(21.6-21.8)
Digestive System	Esophagus	1.5	(0.9-2.4)	3.1	(2.9-3.3)	2.2	(2.2-2.3)	4.5	(4.5-4.5)
	Stomach	5.8	(4.3-7.5)	1.8	(1.6-2.0)	5.4	(5.3-5.5)	2.6	(2.6-2.6)
	Small Intestine	^	(^-^)	0.3	(0.2-0.4)	0.3	(0.2-0.3)	0.4	(0.3-0.4)
	Colorectal	12	(9.9-14.4)	11.6	(11.2-12.1)	12.0	(11.9-12.1)	15.2	(15.1-15.2)
	Anus, Anal Canal and Anorectum	^	(^-^)	0.2	(0.1-0.2)	0.1	(0.1-0.2)	0.3	(0.2-0.3)
	Liver	6.6	(5.1-8.4)	2.7	(2.4-2.9)	7.3	(7.2-7.4)	3.9	(3.8-3.9)
	Intrahepatic Bile Duct	1	(0.5-1.8)	1.2	(1.0-1.3)	1.6	(1.6-1.7)	1.4	(1.4-1.4)
	Gallbladder	^	(^-^)	0.4	(0.3-0.5)	1.0	(0.9-1.0)	0.5	(0.5-0.5)
	Other Biliary	^	(^-^)	0.4	(0.3-0.5)	0.4	(0.4-0.5)	0.4	(0.4-0.4)
	Pancreas	10.1	(8.1-12.3)	9.5	(9.1-9.9)	8.6	(8.4-8.7)	11	(10.9-11.0)
	Retroperitoneum	^		^		0.1	(0.1-0.1)	0.1	(0.1-0.1)
	Peritoneum, Omentum and Mesentery	^		0.2	(0.2-0.3)	0.2	(0.2-0.2)	0.3	(0.3-0.3)
	Other Digestive Organs	^		0.3	(0.2-0.4)	0.3	(0.3-0.3)	0.3	(0.3-0.3)
Endocrine System	Thyroid	^		0.6	(0.5-0.7)	0.6	(0.6-0.6)	0.5	(0.5-0.5)
	Other Endocrine Including Thymus	^		0.3	(0.2-0.3)	0.2	(0.2-0.2)	0.3	(0.3-0.3)
Eye and Orbit	Eye and Orbit	^		0.1	(0.1-0.2)	0.0	(0.0-0.0)	0.1	(0.1-0.1)
Female Genital System	Cervical	1.8	(0.9-3.1)	1.2	(1.0-1.4)	2.7	(2.6-2.8)	2.1	(2.0-2.1)
	Uterine	4.7	(3.1-6.8)	3.6	(3.2-4.0)	3.6	(3.5-3.7)	4.2	(4.1-4.2)
	Ovary	5.8	(3.9-8.1)	7.9	(7.3-8.4)	5.6	(5.4-5.7)	8.1	(8.1-8.2)
	Vagina	^		0.1	(0.0-0.2)	0.2	(0.2-0.2)	0.2	(0.2-0.2)
	Vulva	^		0.3	(0.2-0.4)	0.3	(0.3-0.4)	0.6	(0.5-0.6)
	Other Female Genital Organs	^		0.2	(0.1-0.3)	0.2	(0.2-0.2)	0.3	(0.3-0.3)
Leukemia	Leukemia	3.7	(2.6-5.0)	7	(6.6-7.4)	4.8	(4.7-4.9)	7.2	(7.2-7.3)
Lymphoma	Hodgkin Lymphoma	^		0.3	(0.2-0.3)	0.4	(0.4-0.4)	0.4	(0.4-0.4)
	Non-Hodgkin Lymphoma	4.2	(2.9-5.7)	6	(5.6-6.3)	5.1	(5.0-5.1)	6.4	(6.4-6.4)
Male Genital System	Prostate	16.2	(12.2-20.9)	23.4	(22.3-24.5)	17.4	(17.1-17.7)	19.7	(19.6-19.7)
	Testis	^		0.2	(0.1-0.3)	0.3	(0.3-0.3)	0.3	(0.3-0.3)
	Penis	^		^		0.3	(0.3-0.3)	0.2	(0.2-0.2)
	Other Male Genital Organs	^		^		0.0	(0.0-0.0)	0	(0.0-0.0)
Miscellaneous	Miscellaneous	10.2	(8.3-12.4)	10.8	(10.3-11.2)	8.4	(8.3-8.5)	12.9	(12.9-13.0)
Myeloma	Myeloma	2.5	(1.6-3.7)	3.4	(3.2-3.7)	2.8	(2.7-2.9)	3.1	(3.1-3.1)
Oral Cavity and Pharynx	Oral Cavity and Pharynx	1.7	(1-2.8)	1.6	(1.4-1.8)	1.5	(1.5-1.6)	2.5	(2.5-2.5)
Respiratory System	Nose, Nasal Cavity and Middle Ear	^		0.1	(0.1-0.2)	0.1	(0.1-0.1)	0.1	(0.1-0.1)
	Larynx	^		0.4	(0.3-0.5)	0.8	(0.7-0.8)	1	(1-1.1)
	Lung and Bronchus	17.3	(14.7-20.2)	20.6	(20.0-21.2)	20.0	(19.8-20.1)	49.6	(49.5-49.7)
	Pleura	^		^		0.0	(0-0.1)	0.1	(0.1-0.1)
	Trachea, Mediastinum and Other Respiratory	^		0.1	(0-0.1)	0.1	(0-0.1)	0.1	(0.1-0.1)
Skin excluding Basal and Squamous	Skin Melanoma	^		3.8	(3.6-4.1)	0.8	(0.7-0.8)	3.3	(3.3-3.3)
	Other Non-Epithelial Skin	^		0.9	(0.8-1)	0.5	(0.4-0.5)	1	(1-1.1)
Soft Tissue Including Heart	Soft Tissue Including Heart	0.6	(0.3-1.2)	1.4	(1.2-1.5)	1.0	(1-1)	1.3	(1.3-1.4)
Urinary System	Urinary Bladder	1.8	(1-2.8)	3.8	(3.6-4.1)	2.3	(2.3-2.4)	4.8	(4.8-4.8)
	Kidney and Renal Pelvis	4.4	(3.2-5.9)	3.4	(3.2-3.7)	3.5	(3.4-3.6)	4	(4-4.1)
	Ureter	^		0.1	(0.1-0.2)	0.0	(0-0.1)	0.1	(0.1-0.1)
	Other Urinary Organs	^		0.1	(0-0.1)	0.1	(0.1-0.1)	0.1	(0.1-0.1)

[a] Data Source: SEER Research Data (36) and Cancer in North America (37)
[b] Rate per 100,000 population per year, age-standardized
[c] CI: confidence interval
~ Statistic suppressed due to small cell size (<10 deaths) or allows inference of a small cell

Table C6. Cancer in Utah counties: population and cancer counts, 2015[a]

Population Type	County	Population	New Cases	
			Invasive	In Situ
Urban	Box Elder	51,998	172	41
	Cache	120,060	346	63
	Davis	335,768	1100	242
	Juab	10,566	24	10
	Morgan	11,091	40	14
	Salt Lake	1,104,622	3,950	928
	Tooele	62,879	253	43
	Utah	574,796	1,420	322
	Washington	155,450	787	138
	Weber	243,453	860	198
Rural	Beaver	6,344	28	^
	Carbon	20,430	102	8
	Daggett	1,110	12	^
	Duchesne	20,781	81	11
	Emery	10,352	66	10
	Garfield	4,991	25	^
	Grand	9,493	32	6
	Iron	48,294	192	29
	Kane	7,120	47	9
	Millard	12,649	63	15
	Piute	1,503	11	^
	Rich	2,296	9	^
	San Juan	15,707	32	11
	Sanpete	28,801	87	18
	Sevier	20,940	79	18
	Summit	39,481	171	51
	Uintah	37,789	131	22
	Wasatch	29,165	111	26
	Wayne	2,703	10	^

[a] Data Source: SEER Research Data (36)
^ Statistic suppressed due to small cell size (< 5 cases) or allows inference of a small cell

Table C7. Invasive cancer counts and incidence rates among urban and rural counties in Utah, 2006 to 2015[a]

Cancer Site		Cancer Cases		Incidence per 100,000 Population			
		Urban	Rural	Urban		Rural	
				Rate[b]	95% CI[c]	Rate[b]	95% Ci[c]
All Sites	All Sites	81,177	11,557	408.2	(405.4-411.1)	401.6	(394.2-409.1)
Bones and Joints	Bones and Joints	297	28	1.3	(1.1-1.4)	0.9	(0.6-1.3)
Brain And Other Nervous System	Brain and Other Nervous System	1,554	198	7.0	(6.7-7.4)	6.7	(5.7-7.7)
Breast	Breast, Female	11,848	1,497	114.6	(112.5-116.7)	104.4	(99.1-110.0)
Digestive System	Esophagus	621	100	3.2	(2.9-3.4)	3.3	(2.7-4.1)
	Stomach	872	111	4.5	(4.2-4.9)	3.9	(3.2-4.7)
	Small Intestine	521	62	2.6	(2.4-2.9)	2.2	(1.6-2.8)
	Colorectal	6,235	1,012	32.2	(31.4-33.0)	35.9	(33.7-38.2)
	Anus, Anal Canal and Anorectum	264	36	1.3	(1.2-1.5)	1.2	(0.9-1.7)
	Liver	964	129	4.7	(4.4-5.0)	4.2	(3.5-5.0)
	Intrahepatic Bile Duct	156	29	0.8	(0.7-1.0)	1.0	(0.7-1.5)
	Gallbladder	174	27	0.9	(0.8-1.1)	1.0	(0.7-1.5)
	Other Biliary	217	51	1.2	(1.0-1.3)	1.8	(1.3-2.4)
	Pancreas	2,064	285	10.9	(10.4-11.4)	9.9	(8.7-11.1)
	Retroperitoneum	105	18	0.5	(0.4-0.6)	0.6	(0.3-0.9)
	Peritoneum, Omentum and Mesentery	115	16	0.6	(0.5-0.7)	0.5	(0.3-0.9)
	Other Digestive Organs	109	10	0.6	(0.5-0.7)	0.4	(0.2-0.7)
Endocrine System	Thyroid	3,956	422	18.1	(17.6-18.7)	15.1	(13.7-16.6)
	Other Endocrine Including Thymus	135	23	0.6	(0.5-0.7)	0.8	(0.5-1.2)
Eye and Orbit	Eye and Orbit	228	38	1.1	(1.0-1.3)	1.3	(0.9-1.8)
Female Genital System	Cervical	522	89	4.9	(4.5-5.4)	6.6	(5.2-8.1)
	Uterine	2,728	369	25.7	(24.7-26.6)	24.6	(22.1-27.3)
	Ovary	1,193	163	11.3	(10.7-12.0)	11.4	(9.7-13.4)
	Vagina	52	10	0.5	(0.4-0.7)	0.6	(0.3-1.2)
	Vulva	192	33	1.9	(1.6-2.1)	2.3	(1.6-3.3)
	Other Female Genital Organs	98	17	0.9	(0.7-1.1)	1.1	(0.6-1.8)
Leukemia	Leukemia	2,712	455	13.3	(12.8-13.8)	15.7	(14.3-17.3)
Lymphoma	Hodgkin Lymphoma	607	73	2.5	(2.3-2.7)	2.6	(2.0-3.3)
	Non-Hodgkin Lymphoma	3,840	508	19.6	(19.0-20.2)	18.0	(16.4-19.6)
Male Genital System	Prostate	13,700	1,982	148.8	(146.3-151.4)	133.6	(127.6-139.8)
	Testis	886	81	7.1	(6.6-7.6)	5.9	(4.7-7.4)
	Penis	65	8	0.8	(0.6-1.0)	0.6	(0.2-1.1)
	Other Male Genital Organs	26	5	0.3	(0.2-0.4)	0.3	(0.1-0.8)
Miscellaneous	Miscellaneous	1,186	193	6.3	(5.9-6.7)	7.0	(6.0-8.0)
Myeloma	Myeloma	1,152	183	6.1	(5.8-6.5)	6.2	(5.3-7.2)
Oral Cavity and Pharynx	Oral Cavity and Pharynx	1,691	265	8.4	(8.0-8.8)	8.9	(7.9-10.1)
Respiratory System	Nose, Nasal Cavity and Middle Ear	129	17	0.6	(0.5-0.8)	0.6	(0.3-1.0)
	Larynx	328	57	1.7	(1.5-1.9)	1.9	(1.5-2.5)
	Lung and Bronchus	5,196	880	27.5	(26.7-28.2)	30.7	(28.7-32.9)
	Pleura	^	0	0.0	(0.0-0.1)	0.0	(0.0-0.1)
	Trachea, Mediastinum and Other Respiratory	31	10	0.1	(0.1-0.2)	0.3	(0.2-0.6)
Skin excluding Basal and Squamous	Skin Melanoma	7,046	995	35.0	(34.1-35.8)	35.2	(33.0-37.5)
	Other Non-Epithelial Skin	485	70	2.5	(2.3-2.7)	2.6	(2.0-3.3)
Soft Tissue Including Heart	Soft Tissue Including Heart	747	87	3.5	(3.2-3.7)	3.0	(2.4-3.7)
Urinary System	Urinary Bladder	3,128	480	16.9	(16.3-17.5)	17.7	(16.1-19.4)
	Kidney and Renal Pelvis	2,602	378	13.0	(12.5-13.6)	13.1	(11.8-14.6)
	Ureter	76	9	0.4	(0.3-0.5)	0.3	(0.1-0.6)
	Other Urinary Organs	50	5	0.3	(0.2-0.4)	0.2	(0.1-0.4)

[a] [a] Data Source: SEER Research Data (36)
[b] Rate per 100,000 population per year, age-standardized
[c] CI: confidence interval
^ Statistic suppressed due to small cell size (<5 cases) or allows inference of a small cell