

# NEW HAMPSHIRE CANCER REPORT 2006-2010

New Hampshire Department of Health and Human Services  
Division of Public Health Services  
Health Statistics and Data Management  
New Hampshire State Cancer Registry



**Margaret Hassan, Governor**  
**Nicholas Toumpas, Commissioner**  
Department of Health and Human Services  
**José Thier Montero, Director**  
Division of Public Health Services  
June 2014

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## INTRODUCTION

The New Hampshire State Cancer Registry (NHSCR) was established in 1985 as a statewide population-based cancer surveillance program. The main purposes of the registry are: (1) to maintain an incidence reporting system for the estimation of cancer rates in NH; (2) to provide information to help public health officials and agencies in the planning and evaluation of cancer prevention and control programs, and in cancer cluster investigations; and (3) to be an informational resource for investigation of cancer and its causes.

The NHSCR collects incidence data on all reportable cancer cases of NH residents regardless of place of diagnosis or treatment. It collects reports from hospital registrars in all large NH hospitals including the Manchester Veterans Administration (VA) Medical Center and VA hospitals outside the state. Hospitals with fewer than 105 cancer cases per year generally do not have their own cancer registry and the NHSCR staff helps these hospitals with reporting. The NHSCR also receives case reports from physician practices, free standing radiation oncology centers, out-of-state pathology laboratories, and other sources. In addition, the NHSCR receives case reports for NH residents who are diagnosed outside the state, which is made possible through inter-state data exchange agreements.

Reportable cancers include in situ and/or invasive cancers, with these exceptions: basal and squamous cell carcinoma of the skin (excluding genitalia), and carcinoma in situ of the cervix.

Data in this report were gathered from various sources.

- Cancer incidence data come from the NHSCR
- Cancer mortality data come from the NH Division of Vital Statistics Administration
- Screening information come from the Behavioral Risk Factor Surveillance System (BRFSS), and from the NH Youth Risk Behavior Survey (YRBS).
- US national cancer data were obtained from the Surveillance, Epidemiological and End Results (SEER) Program data. Comparisons were made with the SEER white population, which is the most similar group examined by SEER to New Hampshire's predominantly white population.

All incidence rates reported were calculated using invasive cancers (malignant cancers of all sites and in situ bladder cancers). All incidence and mortality rates are age-adjusted to the 2000 US standard population. NH population estimates were obtained from Census 2010 decennial census and 2006-2009 intercensal population estimates. To maintain the confidentiality and privacy of individuals represented in the data, we suppressed counts and rates when incident case counts were between 1 and 9 and mortality case counts were between 1 and 4.

This report is organized in 5 main sections:

1. Executive summary
2. Cancer in NH, 2006-2010
3. Top 10 cancers in NH, 2006-2010
4. Risk factors, prevention and screening
5. Appendices to provide technical assistance regarding cancer coding, population weights, data quality, and other considerations relevant to using cancer data. [New readers are strongly encouraged to read Appendix 1 and Appendix 2 as preparation to reading the body of the report].

## EXECUTIVE SUMMARY

The purpose of this report is to present 2006-2010 cancer incidence and mortality data for New Hampshire (NH) residents and compare it with United States (US) national data.

NH has the fourth oldest population in the US (median age 41.1 years) and over 5% of NH residents will be living with some form of cancer in 2015.

### *In NH residents between 2006 and 2010:*

- 37,484 new invasive cancer cases were reported to the New Hampshire State Cancer Registry (NHSCR) during these five years.
- The overall age-adjusted cancer incidence rate in NH was significantly higher than the US white rate (508 vs. 481 per 100,000).
- Males had a higher overall cancer incidence rate than females (587 vs. 451 per 100,000).
- Prostate cancer was the leading cause of cancer in males (158 per 100,000).
- Breast cancer was the leading cause of cancer in females (132 per 100,000).
- Lung cancer was the second most commonly diagnosed cancer for both genders.
- Incidence rates for bladder, esophageal, laryngeal, lung and uterine cancer were significantly higher than the US white rate.
- Incidence rates for liver and ovarian cancer was significantly lower than the US white rate.
- Average annual percent change (AAPC) from 2006 to 2010 for overall incidence fell but was not statistically significant (-1.5% per year, 95% CI= -3.5%, 0.4%).
- The overall age-adjusted mortality rate was not significantly different from the US white rate (174 vs. 176 per 100,000).
- Lung cancer was the leading cause of death for both genders (3,537 deaths), killing more people than the next 3 leading cancer causes combined (colorectal, female breast and pancreatic cancer).
- Only esophageal cancer had a significantly higher mortality rate in NH than the US white rate (5.9 vs. 4.4 per 100,000).
- Liver cancer, kidney cancer and Non-Hodgkin's Lymphoma had significantly lower mortality rates than the US white rates.

- Average annual percent change (AAPC) for mortality fell at a statistically significant rate (-2.3% per year, 95% CI= -3.3%, -1.4%).
- 47% of invasive cancer cases were diagnosed at a localized stage.

***In NH females between 2006 and 2010:***

- The top 5 cancers sites among females were breast, lung, colorectal, uterine and melanoma.
- The age-adjusted incidence rate was significantly higher than the US white rate (451 vs. 433 per 100,000) but the age-adjusted mortality rate was similar to the US white rate (151 vs. 150 per 100,000).
- Breast cancer was the most commonly diagnosed cancer among females in NH (29% of all new female cancer cases) and the second most common cause of cancer-related deaths among females.
- Lung cancer was the leading cause of cancer-related deaths among females.

***In NH males between 2006 and 2010:***

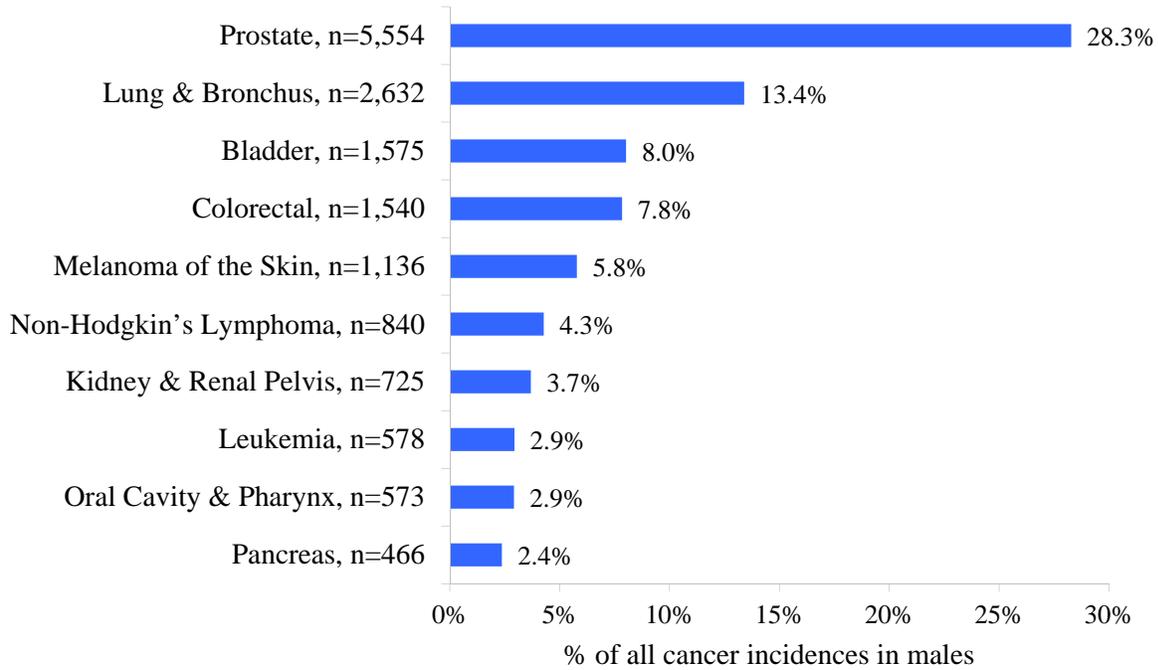
- The top 5 cancers sites among males were prostate, lung, bladder, colorectal and melanoma.
- The overall age-adjusted incidence rate was significantly higher than the US white rate (587 vs. 548 per 100,000) but the overall mortality rate was not significantly higher (209 vs. 213 per 100,000) than the US white rate.
- Prostate cancer was the most commonly diagnosed cancer among males in NH (28% of all new male cancer cases) and was the second leading cause of cancer-related deaths among males.
- Lung cancer was the leading cause of cancer-related deaths among males.

## **CANCER IN NEW HAMPSHIRE, 2006-2010**

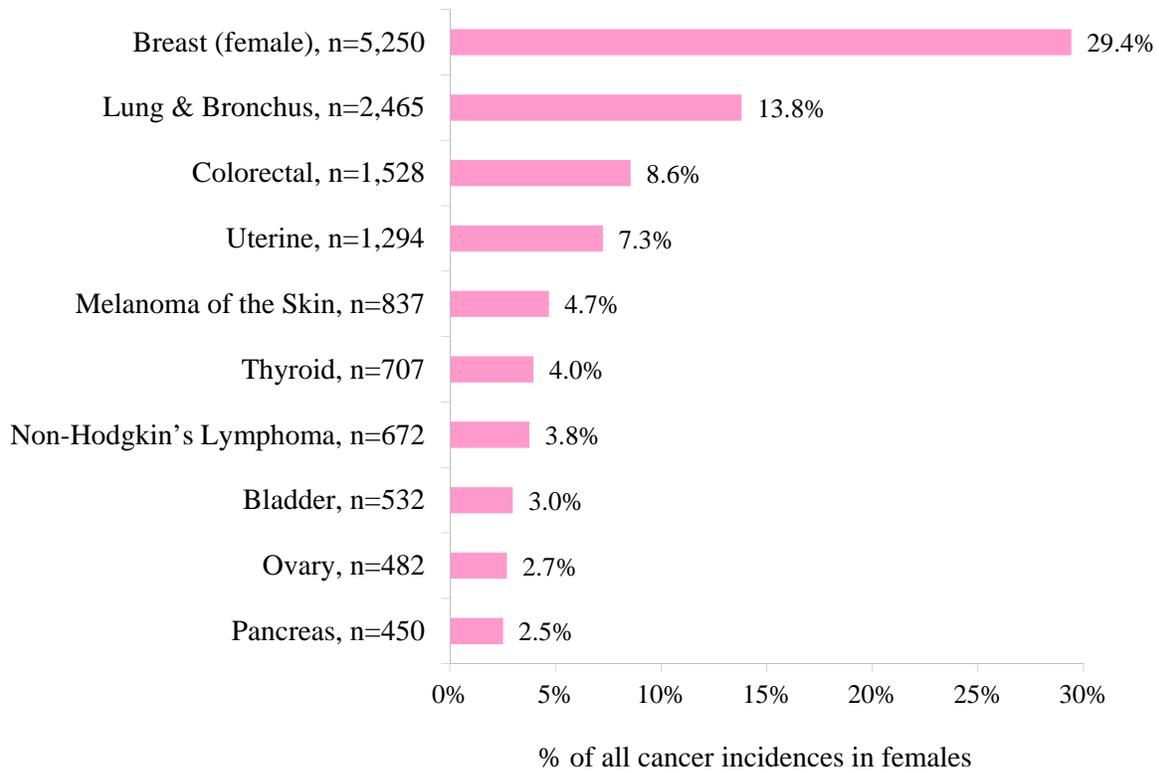
## INCIDENCE

### Incidence Counts

Among NH residents, 37,484 new cases of invasive cancers were diagnosed between 2006 and 2010 with an average of 7,497 cases per year. Of the cases, 52.5% were in males (19,640) and 47.5% were in females (17,842). Among males, prostate (28.3%), lung & bronchus (13.4%), and bladder (8.0%) cancers accounted for 49.7% of all male cancer diagnoses. Among females, breast (29.4%), lung & bronchus (13.8%), and colorectal (8.6%) cancers accounted for 51.8% of all female cancer diagnoses.



**Figure 1.1:** Top 10 invasive cancer sites in NH male residents diagnosed between 2006 and 2010.



**Figure 1.2:** Top 10 invasive cancer sites in NH female residents diagnosed between 2006 and 2010.

## Incidence Rates

The overall age-adjusted cancer incidence rate for NH residents was significantly higher than the US overall rate (508 vs. 481 per 100,000). Males experienced higher cancer incidence rates than females for overall incidence and, in general, for all site specific cancers as listed below (except thyroid cancer where females experienced significantly higher incidence rates than males). [Note: NH cancer incidence rates were compared to the US (SEER) white race incidence rates as over 94 percent of NH's population are white and this was the closest comparison group.]

**Table 1.1:** Age-adjusted incidence rates by gender and primary cancer sites in NH residents diagnosed between 2006 and 2010.

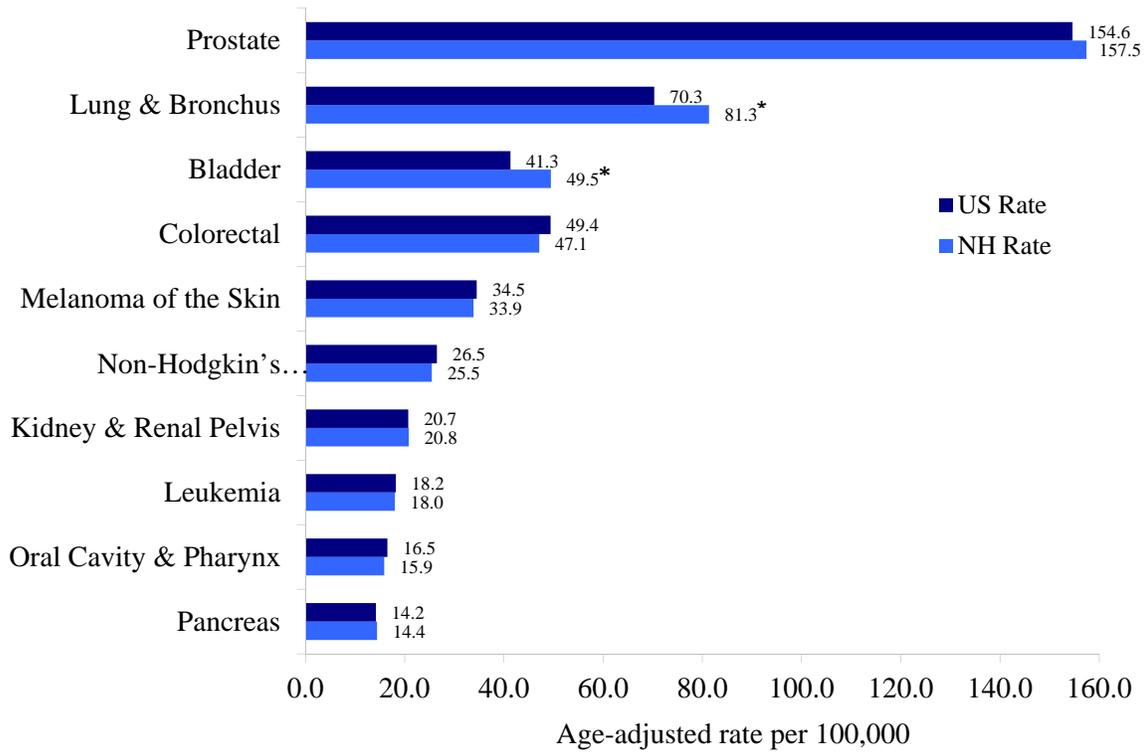
Cancer sites	Female rates				Male rates				Overall rates			
	New Hampshire		US		New Hampshire		US		New Hampshire		US	
	Rate	(95% CI)	Rate	(95% CI)	Rate	(95% CI)	Rate	(95% CI)	Rate	(95% CI)	Rate	(95% CI)
Bladder	13.1	(12.0 – 14.2)*	9.8	(9.6 – 10.1)	49.5	(47.0 – 52.0)*	41.3	(40.7 – 41.9)	29.0	(27.7 – 30.2)*	23.4	(23.1 – 23.7)
Brain & other CNS	6.2	(5.3 – 7.0)	6.1	(5.9 – 6.3)	9.5	(8.4 – 10.5)	8.6	(8.4 – 8.9)	7.7	(7.0 – 8.4)	7.3	(7.1 – 7.5)
Breast (female)	131.9	(128.5 – 135.5)	131.3	(130.4 – 132.3)	--	--	--	--	--	--	--	--
Cervical	5.6	(4.8 – 6.4)	6.6	(6.4 – 6.8)	--	--	--	--	--	--	--	--
Colorectal	37.6	(35.7 – 39.6)	38.2	(37.7 – 38.7)	47.1	(44.7 – 49.5)	49.4	(48.8 – 50.0)	42.0	(40.4 – 43.4)	43.3	(42.9 – 43.7)
Esophagus	2.5	(2.0 – 3.0)	1.9	(1.8 – 2.0)	13.4	(12.1 – 14.7)*	8.3	(8.1 – 8.6)	7.4	(6.8 – 8.0)*	4.8	(4.7 – 4.9)
Hodgkin's Disease	2.8	(2.3 – 3.5)	2.8	(2.7 – 3.0)	4.4	(3.7 – 5.2)	3.6	(3.4 – 3.8)	3.6	(3.1 – 4.1)	3.2	(3.1 – 3.3)
Kidney & Renal pelvis	10.0	(9.1 – 11.0)	10.6	(10.4 – 10.9)	20.8	(19.3 – 22.4)	20.7	(20.3 – 21.1)	15.0	(14.1 – 15.9)	15.3	(15.1 – 15.5)
Larynx	1.7	(1.3 – 2.2)	1.2	(1.1 – 1.3)	7.0	(6.1 – 7.9)*	5.6	(5.4 – 5.9)	4.1	(3.7 – 4.6)*	3.2	(3.1 – 3.3)
Leukemia	10.1	(9.0 – 11.1)	10.9	(10.6 – 11.2)	18.0	(16.5 – 19.5)	18.2	(17.8 – 18.5)	13.6	(12.7 – 14.4)	14.1	(13.9 – 14.3)
Liver & Intrahepatic Bile Duct	2.4	(2.0 – 3.0)*	3.2	(3.1 – 3.4)	7.4	(6.5 – 8.3)*	9.7	(9.4 – 9.9)	4.8	(4.3 – 5.3)*	6.2	(6.1 – 6.4)
Lung & Bronchus	62.0	(59.5 – 64.5)*	54.0	(53.4 – 54.5)	81.3	(78.2 – 84.5)*	70.3	(69.6 – 71.1)	70.1	(68.1 – 72.0)*	60.9	(60.4 – 61.3)
Melanoma of Skin	22.2	(20.7 – 23.7)	23.2	(22.8 – 23.6)	33.9	(31.9 – 35.9)	34.5	(34.0 – 35.0)	27.0	(25.8 – 28.2)	27.9	(27.6 – 28.2)
Multiple Myeloma	4.3	(3.7 – 5.0)	4.4	(4.2 – 4.6)	7.4	(6.4 – 8.3)	7.3	(7.1 – 7.5)	5.7	(5.1 – 6.2)	5.7	(5.5 – 5.8)
Non-Hodgkin's Lymphoma	17.0	(15.7 – 18.3)	17.9	(17.6 – 18.2)	25.5	(23.7 – 27.2)	26.5	(26.0 – 26.9)	20.8	(19.7 – 21.8)	21.8	(21.5 – 22.0)
Oral cavity & Pharynx	5.9	(5.2 – 6.7)	6.4	(6.2 – 6.6)	15.9	(14.5 – 17.2)	16.5	(16.1 – 16.8)	10.7	(9.9 – 11.4)	11.2	(11.0 – 11.4)
Ovary	12.0	(10.9 – 13.1)*	13.5	(13.2 – 13.8)	--	--	--	--	--	--	--	--
Pancreas	10.9	(9.9 – 11.9)	10.9	(10.6 – 11.2)	14.4	(13.1 – 15.8)	14.2	(13.8 – 14.5)	12.4	(11.6 – 13.2)	12.4	(12.2 – 12.6)
Prostate	--	--	--	--	157.5	(153.2 – 161.7)	154.6	(153.6 – 155.7)	--	--	--	--
Stomach	3.9	(3.3 – 4.5)	4.0	(3.8 – 4.2)	8.7	(7.3 – 9.3)	9.0	(8.7 – 9.3)	5.8	(5.3 – 6.4)	6.2	(6.1 – 6.4)
Testis	--	--	--	--	7.4	(6.4 – 8.3)	7.1	(6.9 – 7.3)	--	--	--	--
Thyroid	19.6	(18.2 – 21.1)	20.9	(20.5 – 21.3)	7.2	(6.2 – 8.1)	7.0	(6.7 – 7.2)	13.4	(12.5 – 14.3)	13.9	(13.7 – 14.1)
Uterus	31.6	(29.9 – 33.4)*	26.9	(26.5 – 27.3)	--	--	--	--	--	--	--	--
All Malignant Cancers	450.5	(443.7 – 457.2)*	433.0	(431.4 – 434.7)	587.0	(578.6 – 595.5)*	547.6	(545.6 – 549.6)	508.3	(503.1 – 513.5)*	480.6	(479.4 – 481.9)

\* Difference is statistically significant from the US population; -- gender specific cancer;

NH cancer incidence rates were compared to the national (SEER) white race incidence rates

### Incidence Rates by Gender

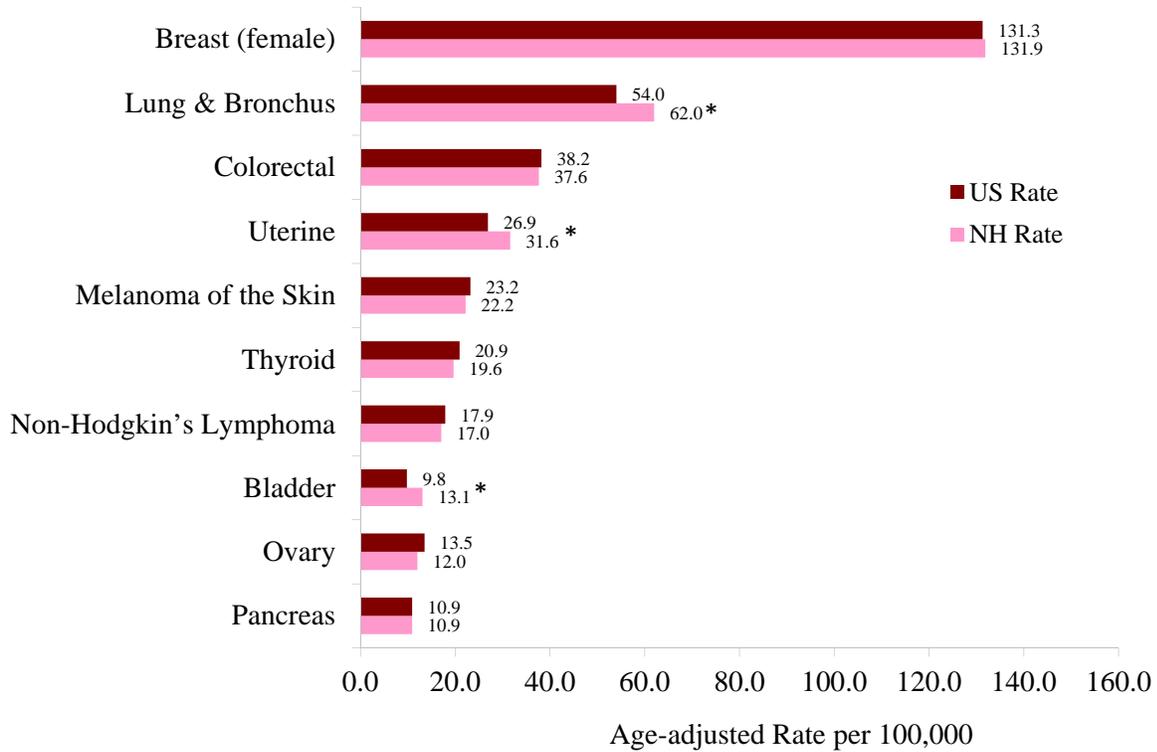
Prostate cancer was the leading invasive cancer site among NH males followed by lung & bronchus cancer.



**Figure 1.3:** Top 10 invasive cancer sites by incidence rate for NH male residents diagnosed between 2006 and 2010.

\* Significantly different between US white and NH rate

Breast cancer was the leading invasive cancer site among NH females followed by lung & bronchus cancer.



**Figure 1.4:** Top 10 invasive cancer sites by incidence rate for NH female residents diagnosed between 2006 and 2010.

\* Significantly different between US white and NH rate

## **Comparison of Incidence Rates between NH and US white population**

### ***Overall***

Between 2006 and 2010, the overall incidence rates of the following cancers (that affect both males and females) were higher in NH residents than the U.S. white population:

1. The bladder cancer incidence rate for NH residents was significantly higher than the US white rate (29.0 vs. 23.4 per 100,000).
2. The esophageal cancer incidence rate for NH residents was significantly higher than the US white rate (7.4 vs. 4.8 per 100,000).
3. The laryngeal cancer incidence rate for NH residents was significantly higher than the U.S. white rate (4.1 vs. 3.2 per 100,000).
4. The lung and bronchus cancer incidence rate for NH residents was significantly higher than the US white rate (70.1 vs. 60.9 per 100,000).

Between 2006 and 2010, the overall incidence rate of the following cancer (that affect both males and females) was lower in NH residents than the US white population:

1. The liver and intrahepatic bile duct cancer incidence rate for NH residents was significantly lower than the US white rate (4.8 vs. 6.2 per 100,000).

### ***Males***

Between 2006 and 2010, the incidence rates of the following cancers were higher in NH males than the US white males:

1. The bladder cancer incidence rate for NH males was significantly higher than the US white male rate (49.5 vs. 41.3 per 100,000).
2. The esophageal cancer incidence rate for NH males was significantly higher than the US white male rate (13.4 vs. 8.3 per 100,000).
3. The laryngeal cancer incidence rate for NH males was significantly higher than the US white male rate (7.0 vs. 5.6 per 100,000).
4. The lung and bronchus cancer incidence rate for NH males was significantly higher than the US white male rate (81.3 vs. 70.3 per 100,000).

Between 2006 and 2010, the incidence rates of the following cancers were lower in NH males than the US white males:

1. The liver and intrahepatic bile duct cancer incidence rate for NH males was significantly lower than the US white male rate (7.4 vs. 9.7 per 100,000).

### ***Females***

Between 2006 and 2010, the incidence rates of the following cancers were higher in NH females than US white females:

1. The bladder cancer incidence rate for NH females was significantly higher than the US white female rate (13.1 vs. 9.8 per 100,000).
2. The lung and bronchus cancer incidence rate for NH females was significantly higher than the US white female rate (62.0 vs. 54.0 per 100,000).
3. The uterine cancer incidence rate for NH females was significantly higher than the US white female rate (31.6 vs. 26.9 per 100,000).

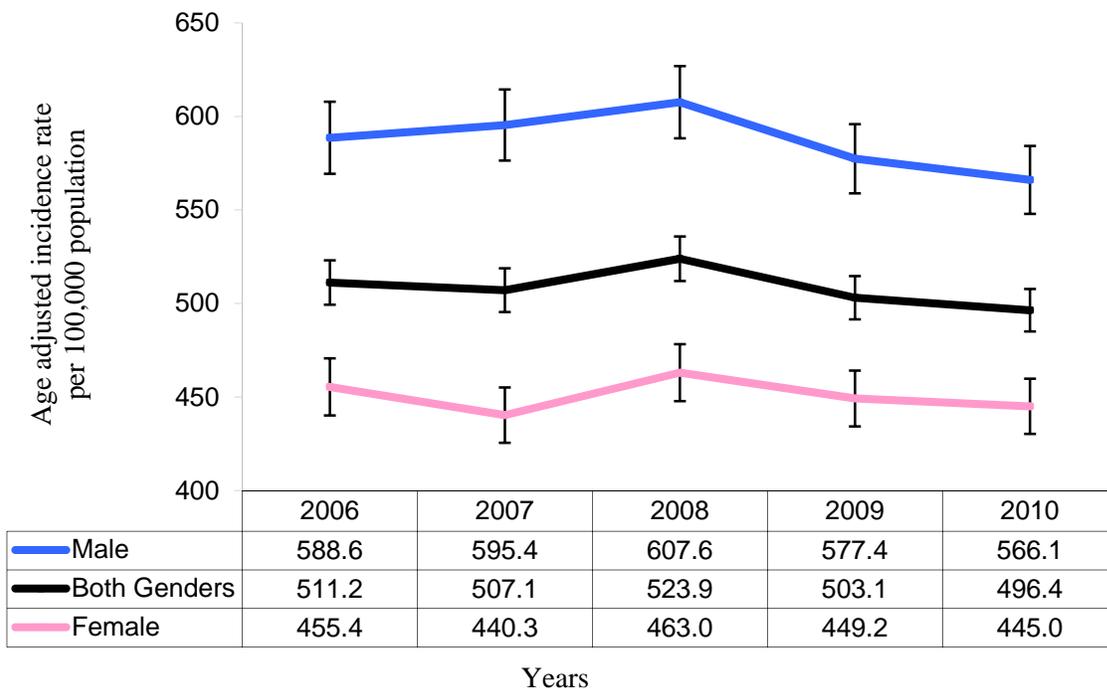
Between 2006 and 2010, the incidence rates of the following cancers were lower in NH females than the US white female:

1. The liver and intrahepatic bile duct cancer incidence rate for NH females was significantly lower than the US white female rate (2.4 vs. 3.2 per 100,000).
2. The ovarian cancer incidence rate for NH females was significantly lower than the US white female rate (12.0 vs. 13.5 per 100,000).

## Average Annual Percent Change of Incidence Rates

### Overall

The overall cancer incidence rate for NH residents was relatively stable between 2006 and 2010 for both genders and females and males individually. The AAPC for both genders fell at a rate of -1.5% per year; but was not statistically significant (-1.5% per year, 95% CI= -3.5%, 0.4%). This trend was the same for males (-2.4% per year, 95% CI= -4.8%, 0.0%) and females (-0.9% per year, 95% CI= -3.0%, 1.2%).



**Figure 1.5:** Cancer incidence rate by gender and by year among NH residents diagnosed between 2006 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

[Source: <http://www.statecancerprofiles.cancer.gov/> ]

## Average Annual Percent Change of Incidence Rates by Cancer Site

Thyroid, prostate, and pancreatic cancer incidence rates for NH residents (both genders and all ages) fell at a statistically significant rate between 2006 and 2010. AAPC did not increase at a statistically significant rate for any cancer site between 2006 and 2010.

**Table 1.2:** Average annual percent change of cancer incidence by cancer site for NH residents diagnosed between 2006 and 2010.

[Source: <http://www.statecancerprofiles.cancer.gov/> ]

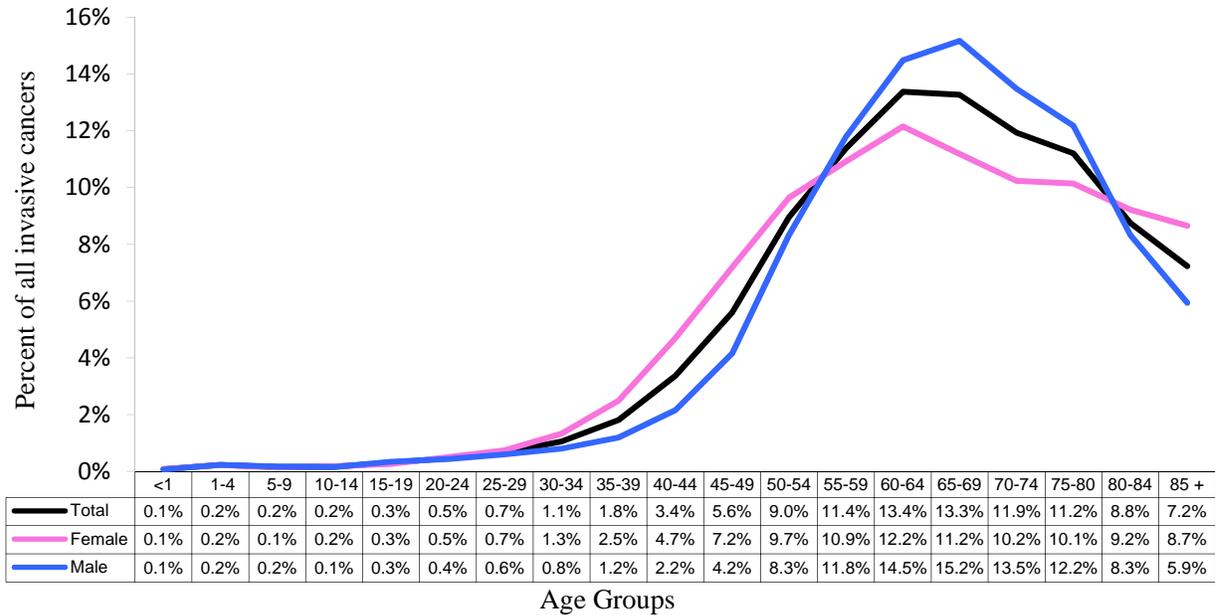
Cancer Site	Estimated Annual Percent Change	Lower 95% CL	Upper 95% CL
Cervix	-7.5	-17.0	3.2
Colon and Rectum	-7.1	-15.4	2.0
Thyroid*	-4.9	-9.4	-0.1
Ovary	-4.7	-13.0	4.4
Esophagus	-3.9	-12.9	6.1
Prostate*	-3.7	-6.1	-1.3
Pancreas*	-2.0	-3.8	-0.1
Melanoma of the Skin	-1.9	-7.3	3.9
Leukemia	-1.2	-11.7	10.6
Lung & Bronchus	-1.2	-2.8	0.4
Breast (Female)	-0.7	-3.1	1.9
Liver & Bile Duct	0.8	-12.9	16.8
Uterus	1.2	-3.1	5.7
Bladder	1.6	-3.2	6.7
Kidney & Renal Pelvis	1.7	-5.2	9.1
Non-Hodgkin's Lymphoma	2.8	-1.9	7.7
Stomach	2.8	-7.0	13.6
Oral Cavity & Pharynx	2.9	-0.6	6.5
Brain & ONS	4.9	-3.7	14.2
<b>Overall cancer incidence</b>	<b>-1.5</b>	<b>-3.5</b>	<b>0.4</b>

\*The average annual percent change is significantly different from zero ( $p < 0.05$ ).

CL = 95% Confidence limit

## Age Distribution of Invasive Cancers

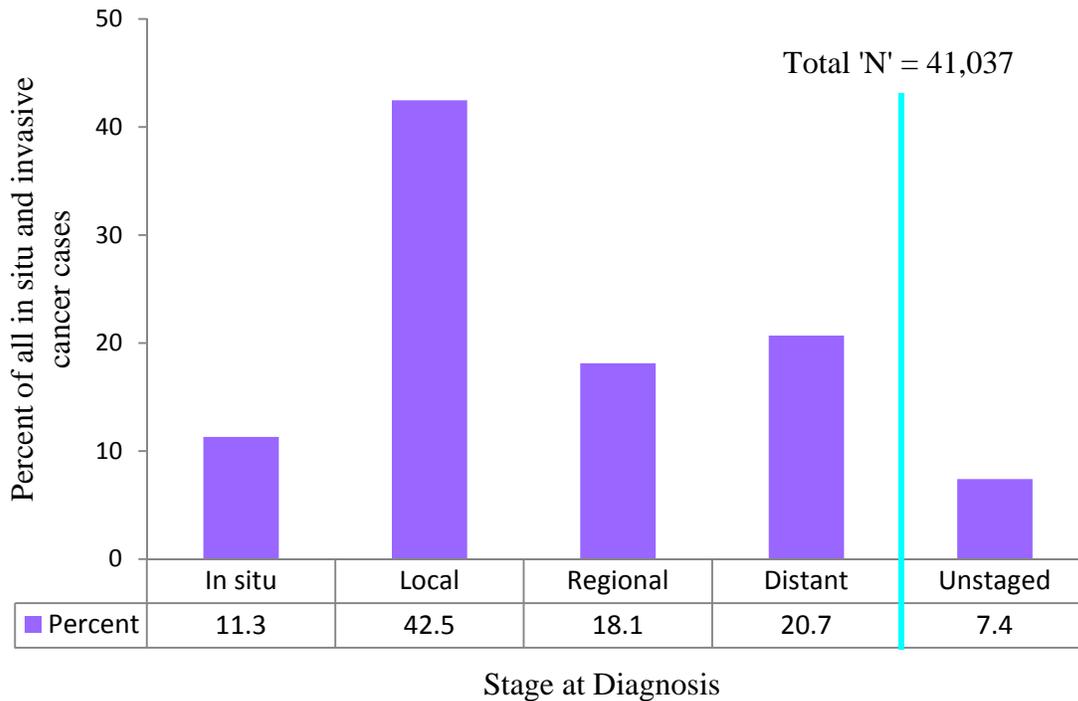
Cancer is relatively rare in younger people. Between 2006 and 2010, less than 1% of NH cancer cases were diagnosed in people younger than 20 years old. The risk of developing cancer increased with age and the rate reached its peak (13.3%) in people 60-64 years old, with some variation by gender.



**Figure 1.6:** Age distribution of invasive cancers by gender in NH residents diagnosed between 2006 and 2010.

### Stage at Diagnosis of Cancers

For staging purpose, we used all reportable cancer cases (in situ and malignant). A total of 41,037 cancer cases (in situ and malignant) were diagnosed between 2006 and 2010. Over half of all cancers (53.8%) in NH residents between 2006 and 2010 were diagnosed at an early stage (in situ and localized) while another 38.8% were diagnosed at a late stage (regional and distant). Just over seven percent (7.4%) were ‘unstaged’.

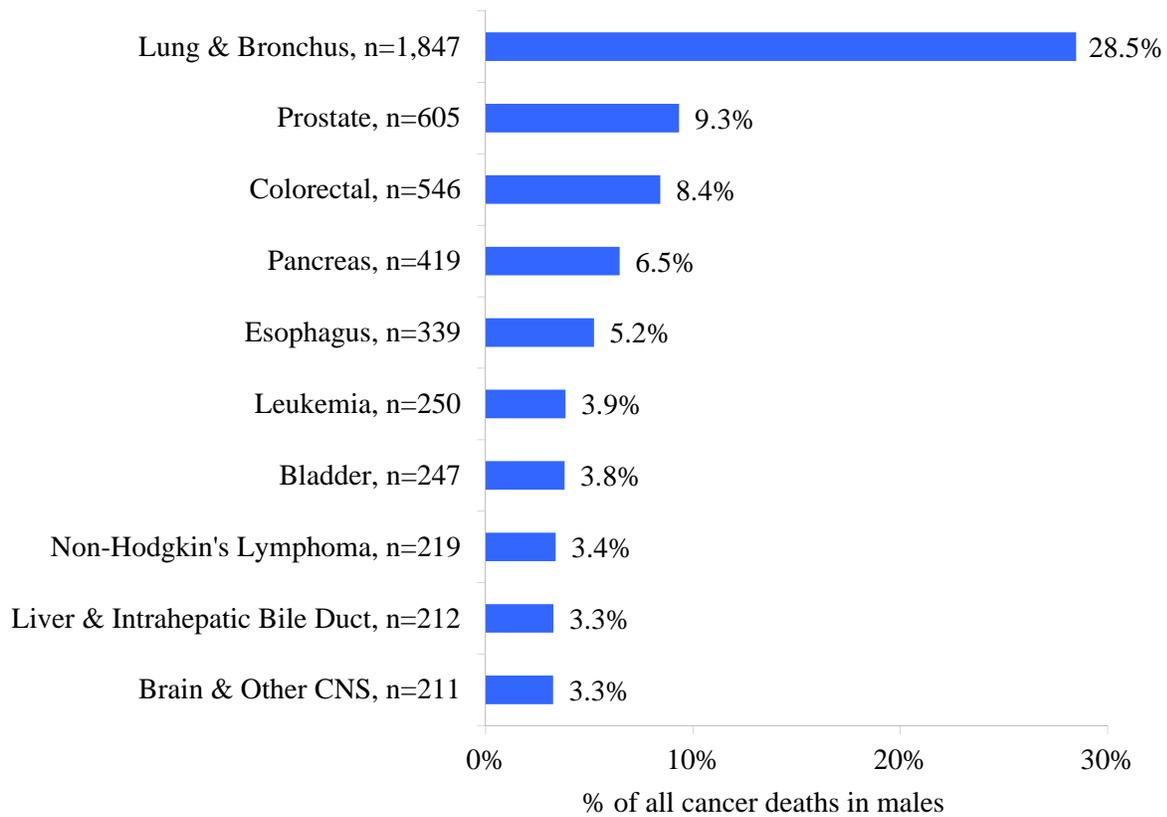


**Figure 1.7:** Stage at diagnosis of all cancers (in situ and invasive) by in NH residents diagnosed between 2006 and 2010.

## MORTALITY

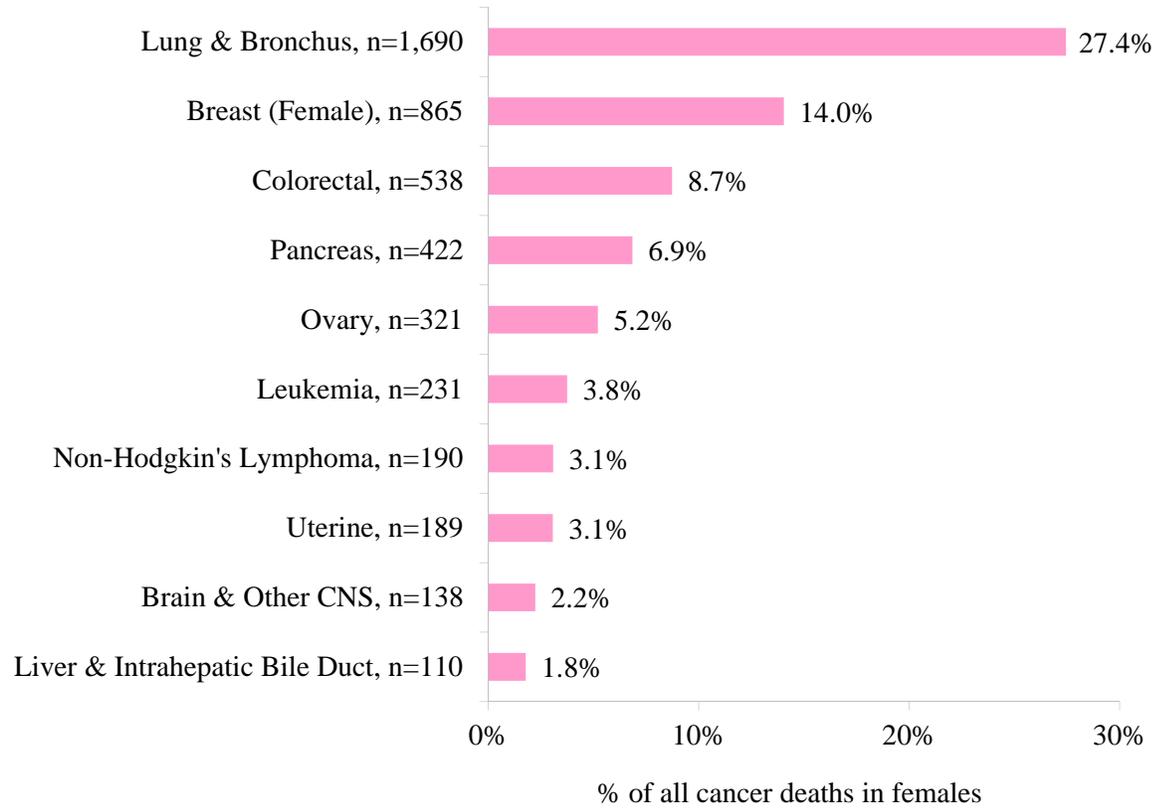
### Mortality Counts

There were 12,642 cancer-related deaths (an average of 2,528/year) among NH residents between 2006 and 2010. Of them, 51.3% of the deaths were in males (n=6,485) and 48.7% were in females (n=6,157). Lung & bronchus (28.5%), prostate (9.3%), and colorectal (8.4%) cancers accounted for 46.2% of all NH male cancer-related deaths.



**Figure 1.8:** Top 10 invasive cancer sites by cancer mortality rate in NH male residents diagnosed between 2006 and 2010.

Lung & bronchus (27.4%), breast (14.0%) and colorectal (8.7%) cancers accounted for 50.1% of all NH female cancer-related deaths.



**Figure 1.9:** Top 10 invasive cancer sites by cancer mortality rate in NH female residents diagnosed between 2006 and 2010.

## Mortality Rates

Overall and gender specific cancer mortality rates for NH residents were not significantly different from corresponding US white rates. However, cancer mortality rates for NH residents were significantly different from US white rates for some site specific cancers as listed in table 1.3.

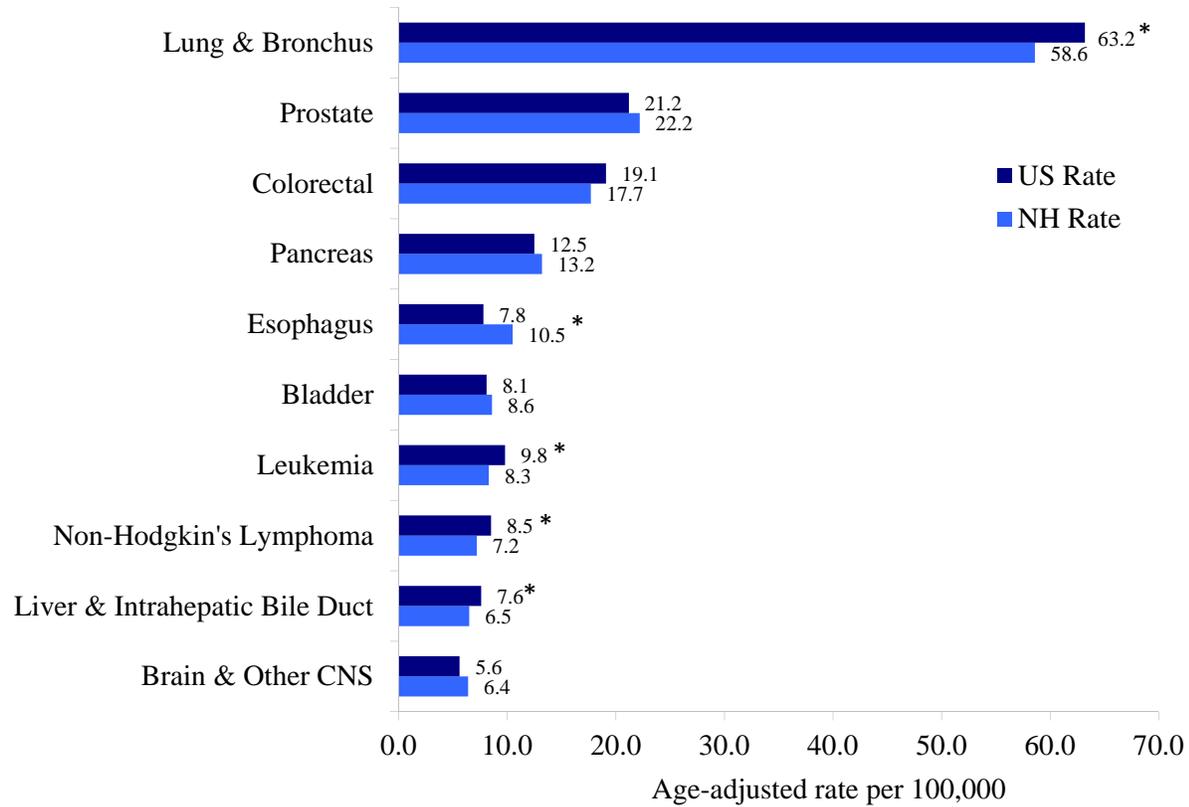
**Table 1.3:** Age-adjusted mortality rates for NH residents by gender and primary cancer site diagnosed between 2006 and 2010.

Cancer sites	Female rates				Male rates				Overall rates			
	New Hampshire		US		New Hampshire		US		New Hampshire		US	
	Rate	(95% CI)	Rate	(95% CI)	Rate	(95% CI)	Rate	(95% CI)	Rate	(95% CI)	Rate	(95% CI)
Bladder	2.5	(2.0 – 3.0)	2.2	(2.2 – 2.3)	8.6	(7.5 – 9.7)	8.1	(8.0 – 8.2)	4.9	(4.4 – 5.4)	4.6	(4.6 – 4.6)
Brain & other CNS	3.6	(3.0 – 4.2)	3.8	(3.7 – 3.8)	6.4	(5.5 – 7.2)	5.6	(5.6 – 5.7)	4.9	(4.3 – 5.4)	4.6	(4.6 – 4.7)
Breast (female)	21.0	(19.6 – 22.4)	22.1	(22.0 – 22.2)	--	--	--	--	--	--	--	--
Cervical	2.0	(1.6 – 2.5)	2.2	(2.1 – 2.2)	--	--	--	--	--	--	--	--
Colorectal	12.8	(11.7 – 13.9)	13.4	(13.3 – 13.5)	17.7	(16.2 – 19.3)	19.1	(18.9 – 19.2)	14.9	(14.0 – 15.8)	15.9	(15.8 – 16.0)
Esophagus	2.1	(1.7 – 2.6)*	1.6	(1.5 – 1.6)	10.5	(9.4 – 11.7)*	7.8	(7.7 – 7.9)	5.9	(5.3 – 6.4)*	4.4	(4.3 – 4.4)
Hodgkin's Disease	0.2	(0.1 – 0.4)	0.3	(0.3 – 0.3)	0.5	(0.3 – 0.8)	0.5	(0.5 – 0.5)	0.4	(0.3 – 0.5)	0.4	(0.4 – 0.4)
Kidney & Renal pelvis	2.0	(1.6 – 2.5)*	2.6	(2.6 – 2.7)	5.3	(4.5 – 6.1)	5.9	(5.8 – 5.9)	3.5	(3.1 – 3.9)*	4.1	(4.0 – 4.1)
Larynx	0.5	(0.3 – 0.7)	0.4	(0.4 – 0.4)	2.2	(1.7 – 2.7)	1.9	(1.9 – 1.9)	1.2	(1.0 – 1.5)	1.1	(1.1 – 1.1)
Leukemia	5.8	(5.1 – 6.6)	5.5	(5.4 – 5.5)	8.3	(7.3 – 9.4)*	9.8	(9.7 – 9.9)	6.8	(6.2 – 7.4)	7.3	(7.3 – 7.4)
Liver & Intrahepatic Bile Duct	2.8	(2.3 – 3.3)	3.2	(3.1 – 3.2)	6.5	(5.6 – 7.3)*	7.6	(7.5 – 7.6)	4.5	(4.0 – 5.0)*	5.2	(5.1 – 5.2)
Lung & Bronchus	42.4	(40.4 – 44.5)	40.4	(40.3 – 40.6)	58.6	(55.9 – 61.3)*	63.2	(63.0 – 63.5)	49.0	(47.4 – 50.7)	50.2	(50.1 – 50.3)
Melanoma of Skin	1.7	(1.4 – 2.2)	2.0	(1.9 – 2.0)	4.1	(3.4 – 4.8)	4.6	(4.6 – 4.7)	2.8	(2.4 – 3.2)	3.1	(3.1 – 3.2)
Multiple Myeloma	2.7	(2.2 – 3.2)	2.5	(2.4 – 2.5)	4.0	(3.3 – 4.7)	4.0	(4.0 – 4.1)	3.2	(2.8 – 3.6)	3.1	(3.1 – 3.2)
Non-Hodgkin's Lymphoma	4.7	(4.0 – 5.3)	5.3	(5.3 – 5.4)	7.2	(6.2 – 8.2)*	8.5	(8.4 – 8.6)	5.7	(5.2 – 6.3)*	6.7	(6.7 – 6.7)
Oral cavity & Pharynx	1.3	(1.0 – 1.7)	1.4	(1.4 – 1.4)	3.9	(3.2 – 4.5)	3.6	(3.6 – 3.7)	2.5	(2.1 – 2.9)	2.4	(2.4 – 2.4)
Ovary	7.8	(7.0 – 8.7)	8.4	(8.4 – 8.5)	--	--	--	--	--	--	--	--
Pancreas	10.2	(9.3 – 11.2)	9.4	(9.3 – 9.4)	13.2	(11.9 – 14.4)	12.5	(12.4 – 12.5)	11.5	(10.7 – 12.3)	10.8	(10.7 – 10.8)
Prostate	--	--	--	--	22.2	(20.4 – 24.0)	21.2	(21.1 – 21.4)	--	--	--	--
Stomach	1.9	(1.5 – 2.4)	2.2	(2.2 – 2.2)	3.8	(3.1 – 4.5)	4.2	(4.2 – 4.3)	2.8	(2.4 – 3.2)	3.1	(3.1 – 3.1)
Testis	--	--	--	--	0.2	(0.1 – 0.4)	0.3	(0.3 – 0.3)	--	--	--	--
Thyroid	0.5	(0.3 – 0.7)	0.5	(0.5 – 0.5)	0.7	(0.4 – 1.0)	0.5	(0.5 – 0.5)	0.5	(0.4 – 0.7)	0.5	(0.5 – 0.5)
Uterus	4.6	(3.9 – 5.2)	4.0	(3.9 – 4.0)	--	--	--	--	--	--	--	--
All Malignant Cancers	150.9	(147.0 – 154.7)	149.8	(149.5 – 150.0)	209.3	(204.1 – 214.5)	213.1	(212.7 – 213.5)	174.0	(171.0 – 177.1)	175.8	(175.6 – 176.0)

\* Difference is statistically significant from the US population; -- gender specific cancer  
NH cancer incidence rates were compared to the national (SEER) white race incidence rates

### Mortality Rates by Gender

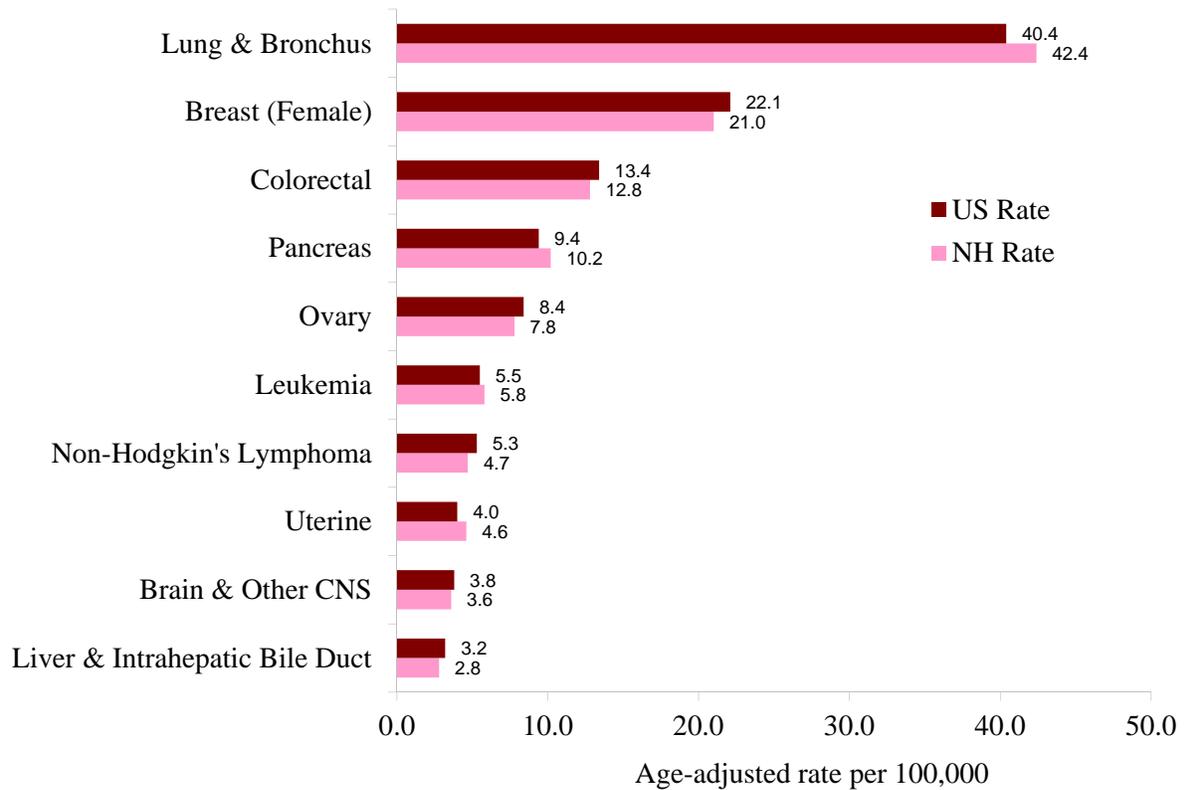
Lung cancer was the leading cause of cancer mortality for male NH residents between 2006 and 2010, followed by prostate cancer. Colorectal cancer was the third leading cause of cancer mortality for males.



**Figure 1.10:** Top 10 mortality rates by cancer site among NH male residents diagnosed between 2006 and 2010.

\* Significantly different between US and NH rates

Lung cancer was the leading cause of cancer mortality for female NH residents between 2006 and 2010, followed by breast cancer. Colorectal cancer was the third leading cause of cancer mortality for females.



**Figure 1.11:** Top 10 mortality rates by cancer site among NH female residents diagnosed between 2006 and 2010.

## **Comparison of Mortality Rates between NH and US white population**

### ***Overall***

Between 2006 and 2010, the mortality rates of the following cancers were higher in NH residents than the US white population:

1. The esophageal cancer mortality rate for NH residents was significantly higher than the US white rate (5.9 vs. 4.4 per 100,000).

Between 2006 and 2010, the mortality rates of the following cancers were lower in NH residents than the US white population:

1. The liver & intrahepatic bile duct cancer mortality rate for NH residents was significantly lower than the US white rate (4.5 vs. 5.2 per 100,000).
2. The kidney and renal pelvis cancer mortality rate for NH residents was significantly lower than the US white rate (3.5 vs. 4.1 per 100,000).
3. Non-Hodgkin's Lymphoma mortality rate for NH residents was significantly lower than the US white rate (5.7 vs. 6.7 per 100,000).

### ***Males***

Between 2006 and 2010, the mortality rate of the following cancer was higher in NH males than US white males:

1. The esophageal cancer mortality rate for male NH residents was significantly higher than the US white male rate (10.5 vs. 7.8 per 100,000).

Between 2006 and 2010, the mortality rates of the following cancers were lower in NH males than US white males:

1. The liver and intrahepatic bile duct cancer mortality rate for male NH residents was significantly lower than the US white male rate (6.5 vs. 7.6 per 100,000).
2. Leukemia mortality rate for male NH residents was significantly lower than the US white male rate (8.3 vs. 9.8 per 100,000).
3. Non-Hodgkin's Lymphoma mortality rate for male NH residents was significantly lower than the US white male rate (7.2 vs. 8.5 per 100,000).

4. The lung & bronchus cancer mortality rate for male NH residents was significantly lower than the US white male rate (58.6 vs. 63.2 per 100,000).

### ***Females***

Between 2006 and 2010, the mortality rate of the following cancer was higher in NH females than US white females:

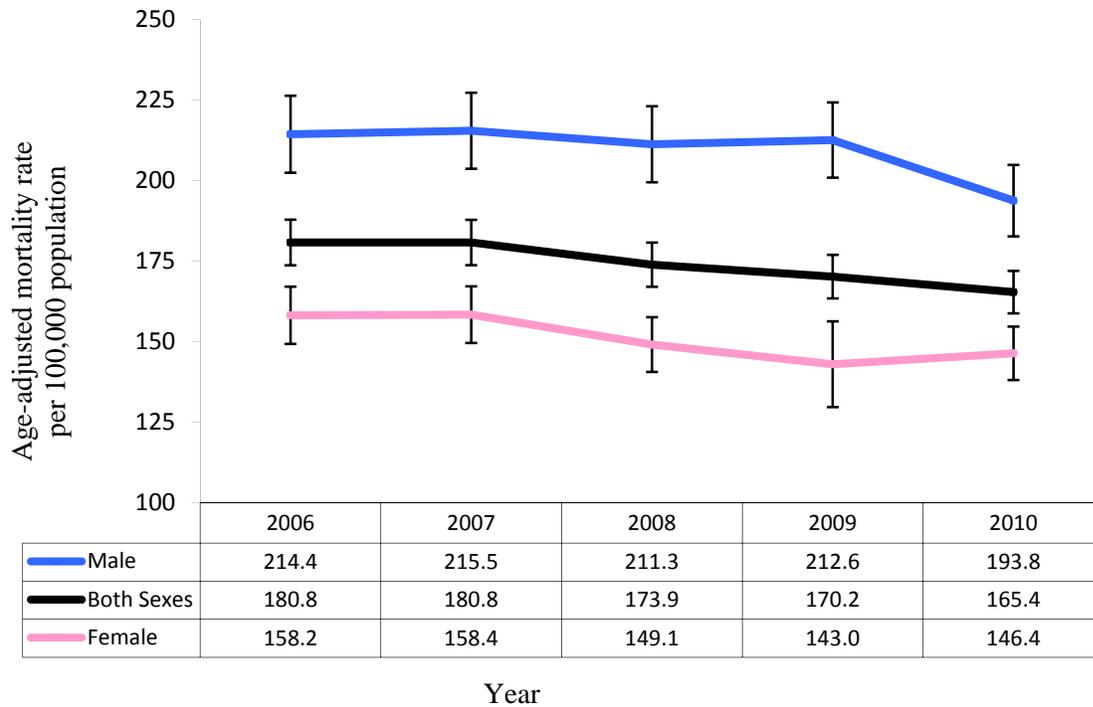
1. The esophageal cancer mortality rate for female NH residents was significantly higher than the US white female rate (2.1 vs. 1.6 per 100,000).

Between 2006 and 2010, the mortality rate of the following cancer was lower in NH females than US white females:

1. The kidney and renal pelvis cancer mortality rate for female NH residents was significantly lower than the US white female rate (2.0 vs. 2.6 per 100,000).

### Average Annual Percent Change (AAPC) in Cancer Mortality

AAPC for cancer mortality among NH residents fell at a statistically significant rate between 2006 and 2010 (-2.3%, 95% CI= -3.3%, -1.4%). This finding was also significant for males (-2.6%, 95% CI= -3.3%, -1.9%) and for females (-1.4%, 95% CI= -1.6%, -1.2%) too.



**Figure 1.12:** Cancer mortality rate by gender and by year among NH residents between 2006 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

[Source: <http://www.statecancerprofiles.cancer.gov/> ]

## Average Annual Percent Change (AAPC) in Cancer Mortality by Cancer Site

Average Annual Percent Change fell significantly for the following 9 cancers in NH between 2006 and 2010: colon and rectum, stomach, cervix, prostate, breast (female), oral cavity and pharynx, Non-Hodgkin's lymphoma, ovary, and lung & bronchus. AAPC rose significantly for 3 cancers in NH between 2006 and 2010: esophagus, liver & bile duct, and thyroid cancer.

**Table 1.4:** Average annual percent change in cancer mortality by cancer site for NH residents diagnosed between 2006 and 2010.

[Source: <http://www.statecancerprofiles.cancer.gov/> ]

Cancer Site	Estimated Annual Percent Change	Lower 95% CL	Upper 95% CL
Colon and Rectum*	-4.5	-5.9	-3.2
Stomach*	-4.0	-4.9	-3.1
Cervix*	-3.8	-5.1	-2.4
Prostate*	-3.3	-3.8	-2.7
Breast (Female)*	-3.1	-3.7	-2.6
Oral Cavity & Pharynx*	-2.6	-3.9	-1.3
Non-Hodgkin's Lymphoma*	-2.5	-3.6	-1.4
Ovary*	-1.7	-2.6	-0.9
Kidney & Renal Pelvis	-1.1	-2.2	0.1
Lung & Bronchus*	-1.1	-1.5	-0.7
Brain and ONS	-0.8	-1.8	0.1
Leukemia	-0.7	-1.5	0.2
Bladder	-0.6	-1.3	0.1
Melanoma of the Skin	-0.1	-1.6	1.4
Pancreas	0.5	-0.2	1.2
Uterus	0.7	-0.9	2.3
Esophagus*	1.0	0.0	1.9
Liver & Bile Duct*	1.6	0.6	2.6
Thyroid*	3.3	0.4	6.3
<b>Overall cancer mortality*</b>	<b>-2.3</b>	<b>-3.3</b>	<b>-1.4</b>

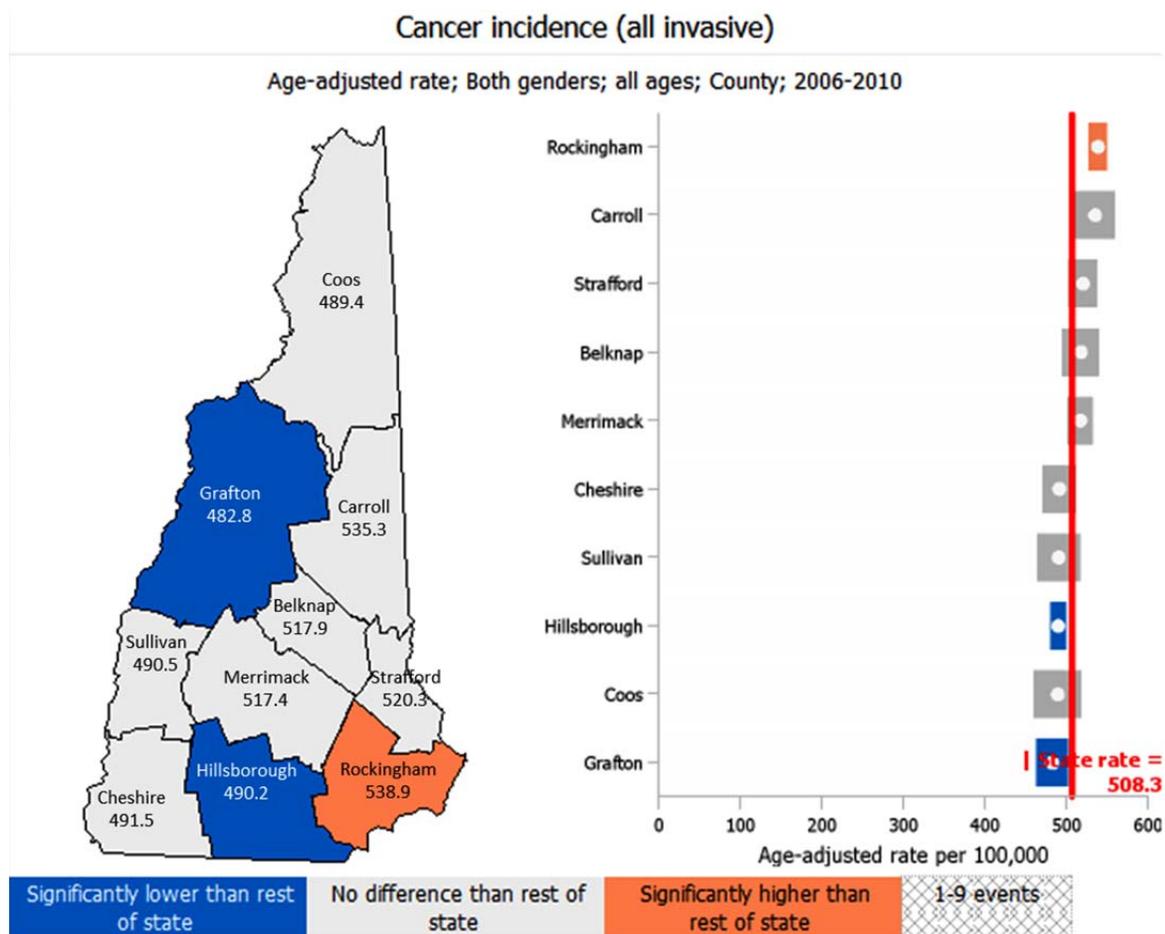
\*The average annual percent change is significantly different from zero ( $p < 0.05$ ).

CL = Confidence limit

## COUNTY LEVEL VARIABILITY IN CANCER

### Overall Cancer Incidence

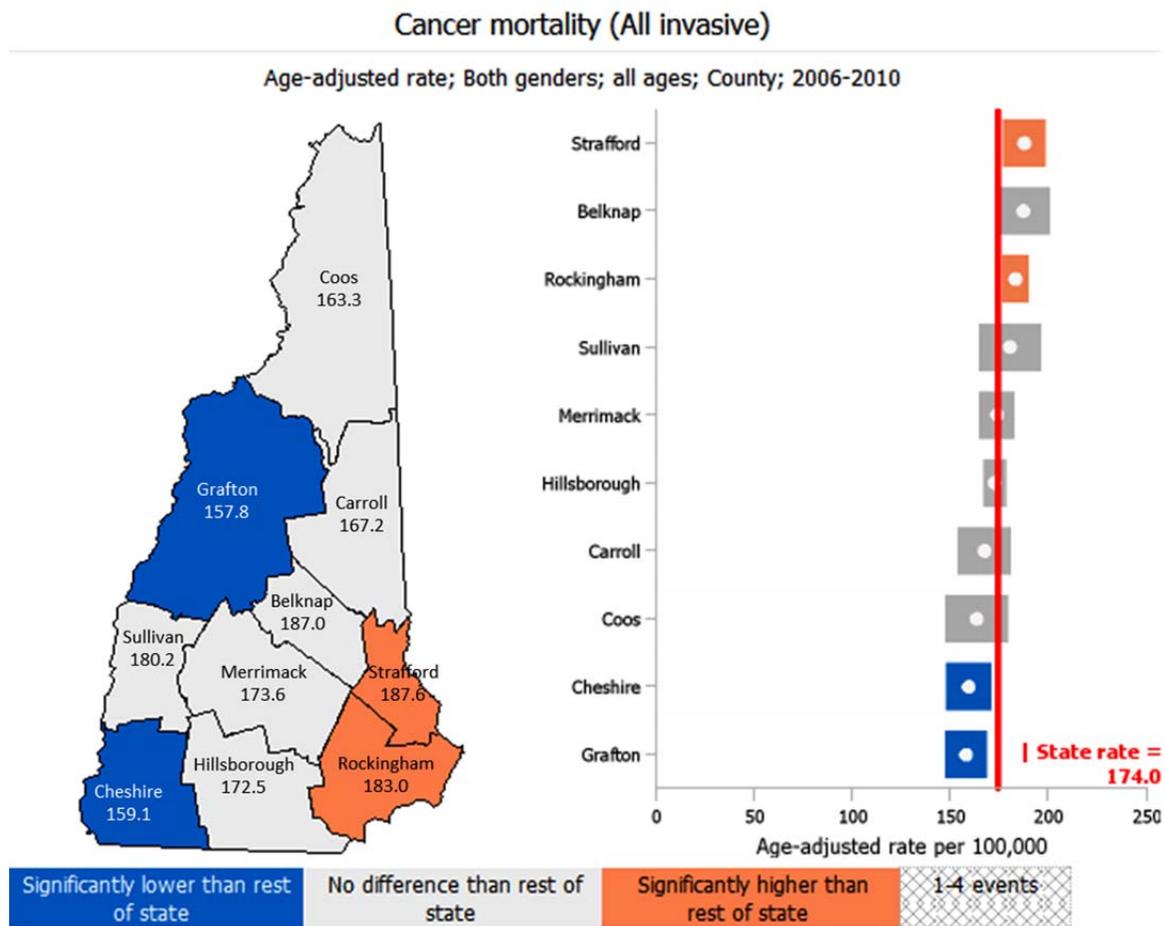
Rockingham County had a higher age-adjusted cancer incidence rate than the rest of the state between 2006 and 2010. Hillsborough and Grafton counties had lower incidence rates than the rest of the state. These differences were statistically significant. All other counties show no statistically significant difference from the rest of the state.



**Figure 1.13:** Overall age-adjusted cancer incidence rates by county in NH residents diagnosed between 2006 and 2010.

## Overall Cancer Mortality

Rockingham and Stafford counties had a higher cancer mortality rates than the rest of the state between 2006 and 2010 and this difference was statistically significant. Cheshire and Grafton counties had lower mortality rates than the rest of the state. These differences were statistically significant. All other counties show no statistically significant difference from the rest of the state.



**Figure 1.14:** Overall cancer mortality rates by county in NH residents diagnosed between 2006 and 2010.

## Cancer Site Specific Geographic Variability

Table 1.5 shows the counties that have significantly higher or lower incidence or mortality rates than the rest of the state for the top 10 cancer site.

[Note: County or town level data involve small numbers which can lead to statistical reliability issues, and publication of small numbers might compromise the confidentiality of individuals represented by the data. This report suppresses estimates which may compromise confidentiality or lead to inappropriate statistical inference. The results reported here should be interpreted with caution and random chance should always be considered first when trying to interpret the data].

**Table 1.5:** Geographic variability in cancer incidence and mortality rates for NH residents between 2006 and 2010 by county

Cancer Site	Incidence Rate		Mortality Rate	
	Higher than rest of State	Lower than rest of State	Higher than rest of State	Lower than rest of State
Breast (female)	Belknap*	--	--	--
Colorectal	--	--	--	--
Leukemia	--	--	--	--
Lung & bronchus	Belknap* Rockingham*	--	Belknap*	Grafton* Carroll*
Non-Hodgkin's Lymphoma	--	--	--	--
Melanoma	Grafton*	Hillsborough*	--	Hillsborough*
Bladder	--	--	--	--
Uterine	--	--	--	--
Kidney & renal pelvis	--	Cheshire*	--	--
Prostate	Carroll* Rockingham*	Sullivan* Cheshire*	--	--

Note: Each county level estimate is compared to the estimate for the 9 other counties within the state.

\*Statistically significant; it was determined by the overlapping 95% confidence interval method

--No county was significantly higher/lower than rest of state.

## **Notes:**

### **Data Sources:**

SEER incidence data source: <http://seer.cancer.gov/canques/incidence.html>

SEER mortality data source: <http://seer.cancer.gov/canques/mortality.html>

NH incidence data source: NH state cancer registry. <http://geiselmed.dartmouth.edu/nhscr/>

NH mortality data source: New Hampshire Department of Health and Human Services, Bureau of Public Health Statistics and Informatics and NH Department of State, Division of Vital Records Administration

### **AAPC- Incidence:**

Created by [statecancerprofiles.cancer.gov](http://statecancerprofiles.cancer.gov) on 11/25/2013.

Source: Incidence data provided by the [National Program of Cancer Registries \(NPCR\)](#). EAAPCs calculated by the National Cancer Institute using [SEER\\*Stat](#). Rates are age-adjusted to the [2000 US standard population](#) (19 age groups: <1, 1-4, 5-9, ..., 80-84, 85+). Population counts for denominators are based on Census populations as modified by NCI. The 1969-2011 US Population Data File is used with NPCR January 2013 data.

### **AAPC-Mortality:**

Created by [statecancerprofiles.cancer.gov](http://statecancerprofiles.cancer.gov) on 11/25/2013.

Source: Death data provided by the National Vital Statistics System (<http://www.cdc.gov/nchs/nvss.htm>) public use data file. Death rates calculated by the National Cancer Institute using [SEER\\*Stat](#) (<http://seer.cancer.gov/seerstat/>). Death rates (deaths per 100,000 population per year) are age-adjusted to the 2000 US (<http://www.seer.cancer.gov/stdpopulations/stdpop.19ages.html>) standard population (<http://www.seer.cancer.gov/stdpopulations/stdpop.19ages.html>) (19 age groups: <1, 1-4, 5-9, ... , 80-84, 85+). Population counts for denominators are based on Census populations as modified (<http://seer.cancer.gov/popdata/>) by NCI. The 1969-2011 US Population Data File is used with mortality data.

### **Data Notes:**

1. Data were suppressed when incident cases were between 1 and 9 and mortality cases were between 1 and 4.
2. Rates are expressed as cases per 100,000.
3. Statistics were generated from data provided by the US National Center for Health Statistics.

### **Suggested Citation:**

Surveillance, Epidemiology, and End Results (SEER) Program ([www.seer.cancer.gov](http://www.seer.cancer.gov)) SEER\*Stat Database: Mortality - All COD, Aggregated With State, Total US (1969-2010), National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2013. Underlying mortality data provided by NCHS ([www.cdc.gov/nchs](http://www.cdc.gov/nchs)).

## **TOP TEN CANCERS IN NEW HAMPSHIRE, 2006-2010**

## **PROSTATE CANCER**

- It is estimated that prostate cancer will be the most invasive cancer diagnosed in US male population in 2013.<sup>a</sup>
- Life time risk: Based on most recent data, 15.3% of US male population will be diagnosed with prostate cancer at some point during their lifetime.<sup>b</sup>
- It is estimated that prostate cancer will represent 14.4% of all new US cancer cases in 2013.<sup>b</sup>
- It is estimated that prostate cancer will represent 5.1% of all US cancer-related deaths in 2013 and will be the second leading cause of cancer related deaths in males.<sup>b</sup>

### ***Risk Factors:***

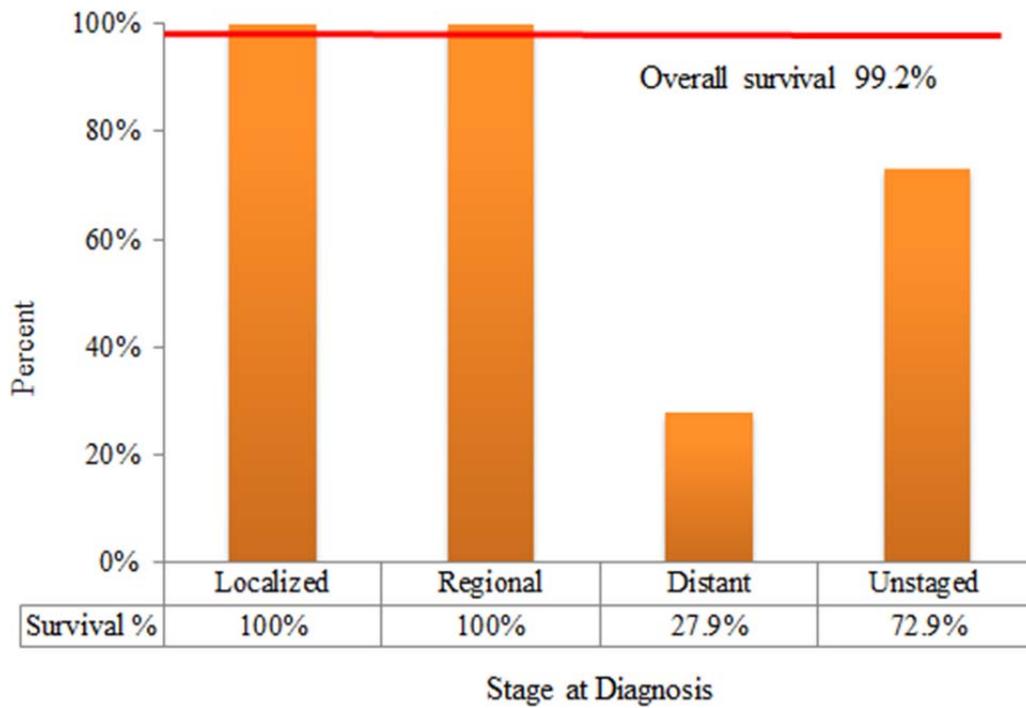
- Age: Prostate cancer is rare below age 40, and it sharply rises after age 50.
- Race/ethnicity: Prostate cancer incidence is highest in African-American males.
- Family history: Family history of prostate cancer increases the risk by twofold.
- Some studies suggest that diet, obesity, smoking, workplace exposure or prostatitis increases the risk of prostate cancer.<sup>c</sup>

### ***Screening guidelines:***

- The USPSTF recommends against Prostate Specific Antigen (PSA)-based screening for prostate cancer.<sup>d</sup>

### ***Survival Rate:***

- Five-year relative survival for prostate cancer in the US is 99.2% for all stages combined based on SEER 18 2003-2009.<sup>b</sup>



**Figure 2.1.1:** 5-year relative survival rates of prostate cancer in the US by stage of diagnosis for males diagnosed between 2003 and 2009.

***Prostate Cancer in NH between 2006 and 2010***

Prostate cancer was the most commonly diagnosed cancer among NH male residents between 2006 and 2010 (5,554 total invasive cases, average of 1,108 cases per year). Prostate cancer accounted for 28.3% of new cancer cases diagnosed among NH males between 2006 and 2010. During the same period, 605 NH male residents died from prostate cancer and it remained the second leading cause of cancer-related deaths among NH males.

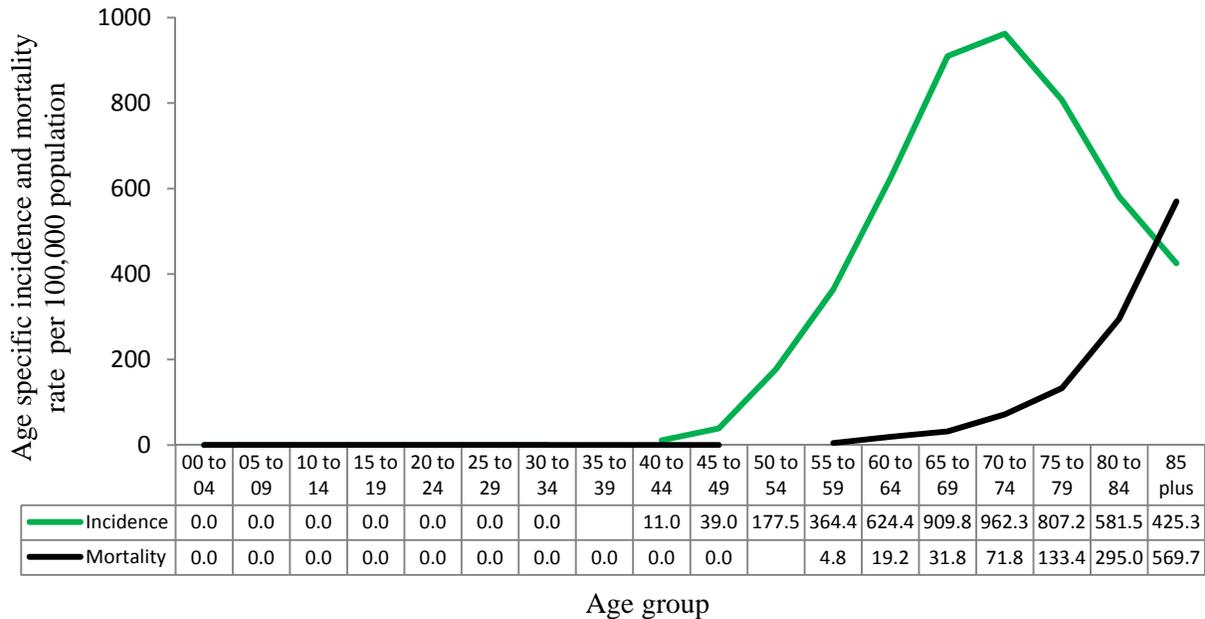
The age-adjusted incidence and mortality rates of prostate cancer among NH males were similar to US white rates between 2006 and 2010.

**Table 2.1.1:** Age-adjusted prostate cancer incidence and mortality rates for NH and US residents between 2006 and 2010

	<b>NH (n)</b>	<b>NH rate per 100,000</b>	<b>US white rate per 100,000</b>
Incidence	5,554	157.5 (153.2 – 161.7)	154.6 (153.6 – 155.7)
Mortality	605	22.2 (20.4 – 24.0)	21.2 (21.1 – 21.4)

**Age-specific incidence and mortality rates**

Prostate cancer incidence rates for NH male residents peaked in 70 to 74 year olds. Mortality rate increased steadily with age and rose sharply after age 79.



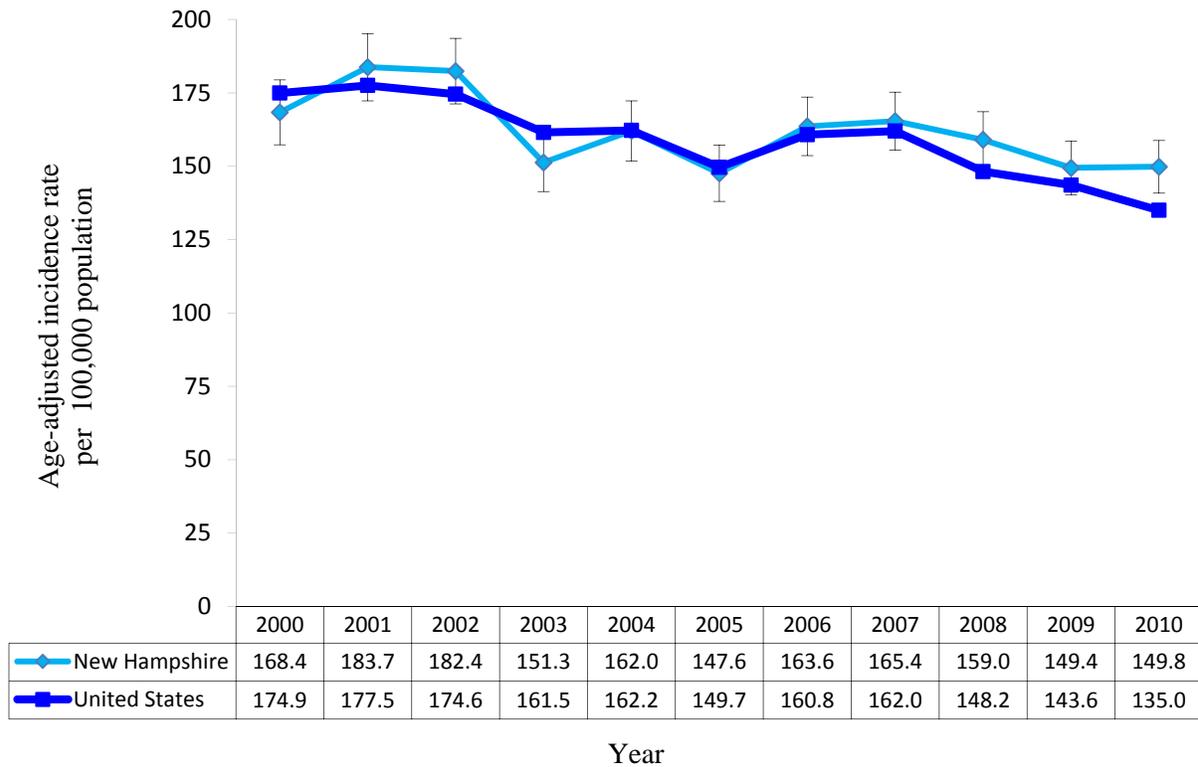
**Figure 2.1.2:** Prostate cancer age-specific incidence and mortality rates for NH male residents diagnosed between 2006 and 2010.

Rates are not displayed if incidence counts were reported between 1 and 9 or mortality counts were reported between 1 and 4 as they tend to be unstable.

*Age-adjusted incidence rate time trends*

The average annual percent change (AAPC) of prostate cancer incidence rate in NH fell between 2006 and 2010 and was statistically significant (-3.7% per year, 95% CI= -6.1%, -1.3%).<sup>e</sup>

Prostate cancer age-adjusted incidence rates for NH male residents were similar to US white male rates except for 2010 when the rate was significantly higher than the US white rate.



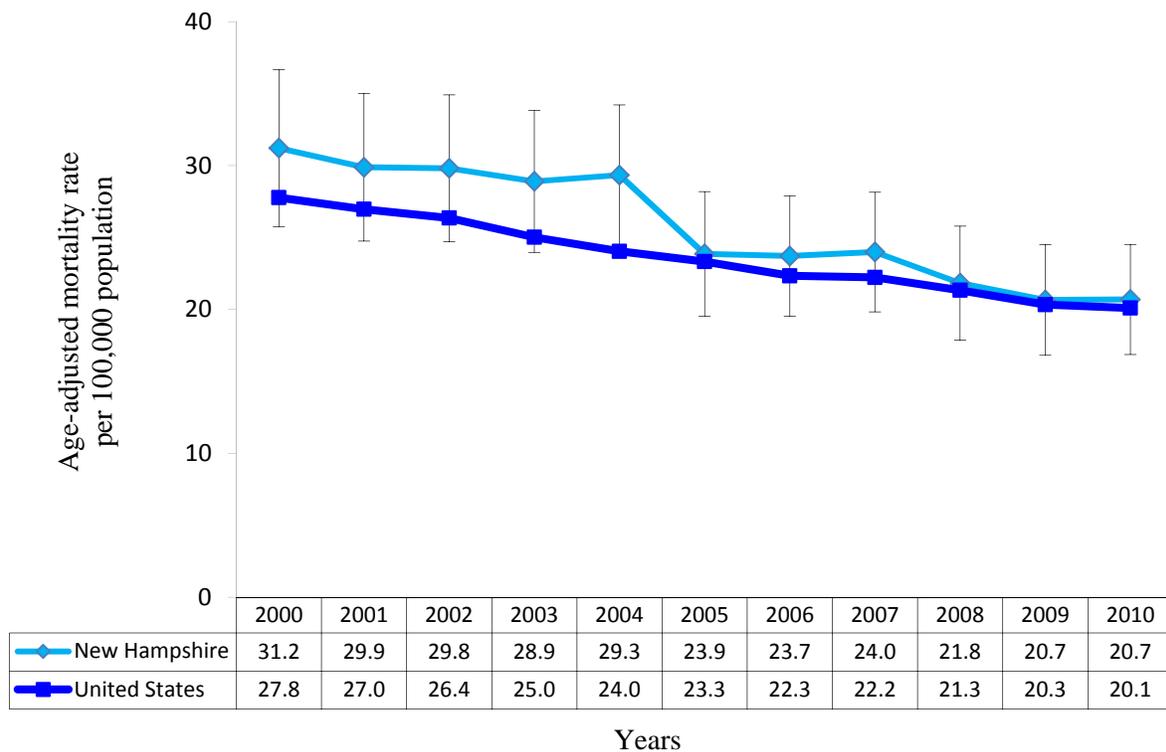
**Figure 2.1.3:** Prostate cancer incidence rate (age-adjusted) time trends for NH male residents diagnosed between 2006 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

**Age-adjusted mortality rate time trends**

The average annual percent change (AAPC) of prostate cancer mortality rate in NH fell between 2006 and 2010 and was statistically significant (-3.3% per year, 95% CI= -3.8%, -2.7%).<sup>e</sup>

Prostate cancer mortality rates in NH male residents were similar to US white male rates between 2006 and 2010.



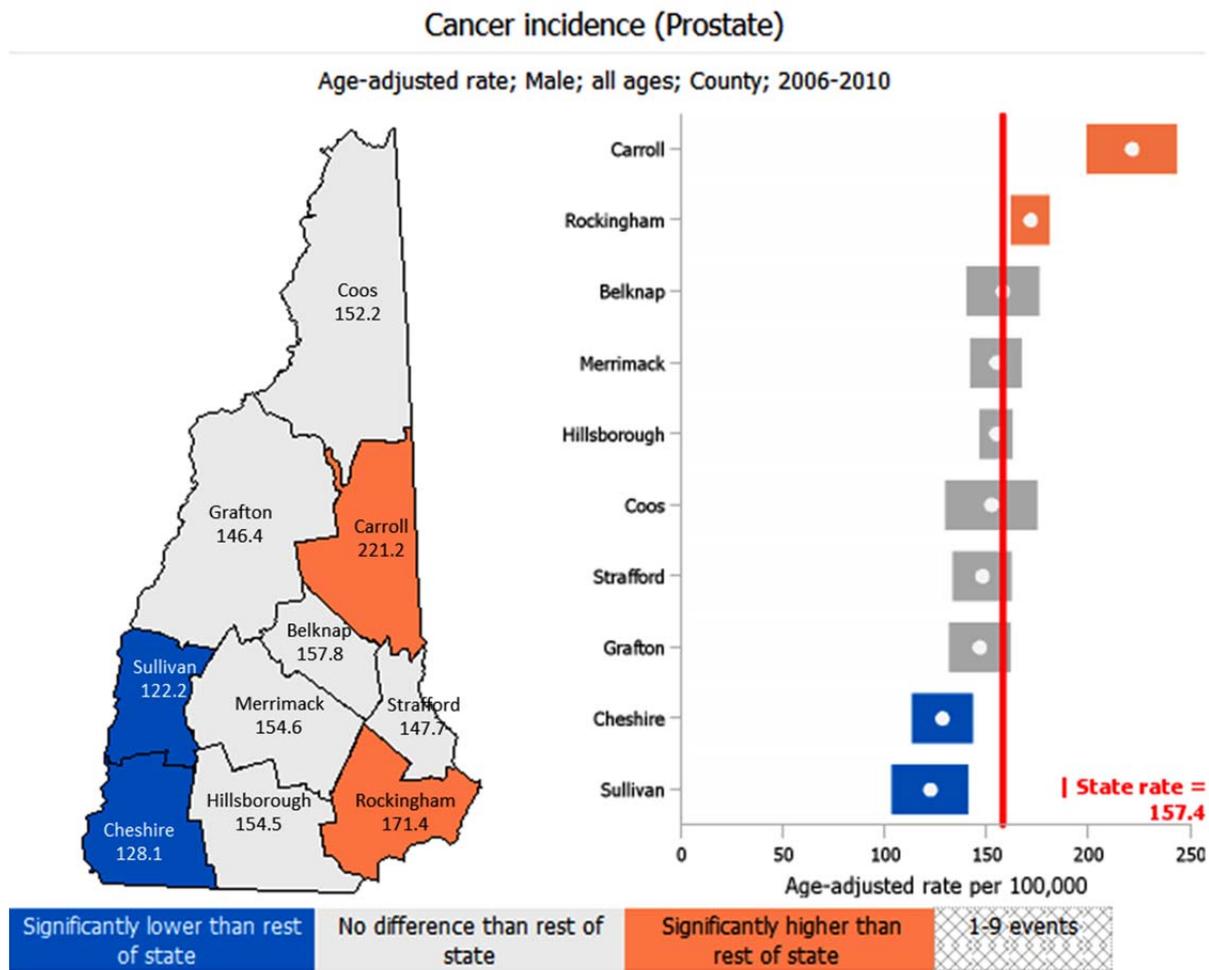
**Figure 2.1.4:** Prostate cancer age-adjusted mortality rate time trends for NH male residents diagnosed between 2006 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

**County level variability in prostate cancer incidence and mortality rates**

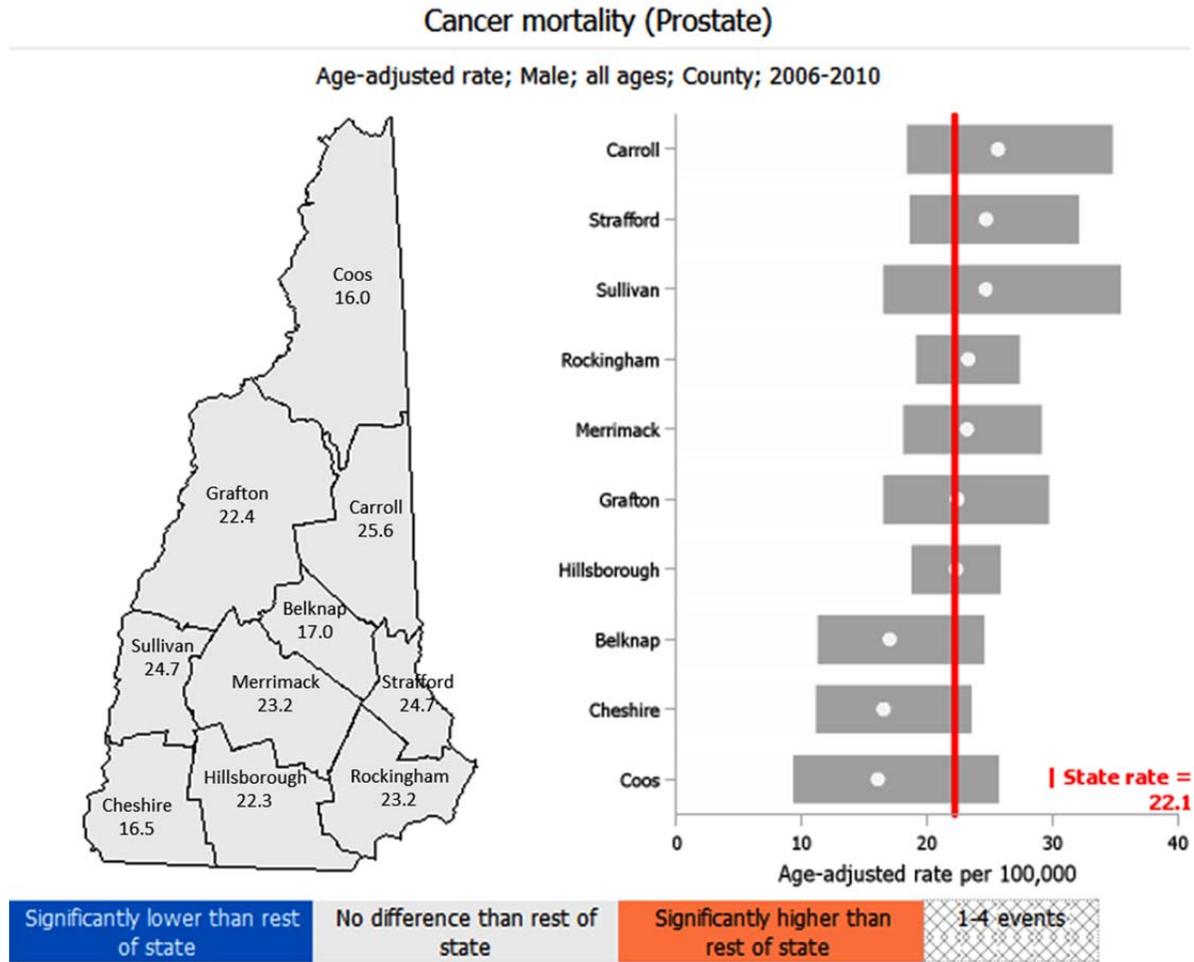
Prostate cancer incidence rates in Carroll and Rockingham counties were higher than the residents in the rest of the state between 2006 and 2010 and this difference was statistically significant.

Prostate cancer incidence rates in Cheshire and Sullivan counties were lower than the residents in the rest of the state between 2006 and 2010 and this difference was statistically significant.



**Figure 2.1.5:** Prostate cancer incidence rates (age-adjusted) by NH counties for male residents diagnosed between 2006 and 2010.

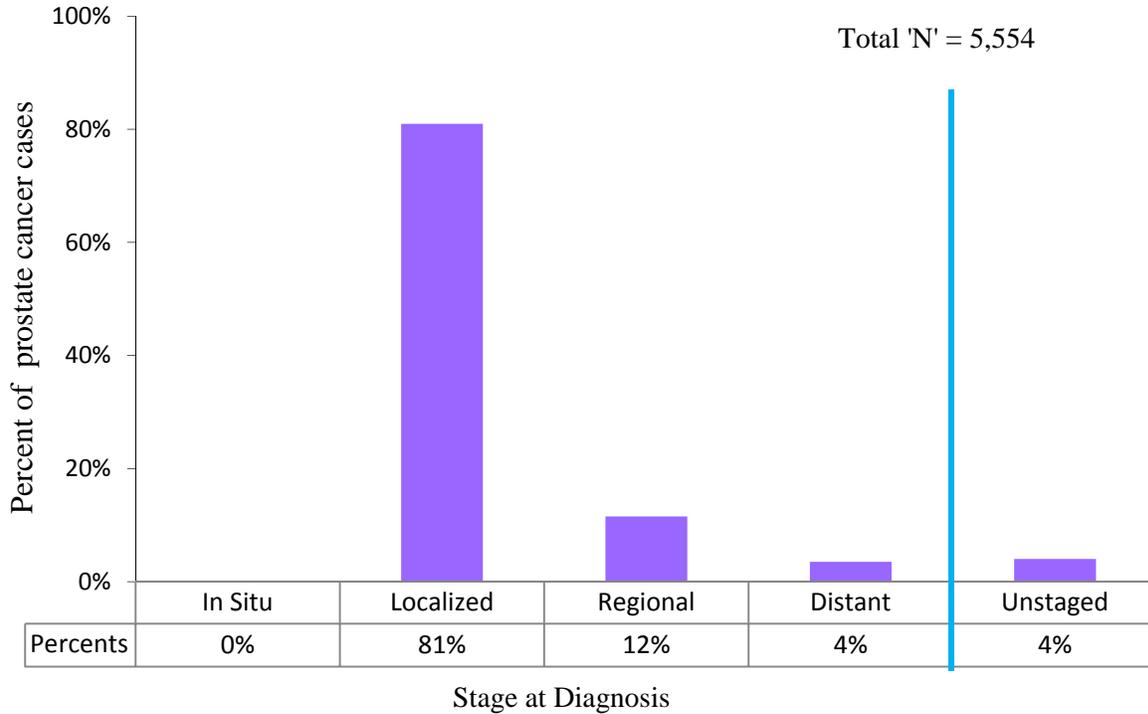
There was no significant geographic variability in prostate cancer mortality rates by NH counties.



**Figure 2.1.6:** Prostate cancer mortality rates (age-adjusted) by NH counties for male residents diagnosed between 2006 and 2010.

**Stage at Diagnosis**

For staging purpose, we used all reportable cancer cases (in situ and malignant). There were 5,554 new prostate cancer cases (in situ and malignant) diagnosed between 2006 and 2010 among NH male residents. Of them 81% were diagnosed at localized stage.



**Figure 2.1.7:** Stage at diagnosis for prostate cancer among NH male residents diagnosed between 2006 and 2010.

## Notes

### Data sources:

<sup>a</sup> American Cancer Society. Cancer statistics 2013:

<http://www.cancer.org/research/cancerfactsfigures/cancerfactsfigures/cancer-facts-figures-2013>

<sup>b</sup> National Cancer Institute. SEER Program: SEER Stat Fact Sheets: Prostate Cancer

<http://seer.cancer.gov/statfacts/html/prost.html>

<sup>c</sup> American Cancer Society.

<http://www.cancer.org/cancer/prostatecancer/detailedguide/prostate-cancer-risk-factors>

<sup>d</sup> Annual Percent Change (APC)- Incidence and Mortality: Created by:

<http://www.statecancerprofiles.cancer.gov/recenttrend/recenttrend.html> on 11/25/2013

<sup>e</sup> New Hampshire Department of Health and Human Services, Behavior Risk Factor Surveillance System data, 2012

Centers for Disease Control, Prostate Cancer Screening

[http://www.cdc.gov/cancer/prostate/basic\\_info/screening.htm](http://www.cdc.gov/cancer/prostate/basic_info/screening.htm)

US Preventive Services Task Force, screening for Prostate cancer

<http://www.uspreventiveservicestaskforce.org/prostatecancerscreening.htm>

National Cancer Institute Prostate Cancer Home Page,

<http://www.cancer.gov/cancertopics/prevention-genetics-causes/prostate>

New Hampshire Data Source:

Incidence: New Hampshire State Cancer Registry Program.

Mortality: New Hampshire Death Certificate Data, NH Dept. of State, Bureau Vital Records.

United States Incidence and Mortality Data Sources: Output, assessed on October 10, 2013.

<http://seer.cancer.gov/faststats/selections.php?#>

United States Incidence Data Source: Surveillance, Epidemiology and End Results (SEER) Program, 13 areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry and Rural Georgia).

United States Mortality Data Source: US Mortality Files, National Center for Health Statistics, CDC.

Rates are per 100,000 and are age-adjusted to the 2000 US Std. Population (19 age groups - Census P25-1130). The modeled rates are the point estimates for the regression lines calculated by the Joinpoint Regression Program (Version 4.0.3, April 2013, National Cancer Institute).

## **BREAST CANCER**

- It is estimated that breast cancer will be the most common invasive cancer diagnosed in US female population in 2013.<sup>a</sup>
- Lifetime risk: Based on most recent data, 12.3% of US females will be diagnosed with breast cancer at some point during their lifetime.<sup>b</sup>
- It is estimated that breast cancer will represent 14.1% of all new US cancer cases in 2013.<sup>b</sup>
- It is estimated that breast cancer will represent 6.9% of all US cancer deaths in 2013.<sup>b</sup>

### ***Risk factors:***

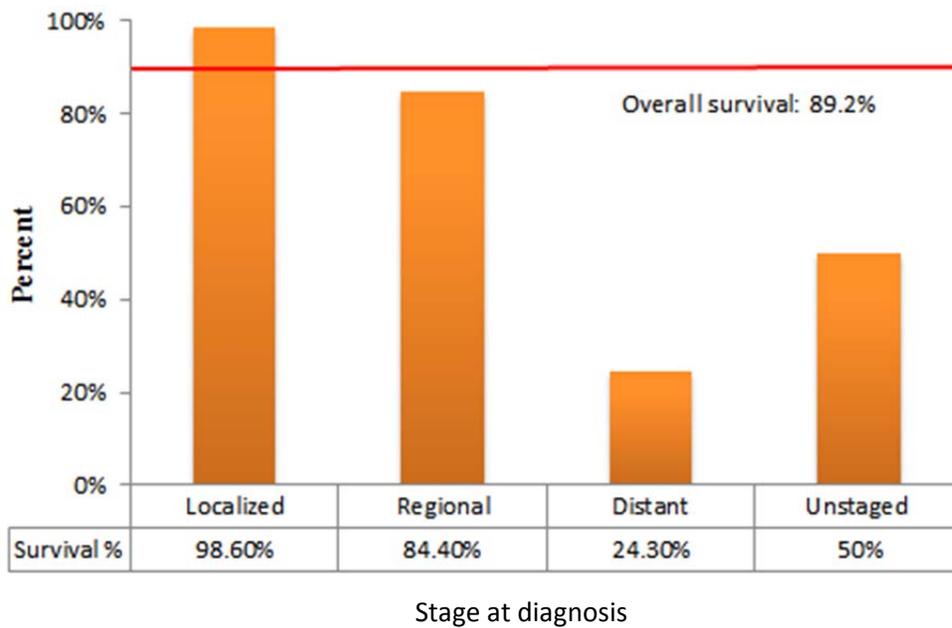
- Inherited genetic mutations; such as BRCA1 and BRCA2 gene mutation
- Personal or family history of breast cancer
- High breast tissue density
- Obesity after menopause
- Recent use of oral contraceptives
- Postmenopausal hormone therapy (especially combined estrogen and progestin)
- Never having children
- Having children after age 30

### ***Screening guidelines:***

- The United States Preventive Services Task Force (USPSTF) recommends biennial mammography screening for females between 50 and 74 years old.
- The USPSTF concludes that the decision to start regular, biennial mammography screening before age of 50 should be made on an individual basis and take patient context into account, including the patient's values regarding specific benefits and risks.
- The USPSTF concludes that current evidence is insufficient to assess the additional benefits and risks of mammography screening in females 75 years or older.

### ***Survival rate:***

Five-year relative survival for female (all races/ethnicities) breast cancer in the US is 89.2% for all stages combined based on SEER 18 2003-2009 data.<sup>b</sup>



**Figure 2.2.1:** 5-year relative survival rates of breast cancer in the US by stage of diagnosis for females diagnosed between 2003 and 2009.

### *Female breast cancer in NH between 2006 and 2010*

Breast cancer was the most commonly diagnosed cancer among female NH residents between 2006 and 2010 (5,250 total invasive cases, average of 1,050 cases per year). It accounted for 29% of new cancer cases among females diagnosed between 2006 and 2010. During this period, 865 female NH residents died from breast cancer and it remained the second most common cause of cancer-related death among females.

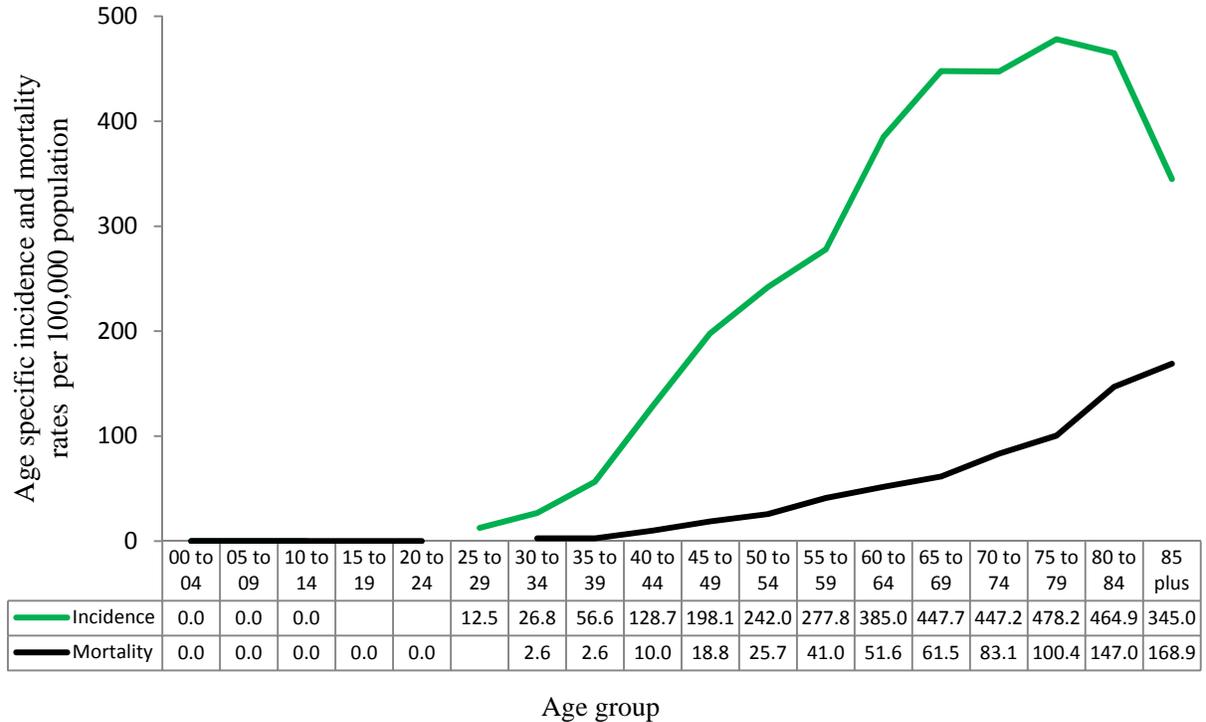
The age-adjusted incidence and mortality rates for female breast cancer among NH residents between 2006 and 2010 were similar to the US white female rate.

**Table 2.2.1:** Age-adjusted breast cancer incidence and mortality rates for NH and US female residents between 2006 and 2010

	<b>NH (n)</b>	<b>NH rate per 100,000</b>	<b>US white rate per 100,000</b>
Incidence	5,250	131.9 (128.5 – 135.5)	131.3 (130.4 - 132.3)
Mortality	865	21.0 (19.6 – 22.4)	22.1 (22.0 - 22.2)

**Age-specific incidence and mortality rate**

Breast cancer incidence rate for female NH residents was highest in 65 to 84 year olds but mortality rates increased steadily with age.



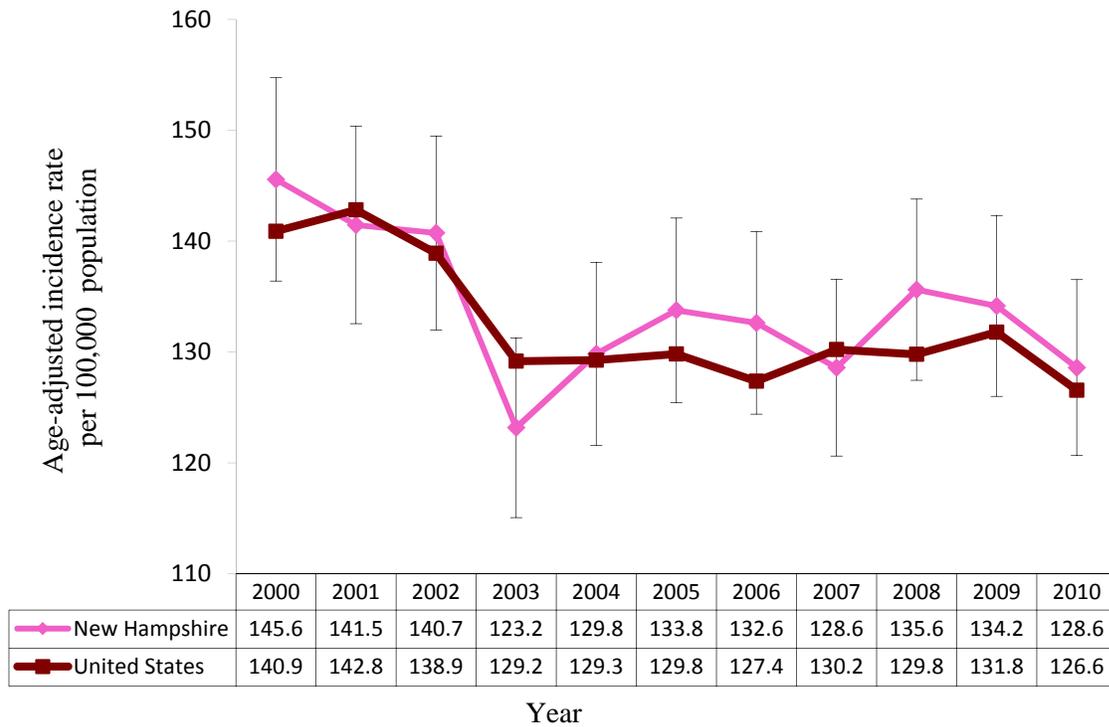
**Figure 2.2.2:** Female breast cancer age-specific incidence and mortality rates for NH female residents diagnosed between 2006 and 2010.

Rates are not displayed if incidence counts were reported between 1 and 9 or mortality counts were reported between 1 and 4 as they tend to be unstable.

**Age-adjusted incidence rate time trends**

The average annual percent change (AAPC) of breast cancer incidence rate in NH fell between 2006 and 2010 but was not statistically significant (-0.7% per year, 95% CI= -3.1%, 1.9%).<sup>c</sup>

NH female breast cancer incidence rates were not significantly different from the US white female rates in any year between 2006 and 2010.



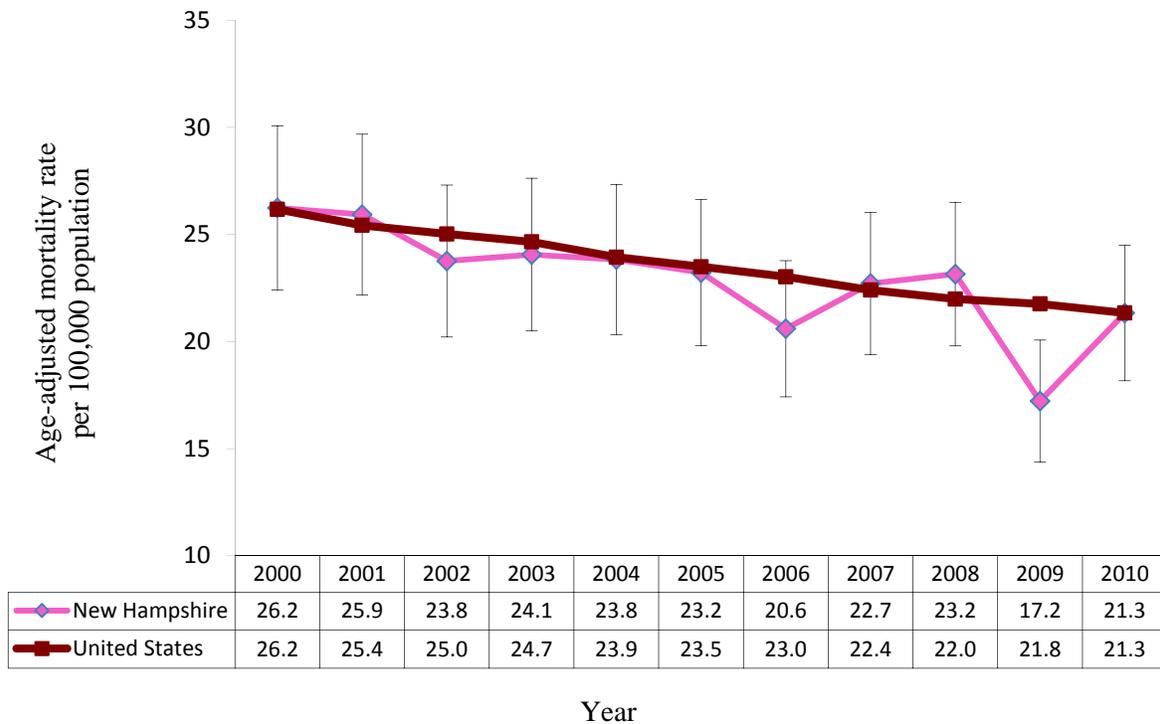
**Figure 2.2.3:** Female breast cancer age-adjusted incidence rate time trends for NH female residents diagnosed between 2000 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

*Age-adjusted mortality rate time trends*

The average annual percent change (AAPC) for breast cancer mortality fell at a statistically significant rate between 2006 and 2010 (-3.1% per year, 95% CI= -3.7%, -2.6%).<sup>c</sup>

NH female breast cancer mortality rates were not significantly different from the US white female rates in any year between 2006 and 2010 except for 2009 when the NH rate was significantly lower than the US white female rate.

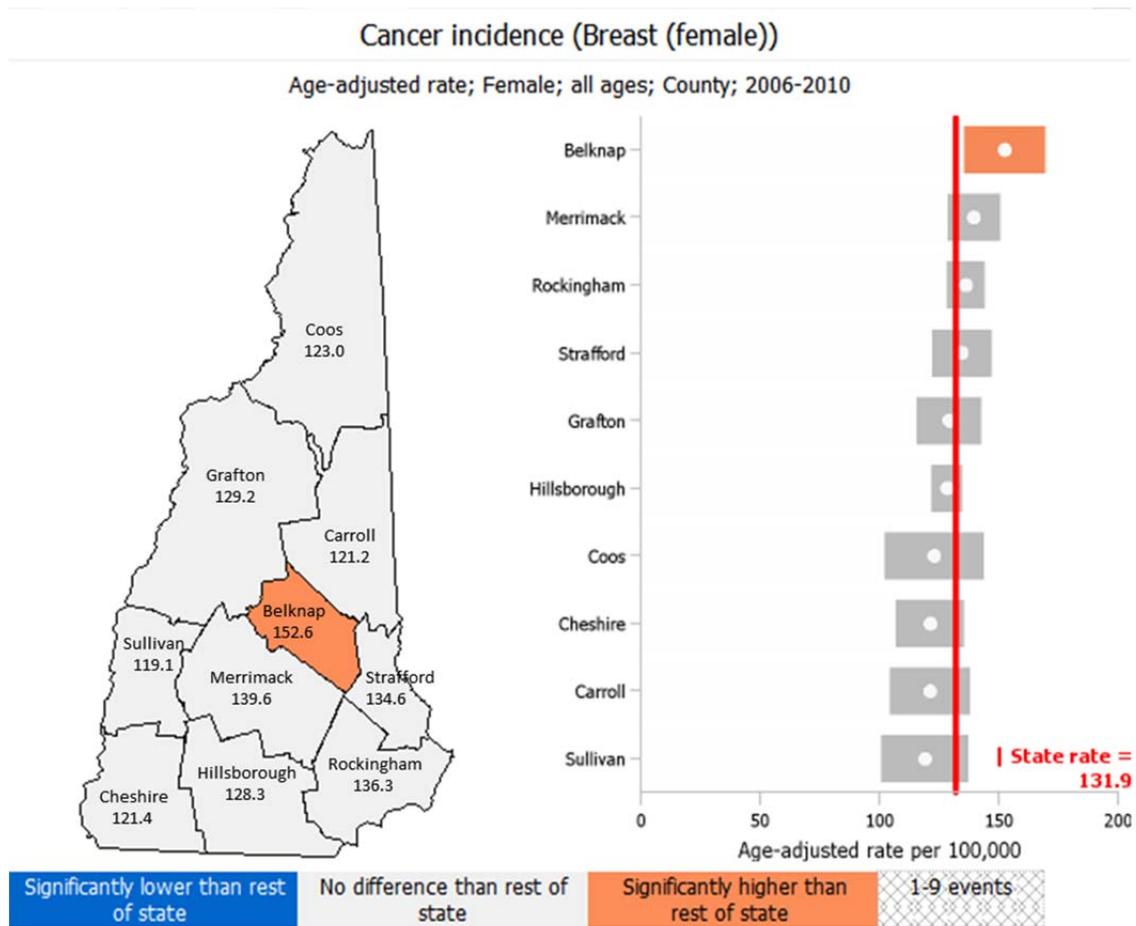


**Figure 2.2.4:** Female breast cancer mortality rate time trends for NH female residents diagnosed between 2000 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

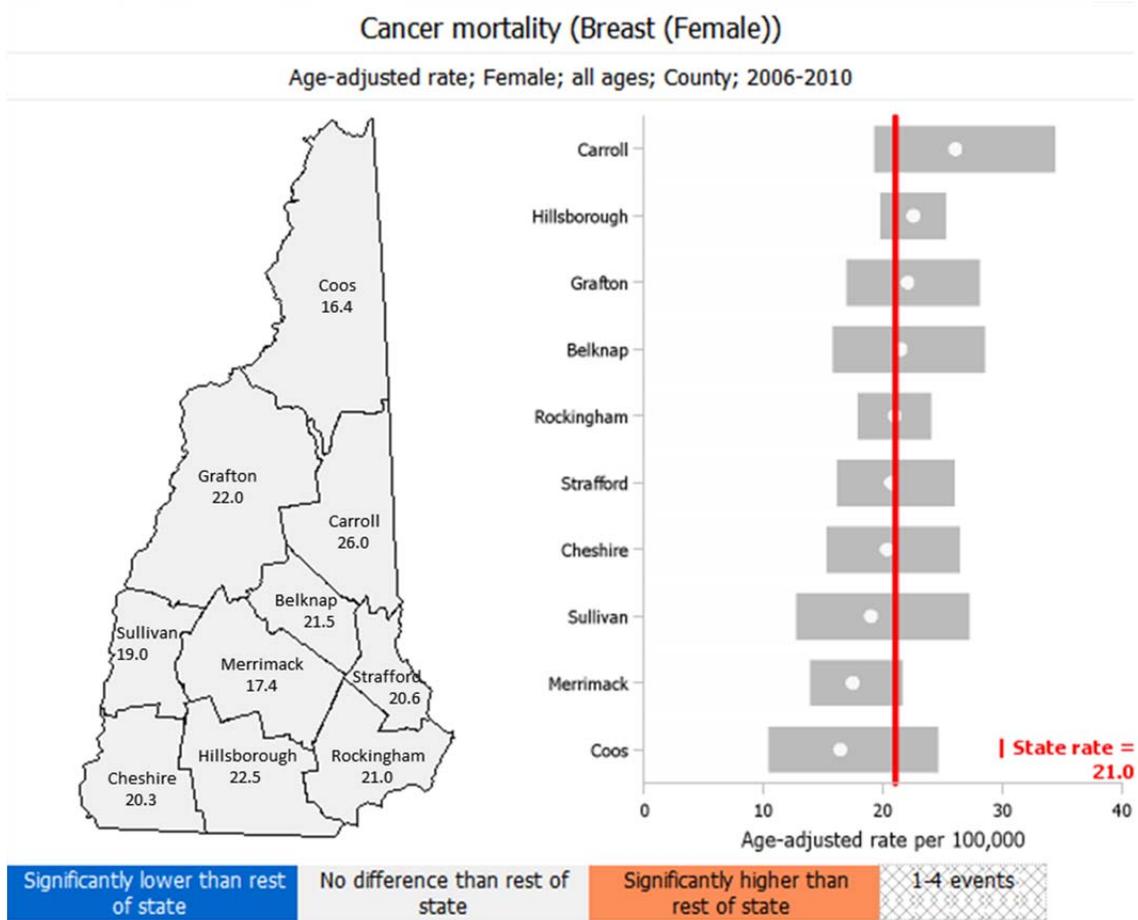
*County level variability in breast (female) cancer incidence and mortality rates*

Female breast cancer incidence rate (age-adjusted) in Belknap County residents was higher than female residents in the rest of state between 2006 and 2010 and this difference was statistically significant.



**Figure 2.2.5:** Female breast cancer incidence rates (age-adjusted) by NH counties for female residents diagnosed between 2006 and 2010.

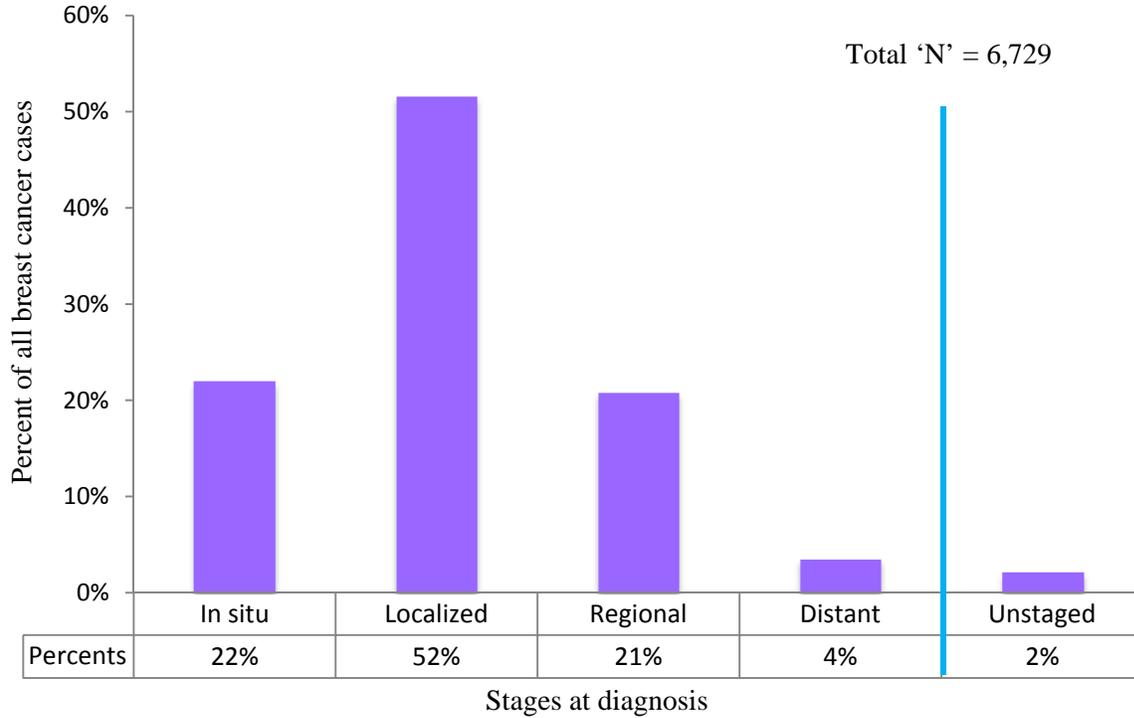
There was no significant geographic variability in female breast cancer mortality rates by NH counties.



**Figure 2.2.6:** Female breast cancer mortality rates by NH counties for female residents diagnosed between 2006 and 2010.

**Stage at diagnosis**

For staging purpose, we used all reportable cancer cases (in situ and malignant). There were 6,729 new breast cancer cases (in situ and malignant) diagnosed between 2006 and 2010 among NH female residents. Of them 74% were diagnosed at early stage (in-situ and localized).



**Figure 2.2.7:** Stage at diagnosis for female breast cancer among NH female residents diagnosed between 2006 and 2010.

## Notes

### Data sources:

<sup>a</sup> American Cancer Society. Cancer statistics 2013:

<http://www.cancer.org/research/cancerfactsfigures/cancerfactsfigures/cancer-facts-figures-2013>

<sup>b</sup> National Cancer Institute. SEER Program: SEER Stat Fact Sheets Breast Cancer

<http://seer.cancer.gov/statfacts/html/breast.html>

<sup>c</sup> Annual Percent Change (APC)- Incidence and Mortality:

Created by <http://www.statecancerprofiles.cancer.gov/recenttrend/recenttrend.html> on 11/25/2013.

<sup>d</sup> New Hampshire Department of Health and Human Services, Behavior Risk Factor Surveillance System data, 2012

US Preventive Services Task Force, Screening for Breast Cancer

<http://www.uspreventiveservicestaskforce.org/uspstf/uspsbrca.htm>

Centers for Disease Control, Breast Cancer:

[http://www.cdc.gov/cancer/breast/basic\\_info/index.htm](http://www.cdc.gov/cancer/breast/basic_info/index.htm)

National Cancer Institute - Breast Cancer Home Page,

<http://www.cancer.gov/cancertopics/prevention-genetics-causes/breast>

Center for Disease Control: <http://www.cdc.gov/cancer/breast/statistics/screening.htm>.

New Hampshire Data Source:

Incidence: New Hampshire State Cancer Registry Program.

Mortality: New Hampshire Death Certificate Data, NH Dept. of State, Bureau Vital Records.

United States Incidence and Mortality Data Sources: <http://seer.cancer.gov/faststats/selections.php?#>

Output, assessed on October 10, 2013.

United States Incidence Data Source: Surveillance, Epidemiology and End Results (SEER) Program, 13 areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry and Rural Georgia).

United States Mortality Data Source: US Mortality Files, National Center for Health Statistics, CDC.

Rates are per 100,000 and are age-adjusted to the 2000 US Std. Population (19 age groups - Census P25-1130). The modeled rates are the point estimates for the regression lines calculated by the Joinpoint Regression Program (Version 4.0.3, April 2013, National Cancer Institute).

## **LUNG AND BRONCHUS CANCER**

- It is estimated that lung & bronchus cancer (henceforth it will be termed ‘lung’ cancer) will be the top most diagnosed cancer in the US in 2013 (among cancers that affect both males and females).<sup>a</sup>
- Lifetime risk: based on most recent data, 6.9% of US population will be diagnosed with lung cancer at some point during their lifetime.<sup>b</sup>
- It is estimated that lung and bronchus cancer will represent 13.7% of all new US cancer cases in 2013.<sup>b</sup>
- Lung cancer is the leading cause of cancer-related death in both males and females. It is estimated that lung and bronchus cancer will represent 27.5% of all US cancer deaths in 2013.<sup>b</sup>

### **Risk Factors:**

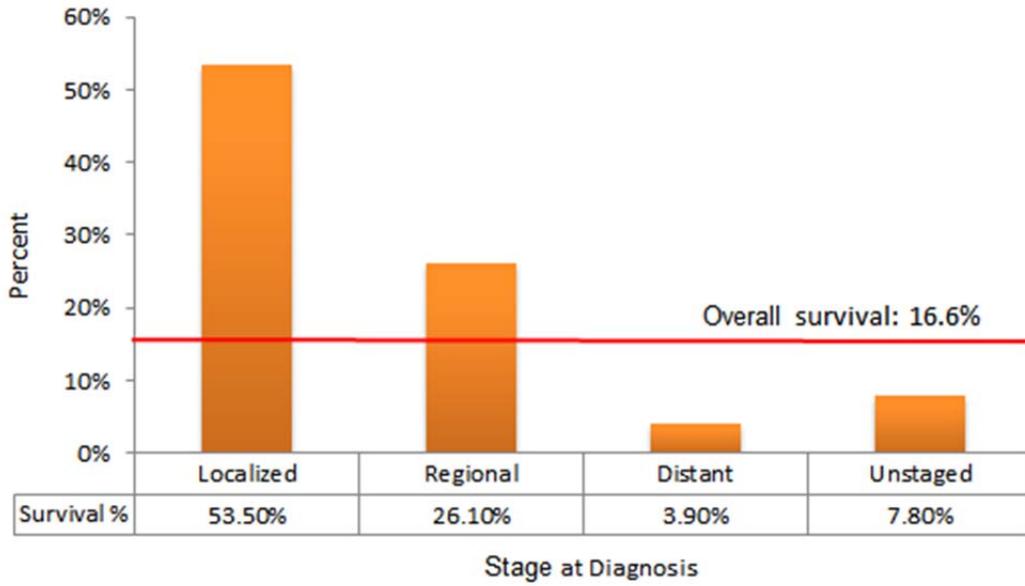
- Cigarette smoking is the most important risk factor for lung cancer.
- Other risk factors include secondhand smoke; occupational or environmental exposures to radon, silica, and asbestos (especially among smokers); certain heavy metals like arsenic, chromium and cadmium; organic chemicals and radiation; air pollution; and tuberculosis.
- Genetic susceptibility is thought to contribute to lung cancers that occur at younger ages.

### **Screening guidelines:**

- The USPSTF concludes that the evidence is insufficient to recommend for or against screening for lung cancer in asymptomatic persons with either low-dose computed tomography, chest x-ray, sputum cytology, or a combination of these tests.<sup>c</sup>

### **Survival Rate:**

- Five-year relative survival for lung cancer is 16.6% for all stages combined based on SEER 18 2003-2009 data. This survival rate is lower (16.6%) than many other leading cancer sites, such as the colon (64.9%), breast (89.2%), and prostate (99.2%).<sup>b</sup>



**Figure 2.3.1:** 5-year relative survival rates of lung and bronchus cancer in the US by stage of diagnosis for people diagnosed between 2003 and 2009.

### *Lung Cancer in NH between 2006 and 2010*

Lung cancer was the leading cancer diagnosed in NH between 2006 and 2010 (among cancers that affect both males and females; 5,097 total invasive cases, average of 1,019 cases per year). Lung cancer accounted for 13.6% of new cancer cases among NH residents. During this period, 3,537 NH residents died from lung cancer and it remained the leading cause of cancer-related death. It killed more people than the next three most common cancers combined (colon, breast, and prostate).

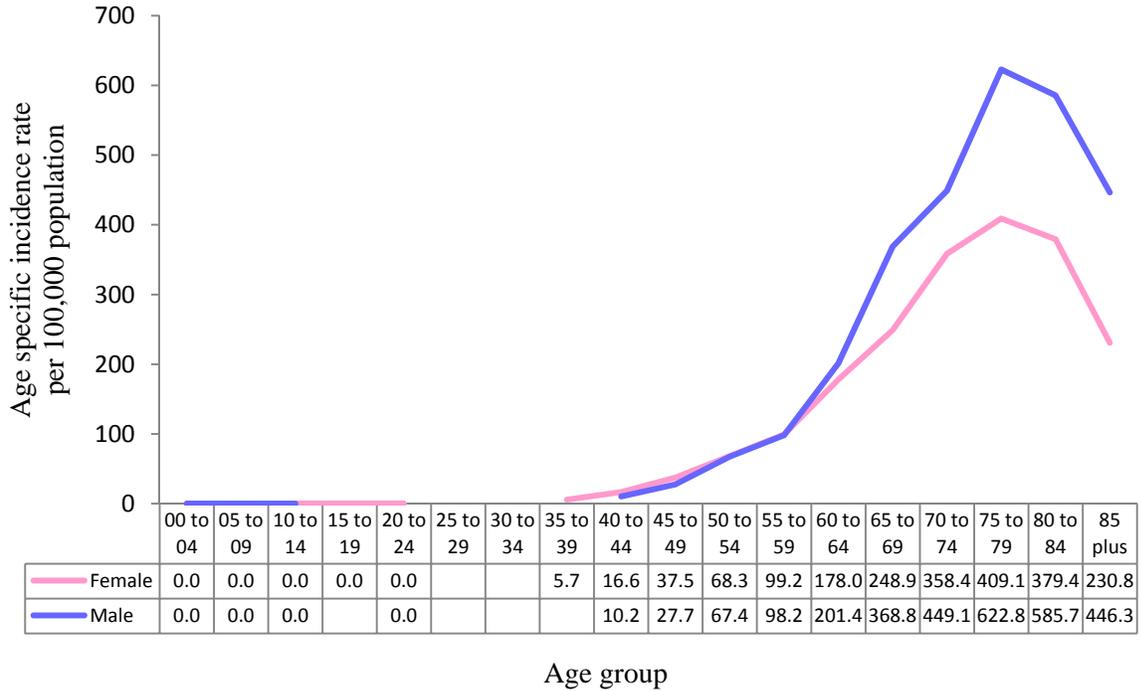
The age-adjusted incidence rate for lung cancer among NH residents between 2006 and 2010 was significantly greater than the US white rate, both as a whole and when considered by gender. The age-adjusted mortality rate for lung cancer among NH males (2006-2010) was significantly lower than the US white male rate.

**Table 2.3.1:** Age-adjusted lung cancer incidence and mortality rates for NH and US residents between 2006 and 2010

	<b>NH (n)</b>	<b>NH rate per 100,000</b>	<b>US white rate per 100,000</b>
<b>Incidence</b>			
Female	2465	62.0 (59.5 – 64.5)	54.0 (53.4 – 54.5)
Male	2632	81.3 (78.2 – 84.5)	70.3 (69.6 – 71.1)
<b>Total</b>	<b>5097</b>	<b>70.1 (68.1 – 72.0)</b>	<b>60.9 (60.4 – 61.3)</b>
<b>Mortality</b>			
Female	1690	42.4 (40.4 – 44.5)	40.4 (40.3 – 40.6)
Male	1847	58.6 (55.9 – 61.3)	63.2 (63.0 – 63.5)
<b>Total</b>	<b>3537</b>	<b>49.0 (47.4 – 50.7)</b>	<b>50.2 (50.1 – 50.3)</b>

### Age-specific incidence rate

Lung cancer incidence rates for NH residents peaked in 75 and 79 years old in both genders. Incidence rates among NH males were significantly higher than NH females after age 65.



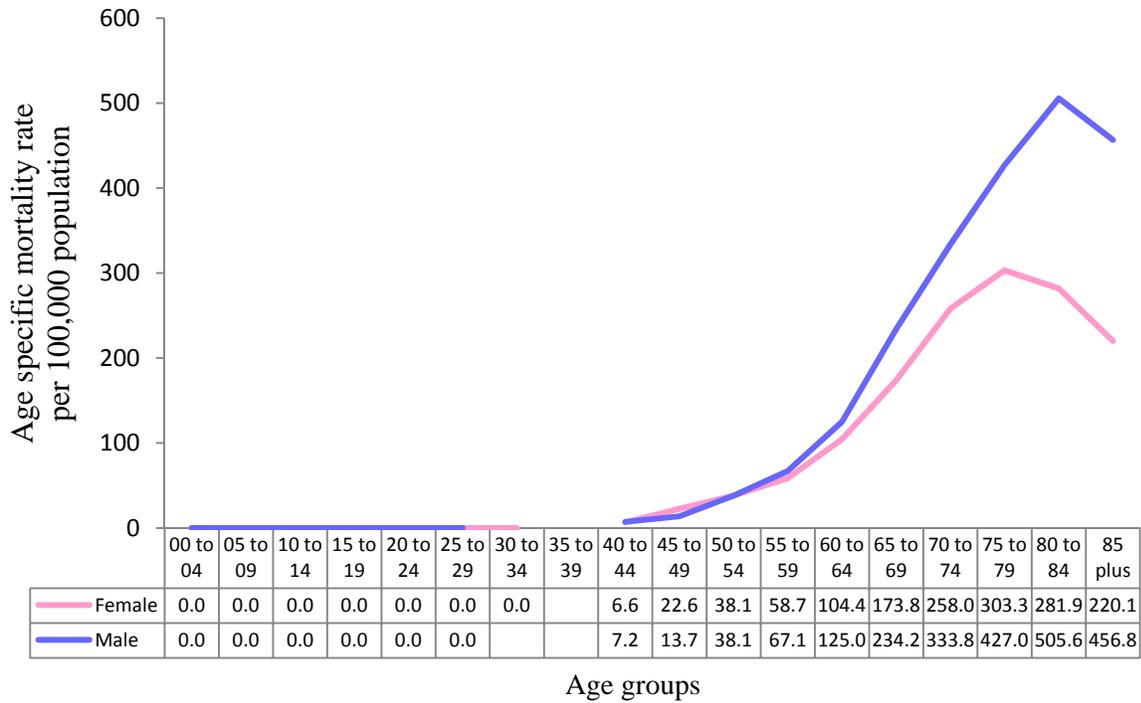
**Figure 2.3.2:** Lung & bronchus age-specific cancer incidence rates for NH male and female residents diagnosed between 2006 and 2010.

Rates are not displayed if incidence counts were reported between 1 and 9 as they tend to be unstable.

### Age-specific mortality rate

Lung cancer mortality rates in NH increased steadily with age. In males, mortality rates peaked in between ages 80 and 84 and in females, mortality rates peaked in between ages 75 and 79.

Significant differences in mortality rates were observed between males and females after age 64.



**Figure 2.3.3:** Lung & bronchus age-specific cancer mortality rates for NH male and female residents between 2006 and 2010.

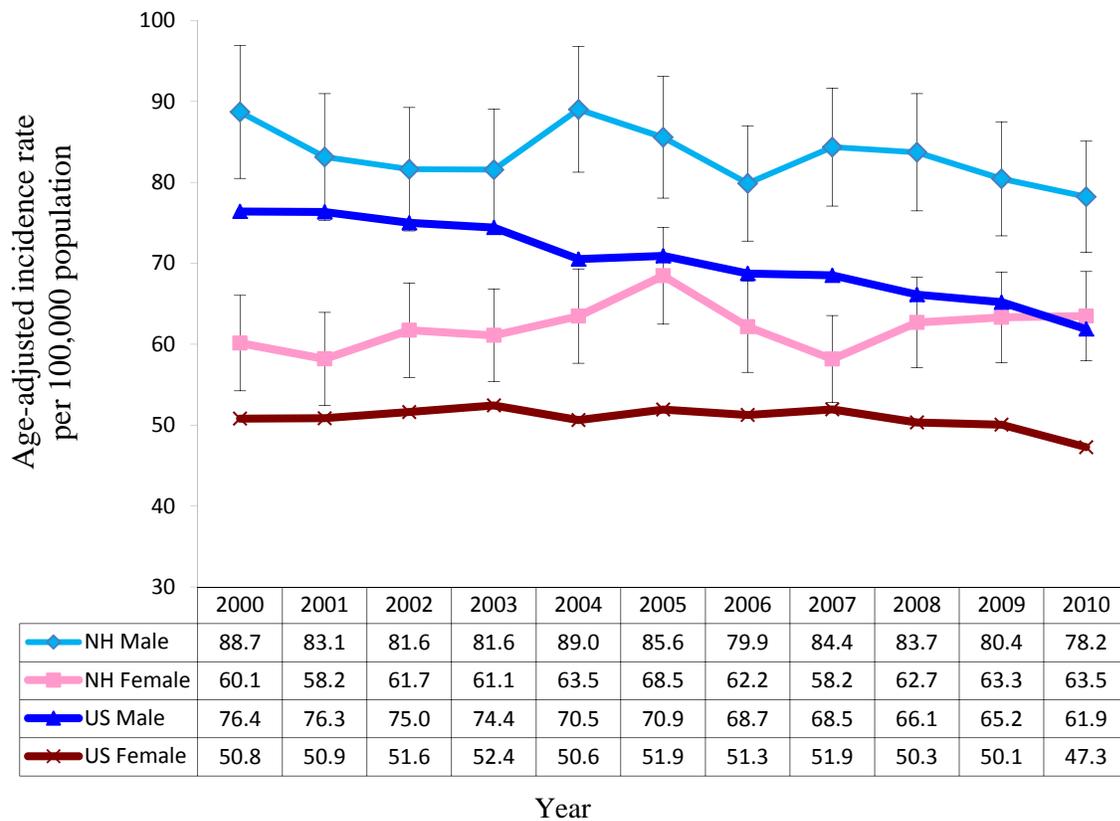
Rates are not displayed if mortality counts were reported between 1 and 4 as they tend to be unstable.

### Age-adjusted incidence rate time trend

The average annual percent change (AAPC) of lung cancer incidence rate in NH (both genders) fell between 2006 and 2010, but was not statistically significant (-1.2% per year, 95% CI= -2.8%, 0.4%).<sup>d</sup>

Lung cancer age-adjusted incidence rates in NH males remained relatively stable between 2006 and 2010 but the rates were significantly higher than the US white male rates in all those years.

Lung cancer age-adjusted incidence rates in NH females did not increase much in between 2006 and 2010 but rates were significantly higher than the US white female rates between 2006 and 2010, except for 2007.



**Figure 2.3.4:** Lung & bronchus cancer age-adjusted incidence rate time trends for NH male and female residents diagnosed between 2000 and 2010.

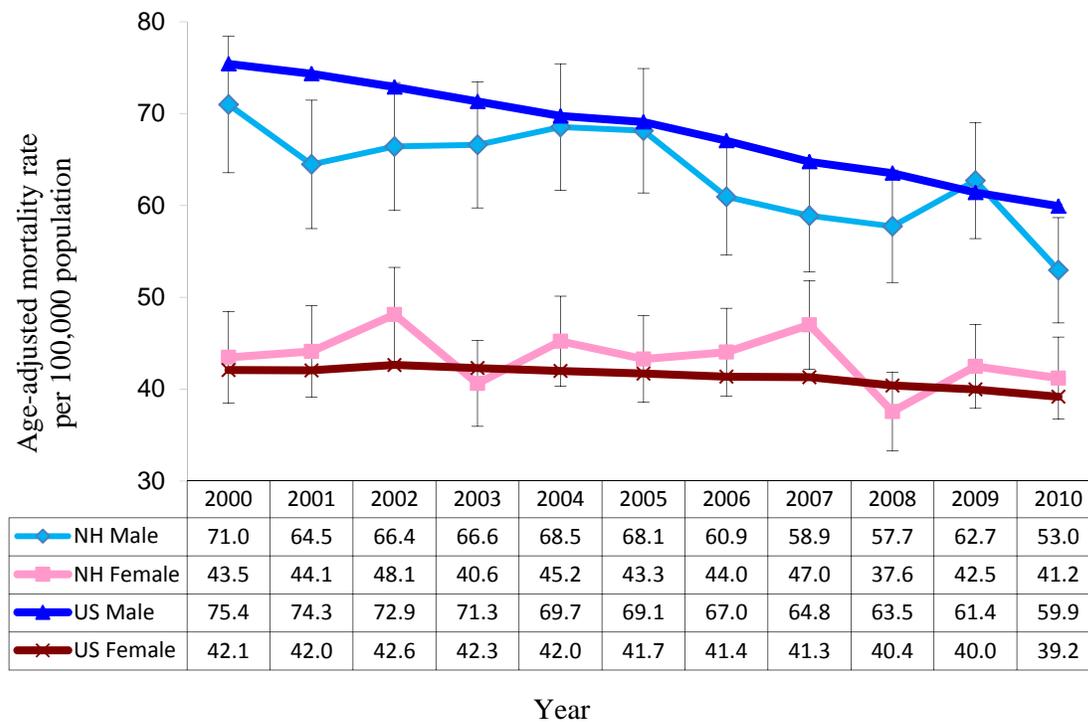
Vertical bars represent 95% confidence intervals around each measure.

### Age-adjusted mortality rate time trend

The average annual percent change (AAPC) of lung cancer mortality rate in NH fell between 2006 and 2010, and was statistically significant (-1.1% per year, 95% CI= -1.5%, -0.7%).<sup>d</sup>

Lung cancer mortality rates in NH males were similar to US white male rates and followed a similar downward trend between 2006 and 2010.

Lung cancer mortality rates in NH females were relatively stable and were not significantly different from US white female rates between 2006 and 2010.



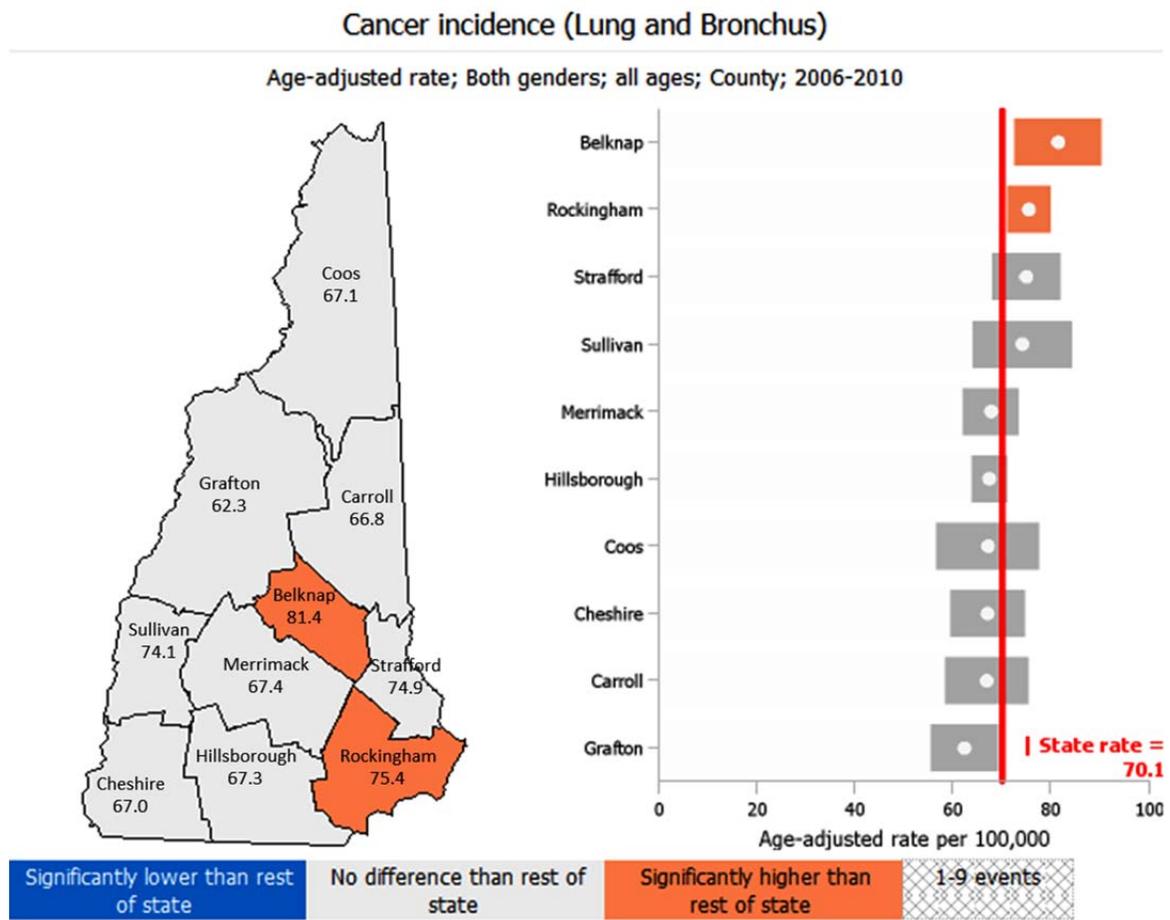
**Figure 2.3.5:** Lung & bronchus cancer mortality rate (age-adjusted) time trends for NH male and female residents diagnosed between 2000 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

### County level variability in lung cancer incidence and mortality rates

Lung cancer incidence rates (age-adjusted) in Belknap and Rockingham county residents were higher than residents in the rest of the state between 2006 and 2010 and this difference was statistically significant.

When stratified by gender, the lung cancer incidence rate (age-adjusted) in Belknap county female residents was higher than female residents in the rest of the state between 2006 and 2010 and this difference was statistically significant (not shown in Figure 2.3.6).

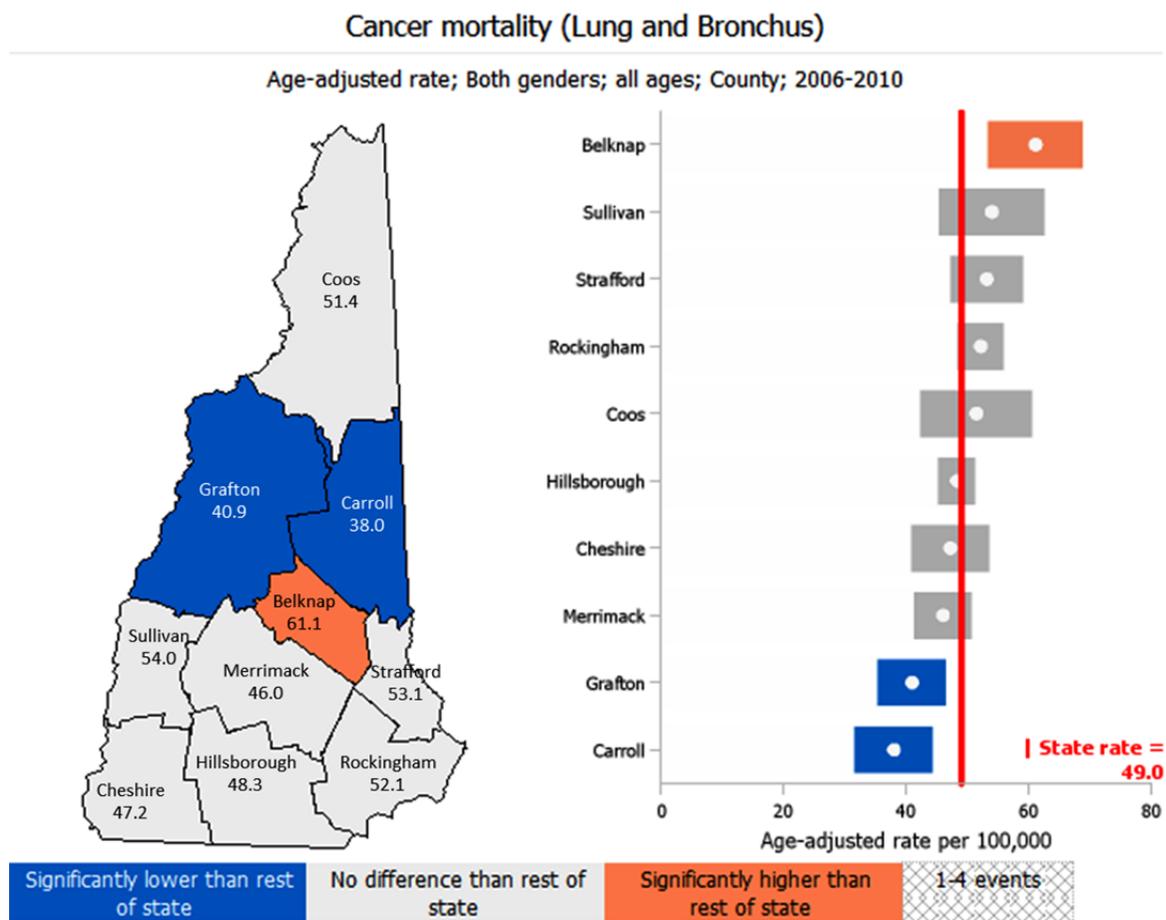


**Figure 2.3.6:** Lung & bronchus cancer incidence rates (age-adjusted) by NH counties for male and female residents diagnosed between 2006 and 2010.

Lung cancer mortality rate (age-adjusted) in Belknap county residents was higher than residents in the rest of the state between 2006 and 2010, and this difference was statistically significant.

When stratified by gender, lung cancer mortality rate (age-adjusted) in Belknap county female residents was higher than female residents in the rest of the state between 2006 and 2010 and this difference was statistically significant (not shown in Figure 2.3.7).

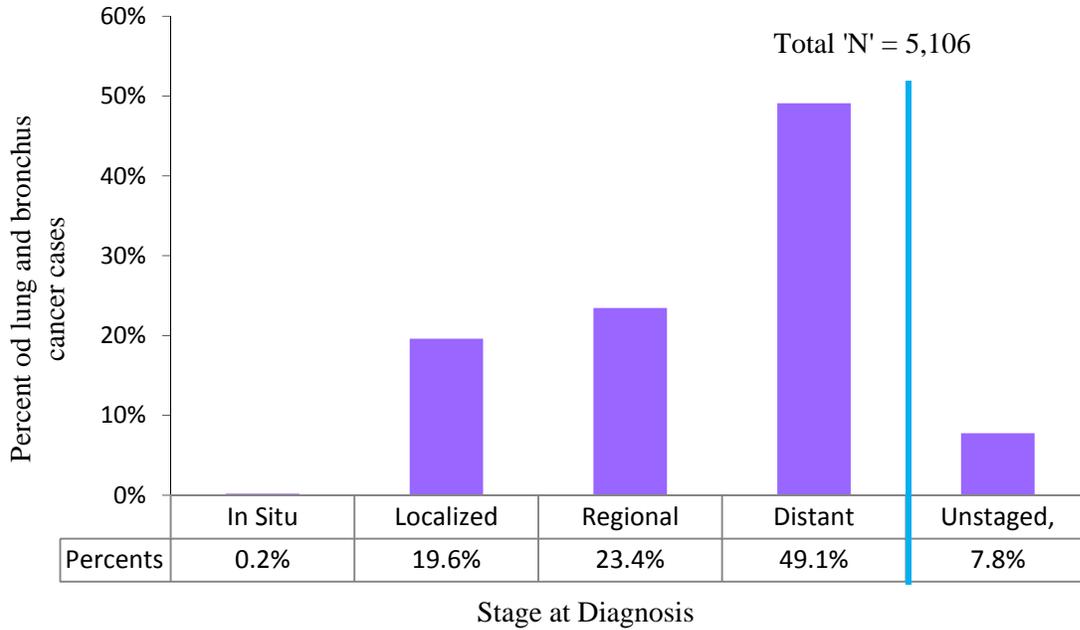
Lung cancer mortality rate (age-adjusted) in Grafton and Carroll county residents was lower than residents in the rest of the state between 2006 and 2010 and this difference was statistically significant.



**Figure 2.3.7:** Lung & bronchus cancer mortality rates (age-adjusted) by NH counties for male and female residents diagnosed between 2006 and 2010.

### Stage at Diagnosis

For staging purpose, we used all reportable cancer cases (in situ and malignant). There were 5,106 new lung cancer cases (in situ and malignant) diagnosed between 2006 and 2010 among NH residents. Of those new cases, 72% were diagnosed at late stage (regional and distant), contributing to lung cancer being the most deadly cancer site.



**Figure 2.3.8:** Stage at diagnosis for lung & bronchus cancer among NH male and female residents diagnosed between 2006 and 2010.

## Notes

### Data sources:

<sup>a</sup> American Cancer Society. Cancer statistics 2013:

<http://www.cancer.org/research/cancerfactsfigures/cancerfactsfigures/cancer-facts-figures-2013>

<sup>b</sup> National Cancer Institute. SEER Program: SEER Stat Fact Sheets: Lung and Bronchus Cancer

<http://seer.cancer.gov/statfacts/html/lungb.html>

<sup>c</sup> US Preventive Services Task Force, Lung cancer screening

<http://www.uspreventiveservicestaskforce.org/3rduspstf/lungcancer/lungcanrs.htm>

<sup>d</sup> Annual Percent Change (APC)- Incidence and Mortality:

Created by <http://www.statecancerprofiles.cancer.gov/recenttrend/recenttrend.html> on 11/25/2013.

National Cancer Institute - Lung Cancer Home Page,

<http://www.cancer.gov/cancertopics/types/lung/>

Centers for Disease Control, Lung Cancer, <http://www.cdc.gov/cancer/lung/>

New Hampshire Data Source:

Incidence: New Hampshire State Cancer Registry Program.

Mortality: New Hampshire Death Certificate Data, NH Dept. of State, Bureau Vital Records.

United States Incidence and Mortality Data Sources: Output, assessed on October 10, 2013.

<http://seer.cancer.gov/faststats/selections.php?#>

United States Incidence Data Source: Surveillance, Epidemiology and End Results (SEER) Program, 13 areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry and Rural Georgia).

United States Mortality Data Source: US Mortality Files, National Center for Health Statistics, CDC.

Rates are per 100,000 and are age-adjusted to the 2000 US Std. Population (19 age groups - Census P25-1130). The modeled rates are the point estimates for the regression lines calculated by the Joinpoint Regression Program (Version 4.0.3, April 2013, National Cancer Institute).

## COLORECTAL CANCER

- It is estimated that colorectal cancer will be the second most commonly diagnosed cancer in the US in 2013 (among cancers that affect both males and females).<sup>a</sup>
- Lifetime risk: Based on most recent data, 4.8% of US population will be diagnosed with colorectal cancer at some point during their lifetime.<sup>b</sup>
- It is estimated that colorectal cancer will represent 8.6% of all new US cancer cases in 2013.<sup>b</sup>
- It is estimated that colorectal cancer will represent 8.8% of all US cancer deaths in 2013.<sup>b</sup>

### *Risk Factors:*

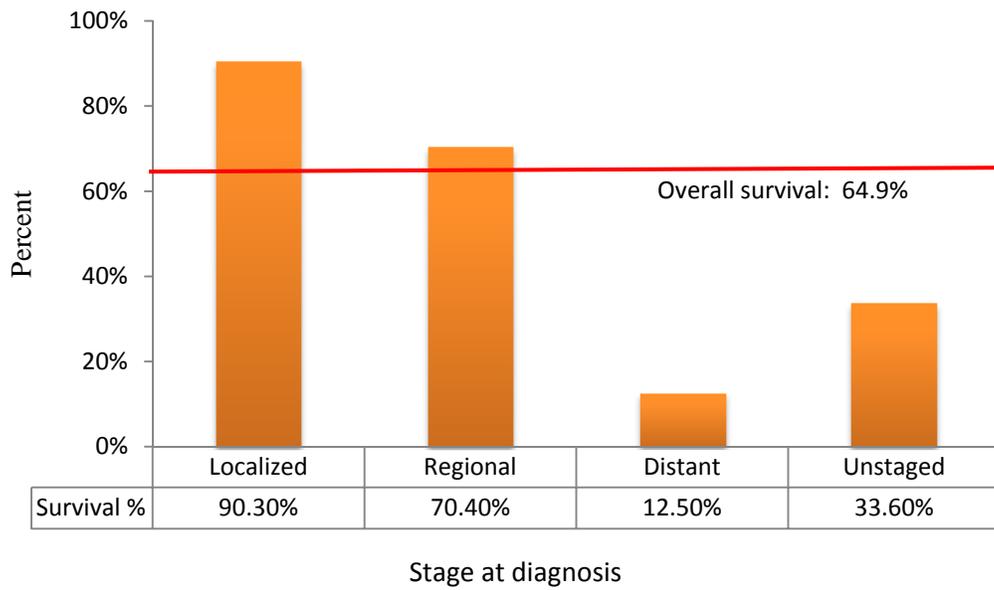
- Colorectal cancer risk is higher in people with inherited genetic mutations of Familial Adenomatous Polyposis (FAP) and Hereditary Nonpolyposis Colorectal Cancer (HNPCC).
- Colorectal cancer risk increases with family or personal history of colorectal cancer or polyps or inflammatory bowel disease.
- There are also several lifestyle risks, including smoking, alcohol consumption, physical inactivity, diet rich in saturated fat/red meat, and inadequate intake of fruits and vegetables.

### *Screening guidelines (USPSTF):*

- The USPSTF recommends screening average-risk adults for colorectal cancer using fecal occult blood testing, sigmoidoscopy, or colonoscopy, beginning at age 50 years and continuing until age 75 years.
- The USPSTF recommends against routine screening for colorectal cancer in adults age 76 to 85 years. There may be considerations that support colorectal cancer screening in an individual patient.
- The USPSTF recommends against screening for colorectal cancer in adults older than age 85 years.

### *Survival Rate:*

- Five-year relative survival for colorectal cancer in the US is 64.9% for all stages combined based on SEER 18 2003-2009 data.<sup>b</sup>



**Figure 2.4.1:** 5-year relative survival rates of colorectal cancer in the US by stage of diagnosis for people diagnosed between 2003 and 2009.

### *Colorectal Cancer in NH between 2006 and 2010*

Colorectal cancer was the second most commonly diagnosed cancer in NH between 2006 and 2010 (among cancers that affect both males and females; 3,068 total invasive cases, average of 614 cases per year). It accounted for 8.2% of new cancer cases among NH residents diagnosed between 2006 and 2010. During this period, 1,084 NH residents died from colorectal cancer and it remained the third leading cause of cancer-related deaths in males and in females respectively.

The age-adjusted incidence and mortality rates for colorectal cancer among NH residents between 2006 and 2010 were similar to the US white rate.

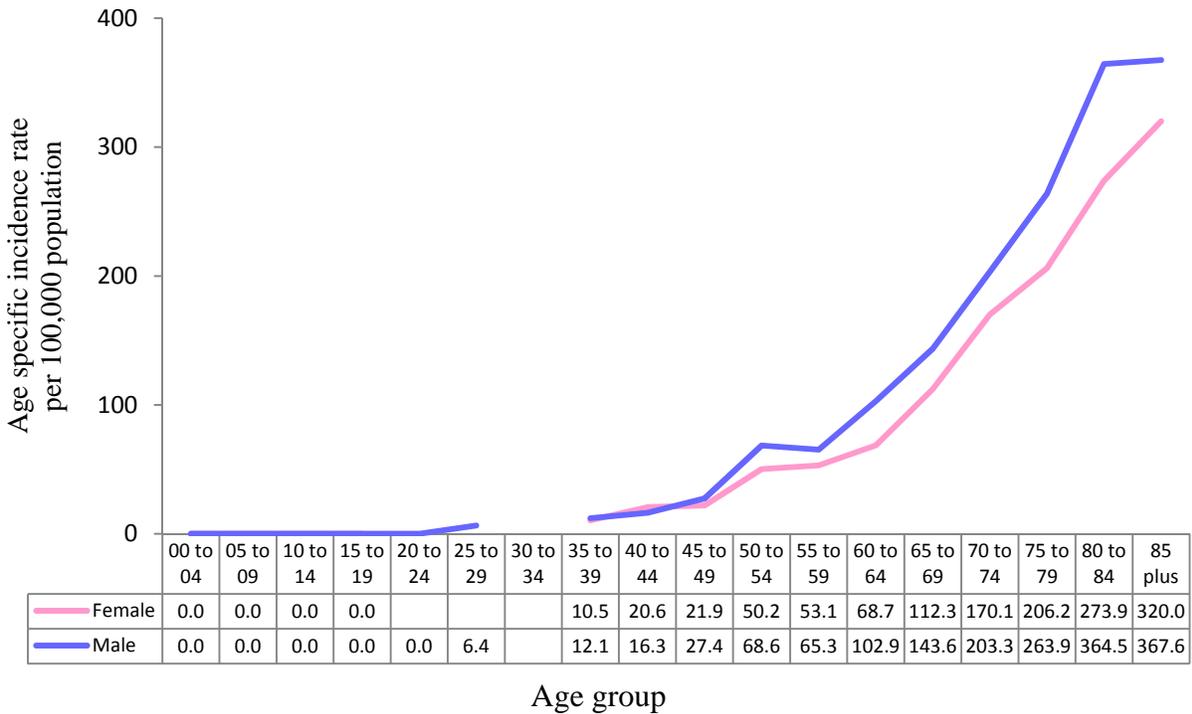
The average annual percent change (AAPC) of colorectal cancer incidence rate in NH fell but was not statistically significant (-7.1% per year, 95% CI= -17.0%, 3.2%).<sup>b</sup> The AAPC for colorectal cancer mortality rate fell at a statistically significant rate between 2006 and 2010 (-4.5% per year, 95% CI= -5.9%, -3.2%).

**Table 2.4.1:** Age-adjusted colorectal cancer incidence and mortality rates for NH and US residents between 2006 and 2010

	<b>NH (n)</b>	<b>NH rate per 100,000</b>	<b>US white rate per 100,000</b>
<b>Incidence</b>			
Female	1528	37.6 (35.7 – 39.6)	38.2 (37.7 – 38.7)
Male	1540	47.1 (44.7 – 49.5)	49.4 (48.8 – 50.0)
<b>Total</b>	<b>3068</b>	<b>42.0 (40.4 – 43.4)</b>	<b>43.3 (42.9 – 43.7)</b>
<b>Mortality</b>			
Female	538	12.8 (11.7 – 13.9)	13.4 (13.3 – 13.5)
Male	546	17.7 (16.2 – 19.3)	19.1 (18.9 – 19.2)
<b>Total</b>	<b>1084</b>	<b>14.9 (14.0 – 15.8)</b>	<b>15.9 (15.8 – 16.0)</b>

**Age-specific incidence rate**

Colorectal cancer incidence rates for NH residents peaked at age 80 and above in both genders. The 60 to 64 years age-group was the only group to show a significant difference in incidence rate between males (102.9, 95% CI=88.0 – 117.9) and females (68.7, 95% CI=56.6 – 80.7).

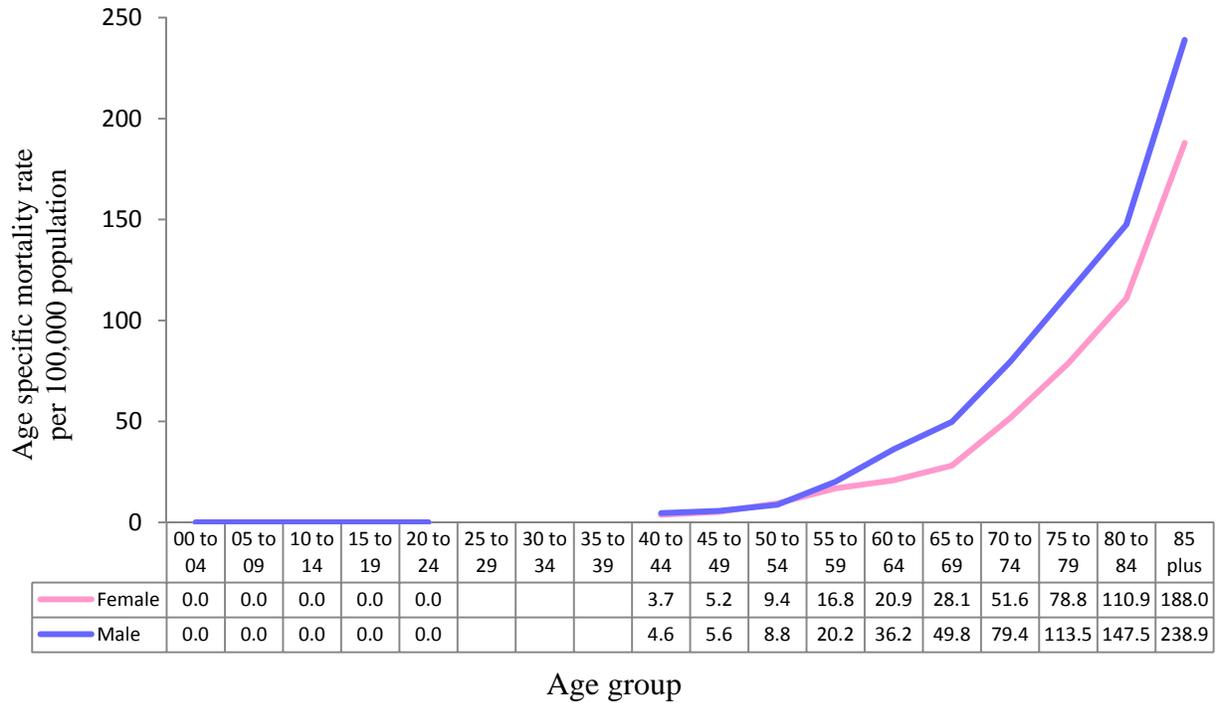


**Figure 2.4.2:** Colorectal cancer age-specific incidence rates for NH male and female residents diagnosed between 2006 and 2010.

Rates are not displayed if incidence counts were reported between 1 and 9 as they tend to be unstable.

**Age-specific mortality rate**

Colorectal cancer mortality rates increased steadily with age in both genders and reached its peak at age 85 plus. No age group showed any significant difference between males and females.



**Figure 2.4.3:** Colorectal cancer age-specific mortality rates for NH male and female residents diagnosed between 2006 and 2010.

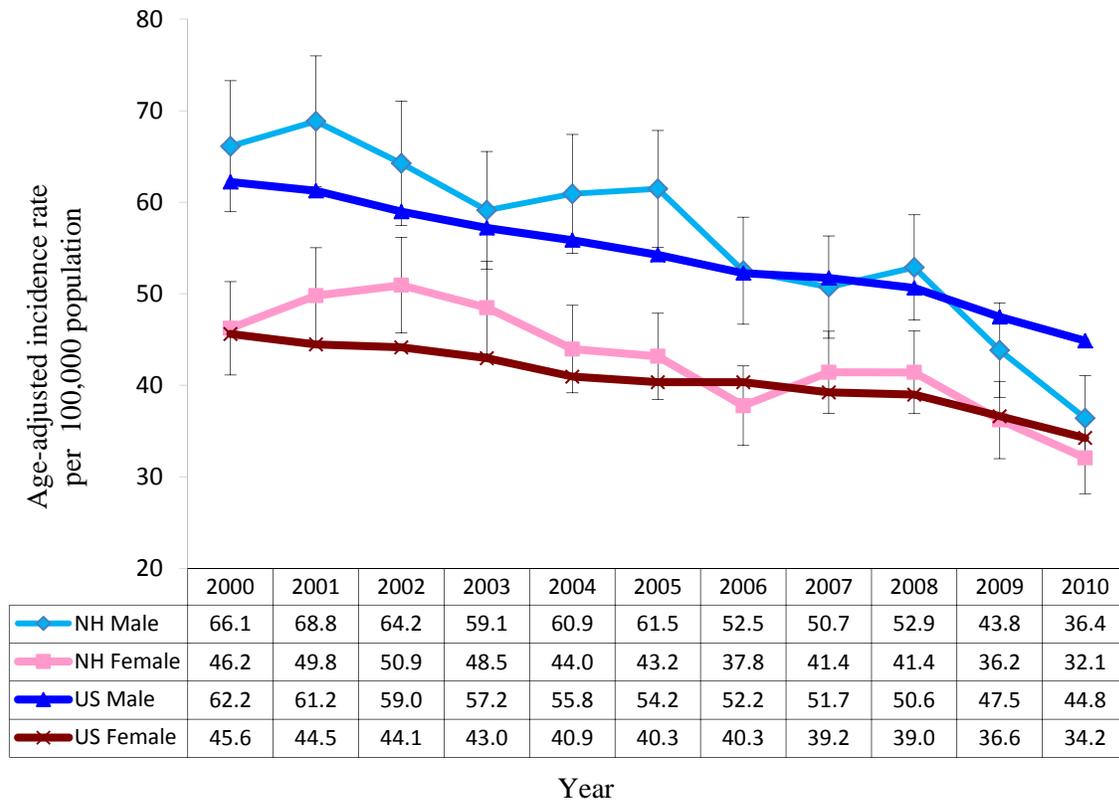
Rates are not displayed if mortality counts were reported between 1 and 4 as they tend to be unstable.

**Age-adjusted incidence rate time trends**

The average annual percent change (AAPC) of colorectal cancer incidence rate in NH residents (both genders) fell between 2006 and 2010 but was not statistically significant (-7.1% per year, 95% CI= -17.0%, 3.2%).<sup>c</sup>

Colorectal cancer incidence rates in NH males followed a similar downward trend like the US white male rates between 2006 and 2010. However, the incidence rate was not significantly different from the US white male rate in any year between 2006 and 2010 except for 2010.

Colorectal cancer incidence rates in NH females were not statistically different from the US white female rates in any year between 2006 and 2010.



**Figure 2.4.4:** Colorectal cancer age-adjusted incidence rate time trends for NH male and female residents diagnosed between 2000 and 2010.

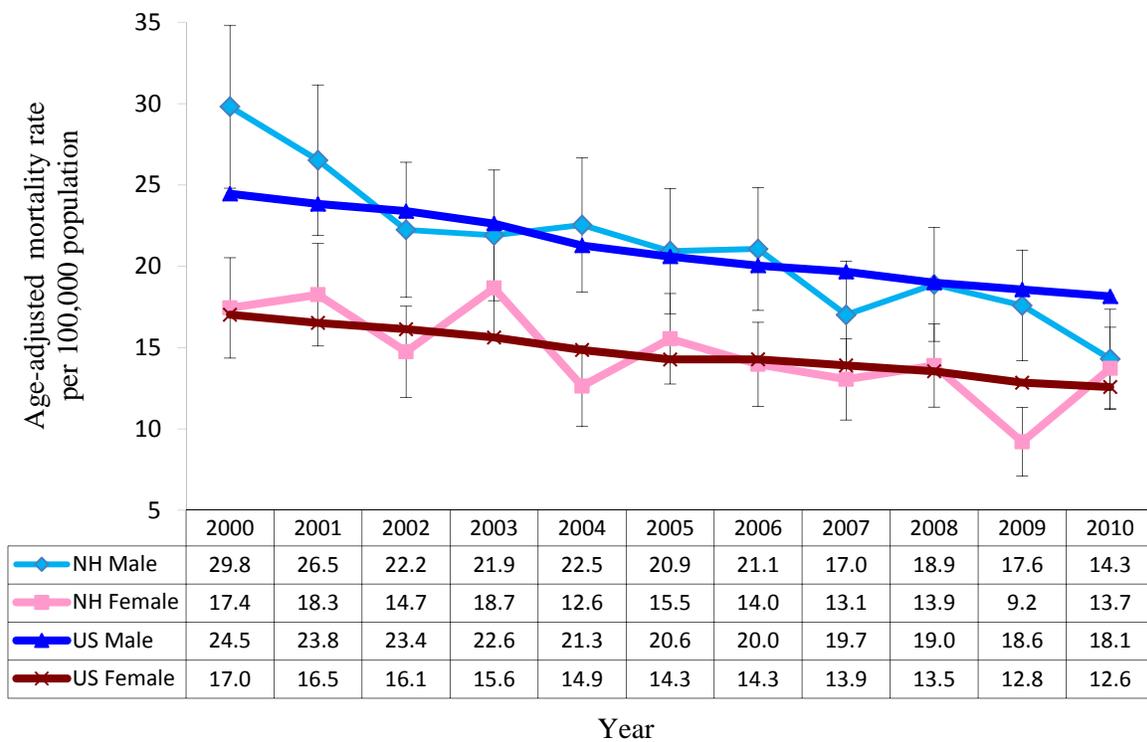
Vertical bars represent 95% confidence intervals around each measure.

### Age-adjusted mortality rate time trends

The average annual percent change (AAPC) for colorectal cancer mortality rate in NH fell between 2006 and 2010 and was statistically significant (-4.5% per year, 95% CI= -5.9%, -3.2%).

Colorectal cancer mortality rates in NH males followed a similar downward trend like the US white male rates between 2006 and 2010. However, mortality rates were not significantly different from the US white male rates in any year between 2006 and 2010 except for 2010.

Colorectal cancer mortality rates in NH females were not significantly different from the US white female rates in any year between 2006 and 2010 except for 2009.

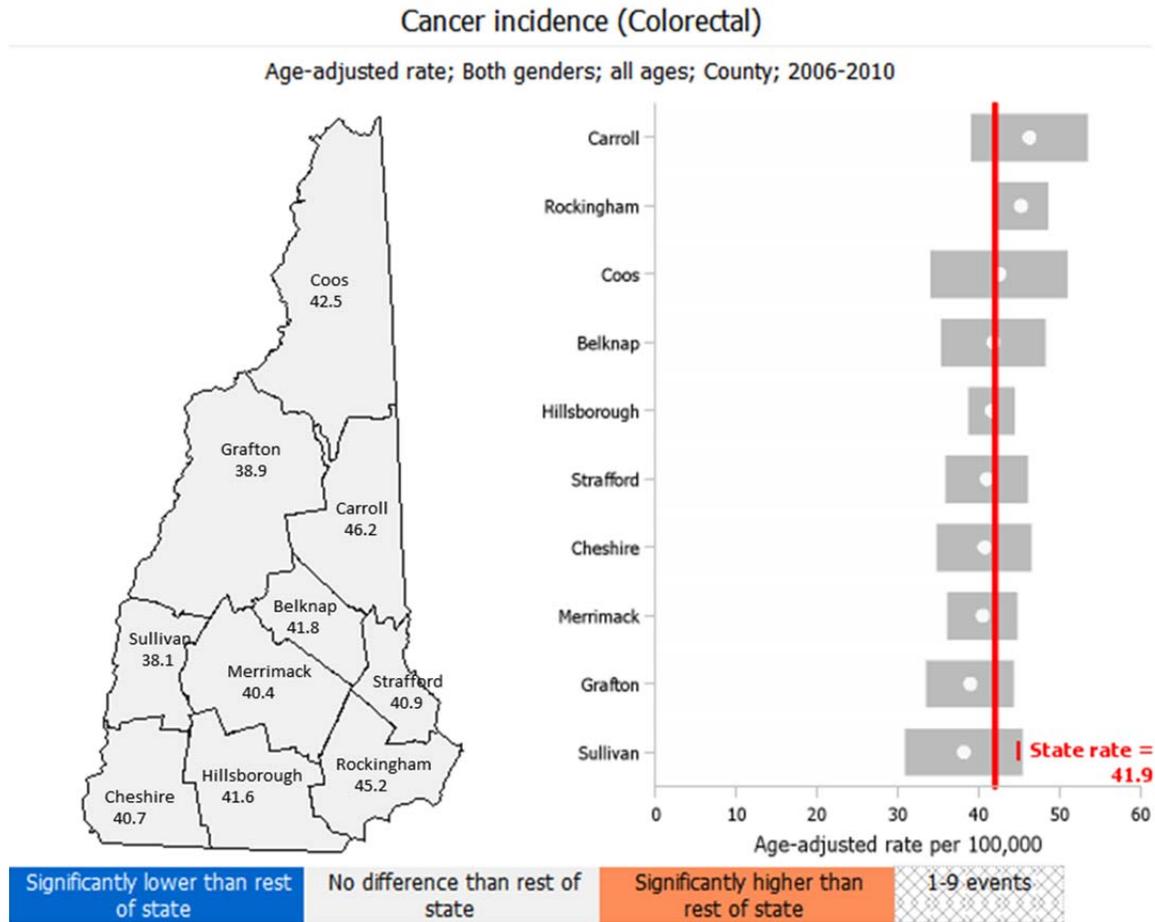


**Figure 2.4.5:** Colorectal cancer age-adjusted mortality rate time trends for NH male and female residents between 2000 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

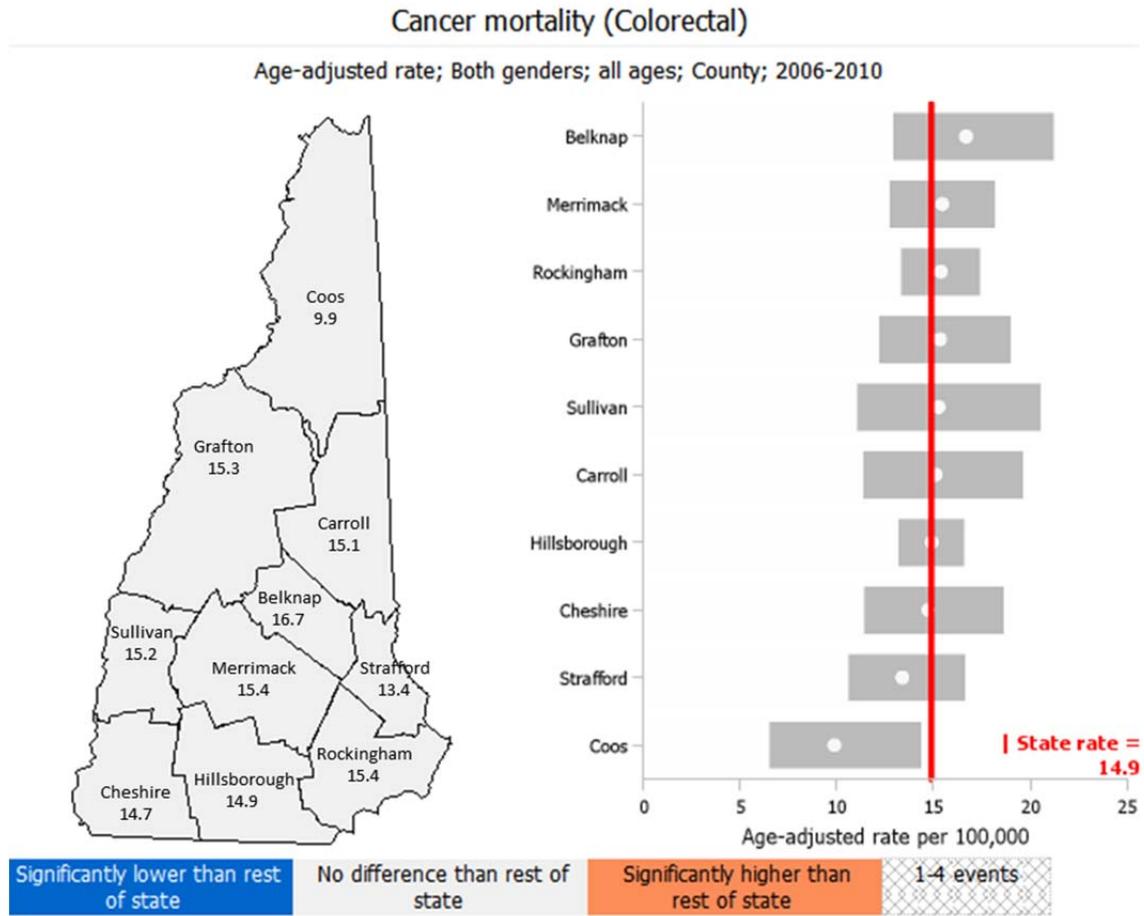
*County level variability in colorectal cancer incidence and mortality rates*

There was no significant geographic variability in colorectal cancer incidence rates by NH counties.



**Figure 2.4.6:** Colorectal cancer incidence rates (age-adjusted) by NH counties for male and female residents diagnosed between 2006 and 2010.

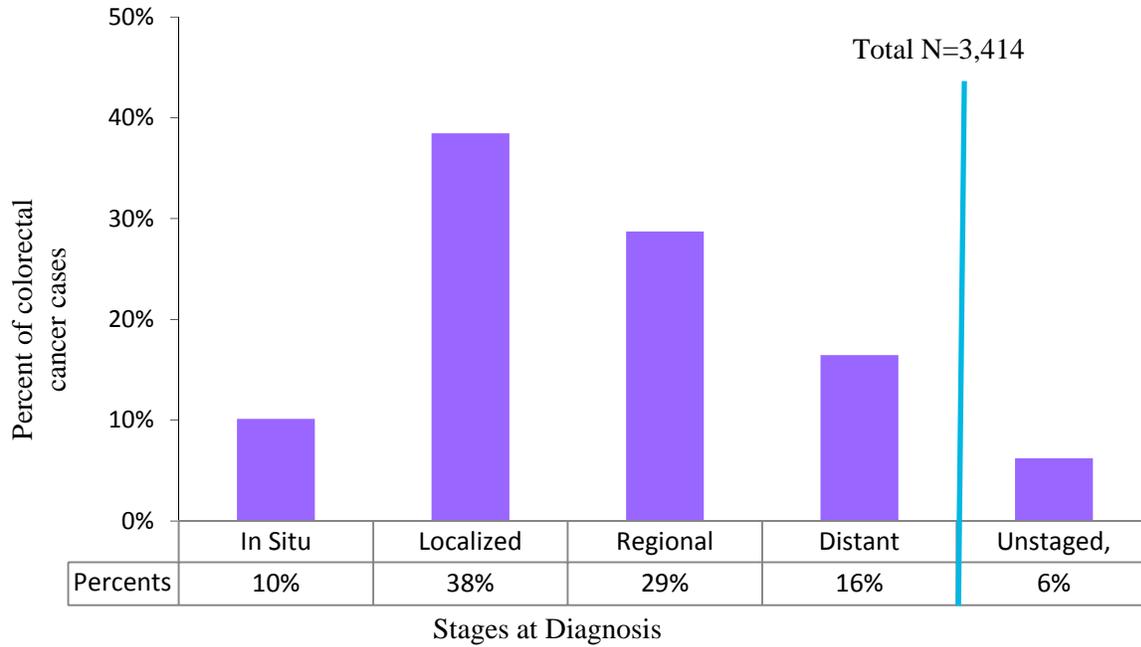
There was no significant geographic variability in colorectal cancer mortality rates by NH counties.



**Figure 2.4.7:** Colorectal cancer mortality rates by NH counties for male and female residents diagnosed between 2006 and 2010.

**Stage at diagnosis**

For staging purpose, we used all reportable cancer cases (in situ and malignant). There were 3,414 new colorectal cancer cases (in situ and malignant) diagnosed between 2006 and 2010 among NH residents and about half (48%) were diagnosed at early stage (in situ and localized).



**Figure 2.4.8:** Stage at diagnosis for colorectal cancer among NH male and female residents diagnosed between 2006 and 2010.

## Notes

### Data sources:

<sup>a</sup> American Cancer Society. Cancer statistics 2013:

<http://www.cancer.org/research/cancerfactsfigures/cancerfactsfigures/cancer-facts-figures-2013>

<sup>b</sup> National Cancer Institute. SEER Program: SEER Stat Fact Sheets: Colorectal Cancer

<http://seer.cancer.gov/statfacts/html/colorect.html>

<sup>c</sup> Annual Percent Change (APC)- Incidence and Mortality:

Created by <http://www.statecancerprofiles.cancer.gov/recenttrend/recenttrend.html>

<sup>d</sup> New Hampshire Department of Health and Human Services, Behavior Risk Factor Surveillance System data, 2012.

National Cancer Institute - Colon and Rectal Cancer Home Page,

<http://www.cancer.gov/cancertopics/types/colon-and-rectal/>

Centers for Disease Control, Colon and Rectal Cancer

[http://www.cdc.gov/cancer/colorectal/basic\\_info/risk\\_factors.htm](http://www.cdc.gov/cancer/colorectal/basic_info/risk_factors.htm)

US Preventive Services Task Force, Colorectal cancer screening

<http://www.uspreventiveservicestaskforce.org/uspstf/uspcolo.htm>

New Hampshire Data Source:

Incidence: New Hampshire State Cancer Registry Program.

Mortality: New Hampshire Death Certificate Data, NH Dept. of State, Bureau Vital Records.

United States Incidence and Mortality Data Sources: Output, assessed on October 10, 2013.

<http://seer.cancer.gov/faststats/selections.php?#>

United States Incidence Data Source: Surveillance, Epidemiology and End Results (SEER) Program, 13 areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry and Rural Georgia).

United States Mortality Data Source: US Mortality Files, National Center for Health Statistics, CDC.

Rates are per 100,000 and are age-adjusted to the 2000 US Std. Population (19 age groups - Census P25-1130). The modeled rates are the point estimates for the regression lines calculated by the Joinpoint Regression Program (Version 4.0.3, April 2013, National Cancer Institute).

## **URINARY BLADDER CANCER**

- Urinary bladder cancer (henceforth it will be termed ‘bladder’ cancer) incidence is higher in males than females, and higher in whites than African Americans.<sup>a</sup>
- It is estimated that bladder cancer will be the fourth most common cancer in US male population in 2013.<sup>a</sup>
- Life time risk: Based on most recent data, 2.4% of US population will be diagnosed with bladder cancer at some point during their lifetime.<sup>b</sup>
- It is estimated that bladder cancer will represent 4.4% of all new US cancer cases in 2013.<sup>b</sup>
- It is estimated that bladder cancer will represent 2.6% of all US cancer-related deaths in 2013.<sup>b</sup>

### ***Risk Factors:***

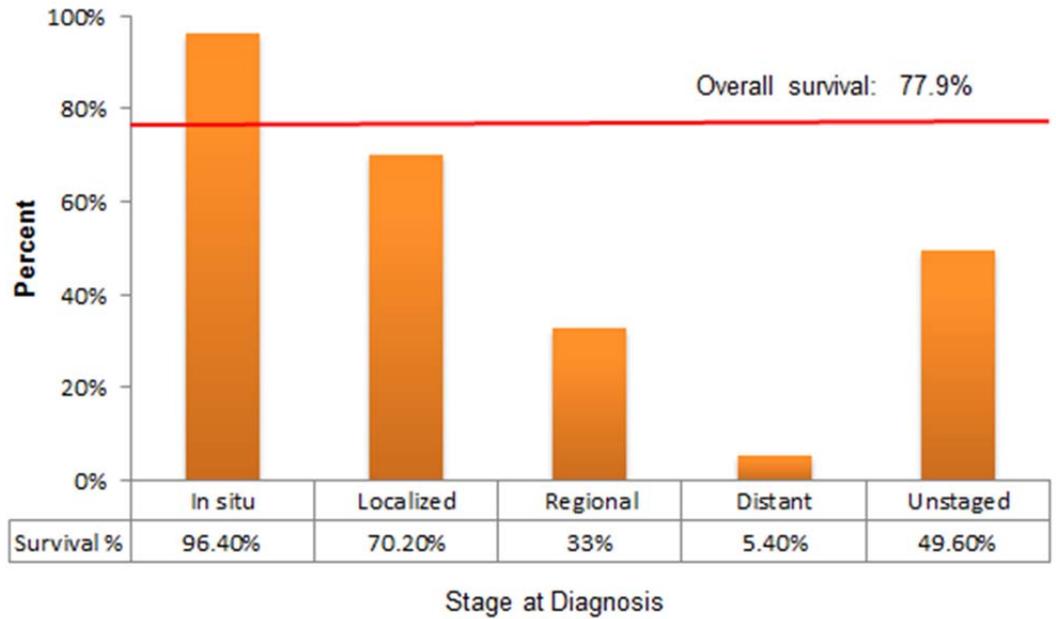
- Smoking is the biggest risk factor for bladder cancer. Smokers experience twice the risk for bladder cancer than non-smokers.
- Workers in the dye, rubber or leather industries are at increased risk of developing bladder cancer.
- Communities with high levels of arsenic in drinking water are also at higher risk.

### ***Screening:***

- USPSTF states that the evidence is inadequate regarding the diagnostic accuracy of potential tests (urinalysis for microscopic hematuria, urine cytology, or tests for urine biomarkers) for identifying bladder cancer in asymptomatic persons with no history of bladder cancer.

### ***Survival Rate:***

- Five-year relative survival for bladder cancer in the US is 78% for all stages combined based on SEER 18 2003-2009 data.<sup>b</sup>



**Figure 2.5.1:** 5-year relative survival rates of bladder cancer in the US by stage of diagnosis for people diagnosed between 2003 and 2009.

### ***Bladder Cancer in NH between 2006 and 2010***

A total of 2,107 invasive bladder cancer cases were diagnosed among NH residents between 2006 and 2010 (average 421 cases per year) and it accounted for 5.6% of new cancer cases diagnosed among NH residents. During the same period, 352 NH residents died from bladder cancer.

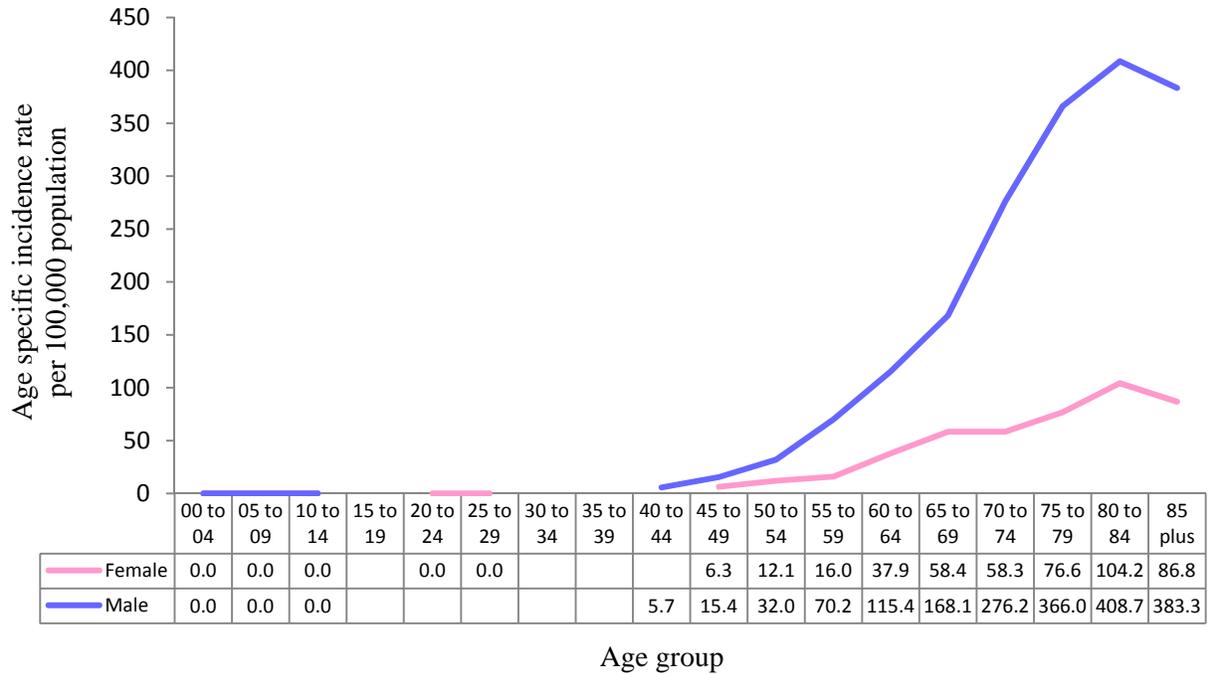
The age-adjusted incidence rate of bladder cancer was significantly higher among NH residents than the US white rate between 2006 and 2010. The mortality rate for bladder cancer among NH residents was similar to the US white rate during this period.

**Table 2.5.1:** Age-adjusted bladder cancer incidence and mortality rates for NH and US residents between 2006 and 2010

	<b>NH (n)</b>	<b>NH rate per 100,000</b>		<b>US white rate per 100,000</b>	
<b>Incidence</b>					
Female	532	13.1	(12.0 – 14.2)	9.8	(9.6 – 10.1)
Male	1,575	49.5	(47.0 – 52.0)	41.3	(40.7 – 41.9)
<b>Total</b>	<b>2,107</b>	<b>29.0</b>	<b>(27.7 – 30.2)</b>	<b>23.4</b>	<b>(23.1 – 23.7)</b>
<b>Mortality</b>					
Female	105	2.5	(2.0 – 3.0)	2.2	(2.2 – 2.3)
Male	247	8.6	(7.5 – 9.7)	8.1	(8.0 – 8.2)
<b>Total</b>	<b>352</b>	<b>4.9</b>	<b>(4.4 – 5.4)</b>	<b>4.6</b>	<b>(4.6 – 4.6)</b>

**Age-specific incidence rate**

Bladder cancer incidence rates in NH residents increased with age and peaked in 80 to 84 year olds in both males and females. Incidence rate was significantly higher in NH males than NH females in all age groups above 44 years.

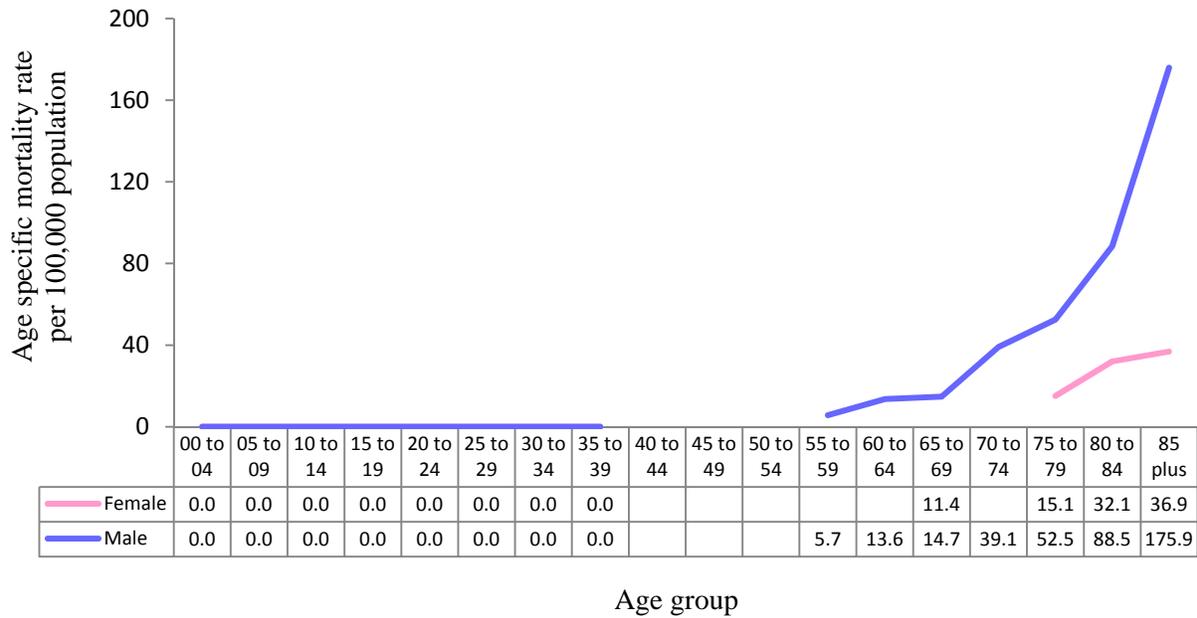


**Figure 2.5.2:** Bladder cancer age-specific incidence rates for NH male and female residents diagnosed between 2006 and 2010.

Rates are not displayed if incidence counts were reported between 1 and 9 as they tend to be unstable

**Age-specific mortality rate**

Bladder cancer mortality rate in NH males increased with age in both males and females.



**Figure 2.5.3:** Bladder cancer age-specific mortality rates for NH male and female residents diagnosed between 2006 and 2010.

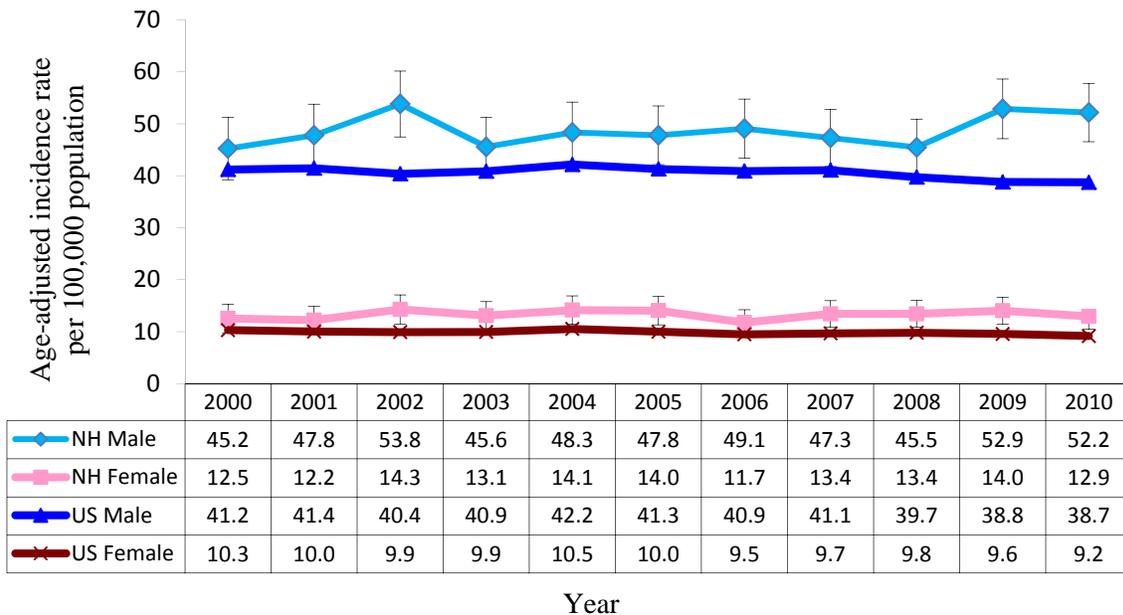
Rates are not displayed if mortality counts were reported between 1 and 4 as they tend to be unstable

**Age-adjusted incidence rate time trends**

The average annual percent change (AAPC) of bladder cancer incidence rate in NH increased between 2006 and 2010 but was not statistically significant (1.6% per year, 95% CI= -3.2%, 6.7%).<sup>c</sup>

Bladder cancer age-adjusted incidence rates for NH male residents were significantly higher than US white male rates in 2009 and 2010.

Bladder cancer incidence rates for NH female residents were significantly higher than the US white female rates between 2007 and 2010.



**Figure 2.5.4:** Bladder cancer age-adjusted incidence rate time trends for NH male and female residents diagnosed between 2006 and 2010.

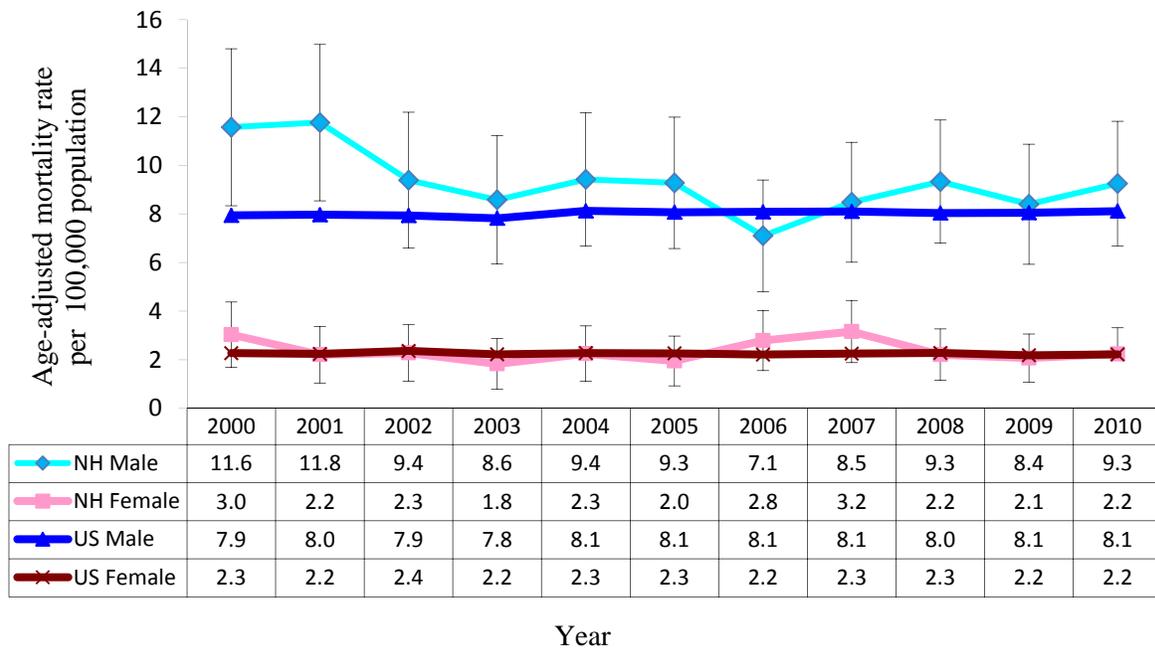
Vertical bars represent 95% confidence intervals around each measure.

**Age-adjusted mortality rate time trends**

The average annual percent change (AAPC) of bladder cancer mortality rate in NH fell between 2006 and 2010 but was not statistically significant (-0.6% per year, 95% CI= -1.3%, 0.1%).<sup>c</sup>

Bladder cancer mortality rates for NH male residents were similar to US white male rates between 2006 and 2010.

Bladder cancer mortality rates for NH female residents were relatively stable and similar to US white female rates between 2006 and 2010.

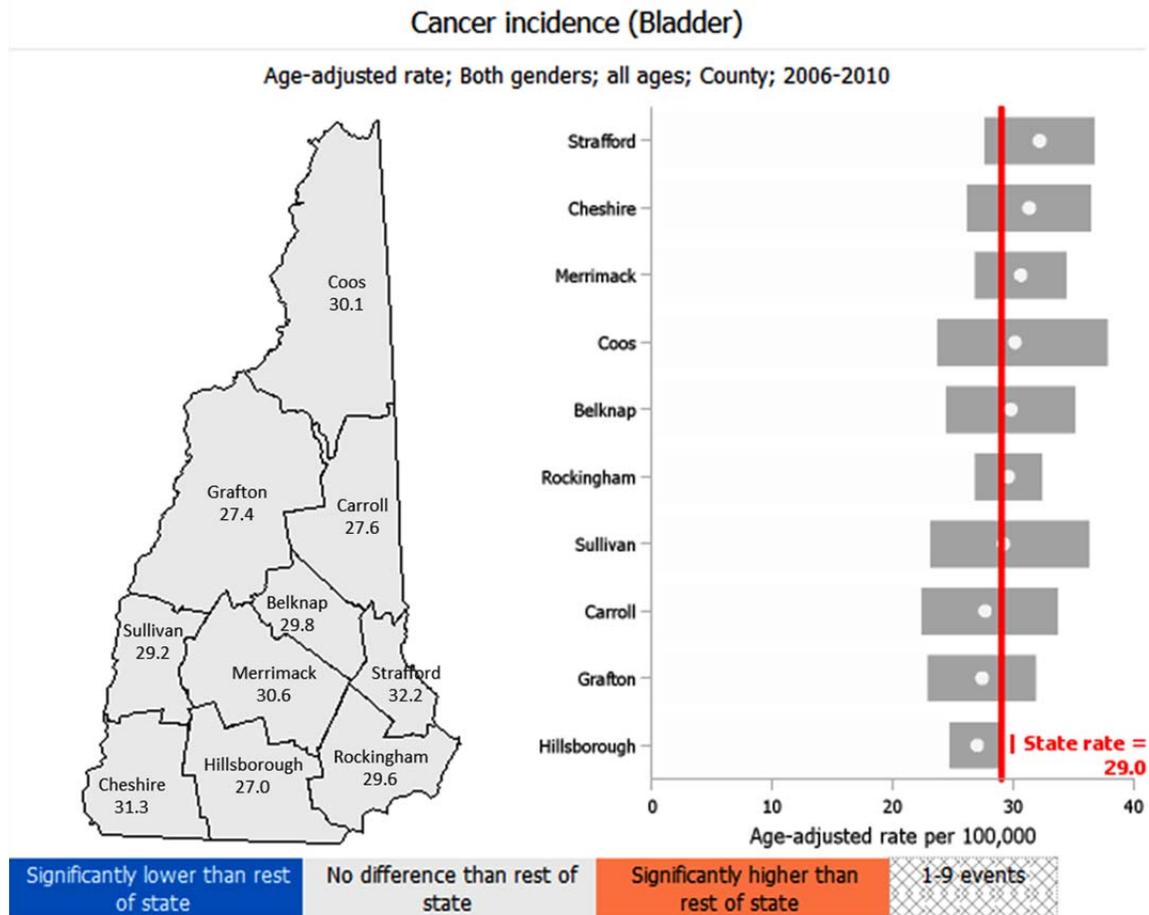


**Figure 2.5.5:** Bladder cancer age-adjusted mortality rate time trends for NH male and female residents diagnosed between 2006 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

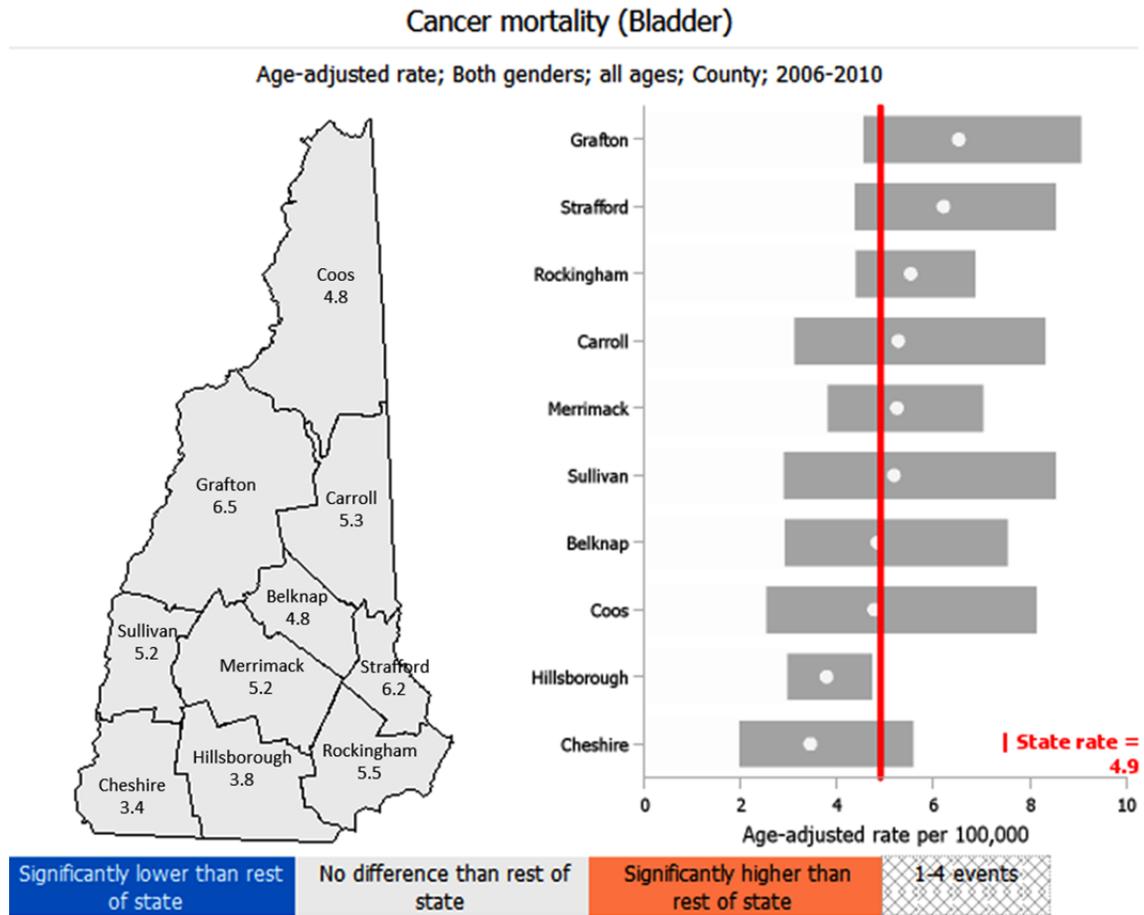
*County level variability in bladder cancer incidence and mortality rates*

There was no significant geographic variability in bladder cancer age-adjusted incidence rates by NH counties.



**Figure 2.5.6:** Bladder cancer incidence rates (age-adjusted) by NH counties for male and female residents diagnosed between 2006 and 2010.

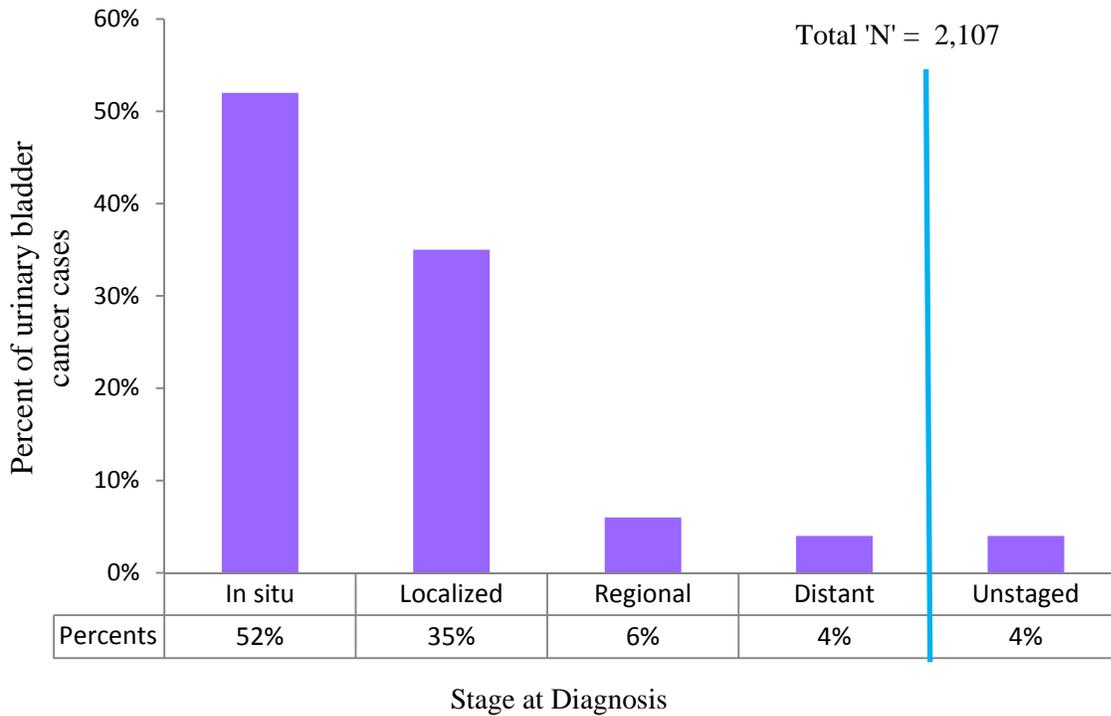
There was no significant geographic variability in bladder cancer mortality rates by NH counties.



**Figure 2.5.7:** Bladder cancer mortality rates (age-adjusted) by NH counties for male and female residents diagnosed between 2006 and 2010.

**Stage at Diagnosis**

For staging purpose, we used all reportable cancer cases (in situ and malignant). There were 2,107 new urinary bladder cancer cases (in situ and malignant) diagnosed between 2006 and 2010 among NH residents. Of these, 87% of all new bladder cancer cases were diagnosed at early stage (in situ and localized).



**Figure 2.5.8:** Stage at diagnosis for bladder cancer among NH male and female residents diagnosed between 2006 and 2010.

## Notes

### Data sources:

<sup>a</sup> American Cancer Society. Cancer statistics 2013:

<http://www.cancer.org/research/cancerfactsfigures/cancerfactsfigures/cancer-facts-figures-2013>

<sup>b</sup> National Cancer Institute. SEER Program: SEER Stat Fact Sheets: Bladder Cancer

<http://seer.cancer.gov/statfacts/html/urinb.html>

<sup>c</sup> Annual Percent Change (APC)- Incidence and Mortality:

Created by <http://www.statecancerprofiles.cancer.gov/recenttrend/recenttrend.html> on 11/25/2013.

National Cancer Institute, Bladder Cancer Home Page,

<http://www.cancer.gov/cancertopics/types/bladder>

New Hampshire Data Source:

Incidence: New Hampshire State Cancer Registry Program.

Mortality: New Hampshire Death Certificate Data, NH Dept. of State, Bureau of Vital Records.

United States Incidence and Mortality Data Sources: Output, assessed on October 10, 2013.

<http://seer.cancer.gov/faststats/selections.php?#>

United States Incidence Data Source: Surveillance, Epidemiology and End Results (SEER) Program, 13 areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry and Rural Georgia).

United States Mortality Data Source: US Mortality Files, National Center for Health Statistics, CDC.

Rates are per 100,000 and are age-adjusted to the 2000 US Std. Population (19 age groups - Census P25-1130). The modeled rates are the point estimates for the regression lines calculated by the Joinpoint Regression Program (Version 4.0.3, April 2013, National Cancer Institute).

## **MELANOMA OF SKIN**

- It is estimated that melanoma will be the fifth most common cancer in the US male population, and seventh most common cancer in the US female population in 2013.<sup>a</sup>
- Melanoma primarily affects whites, who have incidence rates 10 times higher than African Americans.<sup>a</sup>
- Life time risk: Based on most recent data, 2% of the US population will be diagnosed with melanoma at some point during their lifetime.<sup>b</sup>
- It is estimated that melanoma will represent 4.6% of all new US cancer cases in 2013.<sup>b</sup>
- It is estimated that melanoma will represent 1.6% of all US cancer deaths in 2013.<sup>b</sup>

### ***Risk Factors:***

- The major risk factors are prior melanoma; family history of melanoma; and the presence of many large or unusual moles.
- Other risk factors include sun sensitivity, history of sun exposure, use of tanning booths; autoimmune diseases; history of basal or squamous cell skin carcinoma; and occupational exposure to coal tar, creosote, arsenic compounds or radium.

### ***Prevention:***

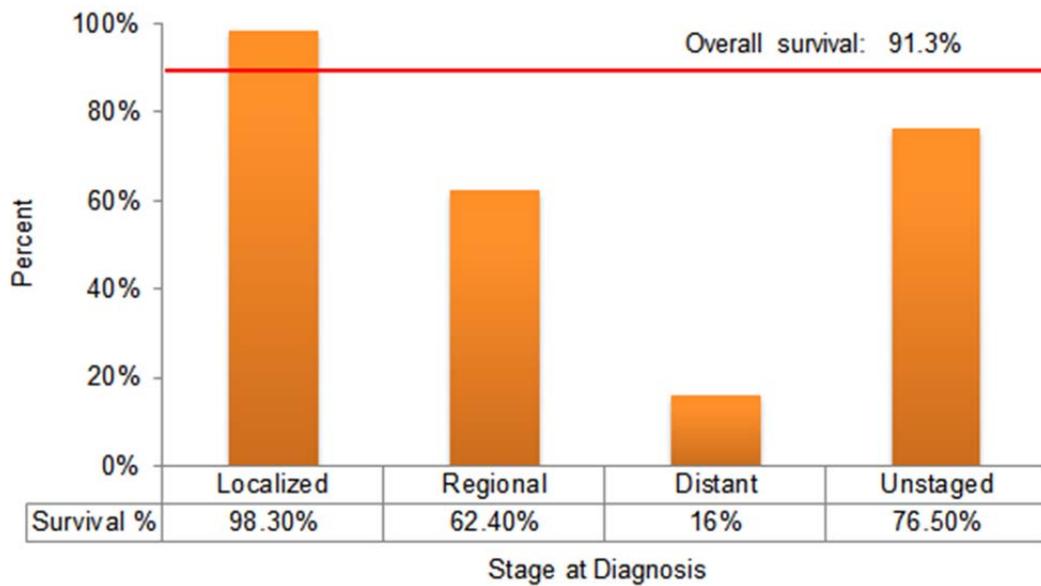
- Avoid or limit sun exposure during midday hours (10 a.m. - 4 p.m.).
- Wear hats, sunglasses and long-sleeved shirts and pants to protect skin from exposure to sun when in outdoors. Also use sunscreen for outdoor activities.
- Avoid tanning beds and sun lamps, which produce more UV radiation.

### ***Early Detection:***

- The American Cancer Society suggests a simple ABCD outline for early detection of melanoma of skin. These are:
  1. A for “Asymmetry”: whether one half of the mole is different from other half;
  2. B for “Border”: irregularity whether it is ragged, notched or blurred;
  3. C for “Color”: whether the pigmentation is uniform or variable with tan, black, or brown;
  4. D for “Diameter”: whether the mole diameter is greater than 6 mm.

**Survival Rate:**

- Five-year relative survival for melanoma in the US is 91.3% for all stages combined based on SEER 18 2003-2009 data.<sup>b</sup>



**Figure 2.6.1:** 5-year relative survival rates of melanoma in the US by stage of diagnosis for people diagnosed between 2003 and 2009.

### *Melanoma in NH between 2006 and 2010*

Melanoma was the fourth most commonly diagnosed cancer in NH between 2006 and 2010 (among cancers that affect both males and females; 1,973 total invasive cases, average of 395 cases per year). It accounted for 5.3% of new cancer cases among NH residents and 1.6% of cancer-related deaths in NH between 2006 and 2010.

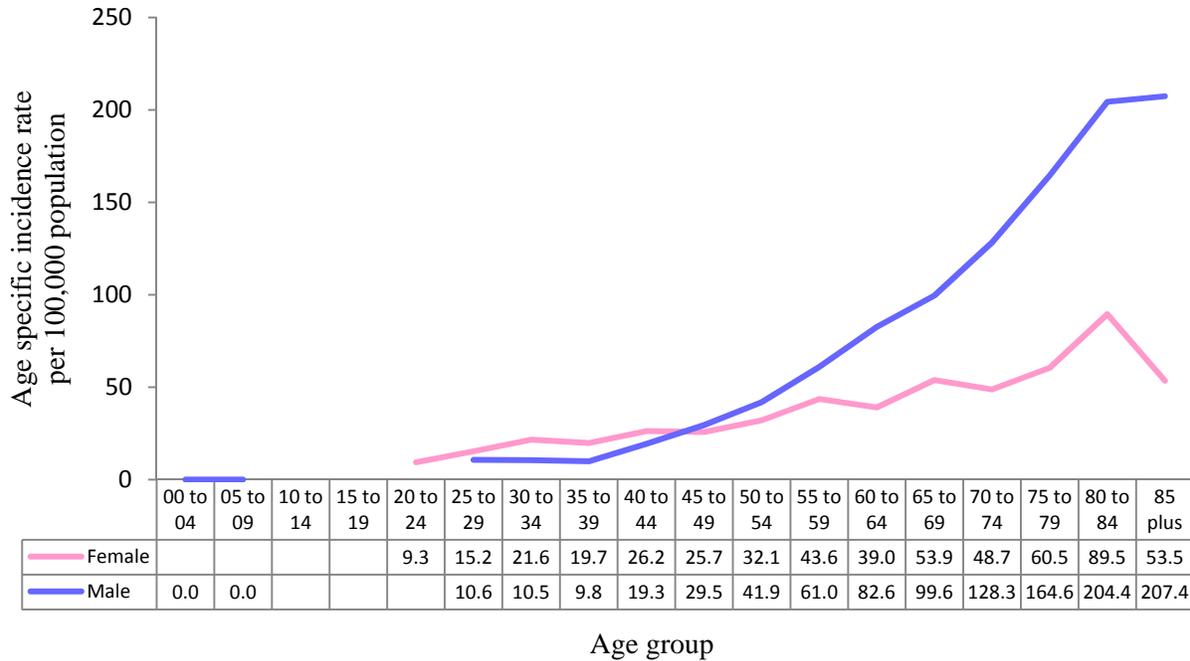
The age-adjusted incidence and mortality rates of melanoma among NH residents (2006-2010) were similar to the US white rates.

**Table 2.6.1:** Age-adjusted melanoma incidence and mortality rates for NH and US residents between 2006 and 2010

	<b>NH (n)</b>	<b>NH rate per 100,000</b>	<b>US white rate per 100,000</b>
Incidence			
Female	837	22.2 (20.7 – 23.7)	23.2 (22.8 – 23.6)
Male	1136	33.9 (31.9 – 35.9)	34.5 (34.0 – 35.0)
<b>Total</b>	<b>1973</b>	<b>27.0 (25.8 – 28.2)</b>	<b>27.9 (27.6 – 28.2)</b>
Mortality			
Female	68	1.7 (1.4 – 2.2)	2.0 (1.9 – 2.0)
Male	133	4.1 (3.4 – 4.8)	4.6 (4.6 – 4.7)
<b>Total</b>	<b>201</b>	<b>2.8 (2.4 – 3.2)</b>	<b>3.1 (3.1 – 3.2)</b>

**Age-specific incidence rate**

Melanoma incidence rates for NH residents increased with age, and were comparatively higher in females than males in younger age groups (<45 years). Melanoma incidence rates in NH males become significantly higher than NH females after age 59.

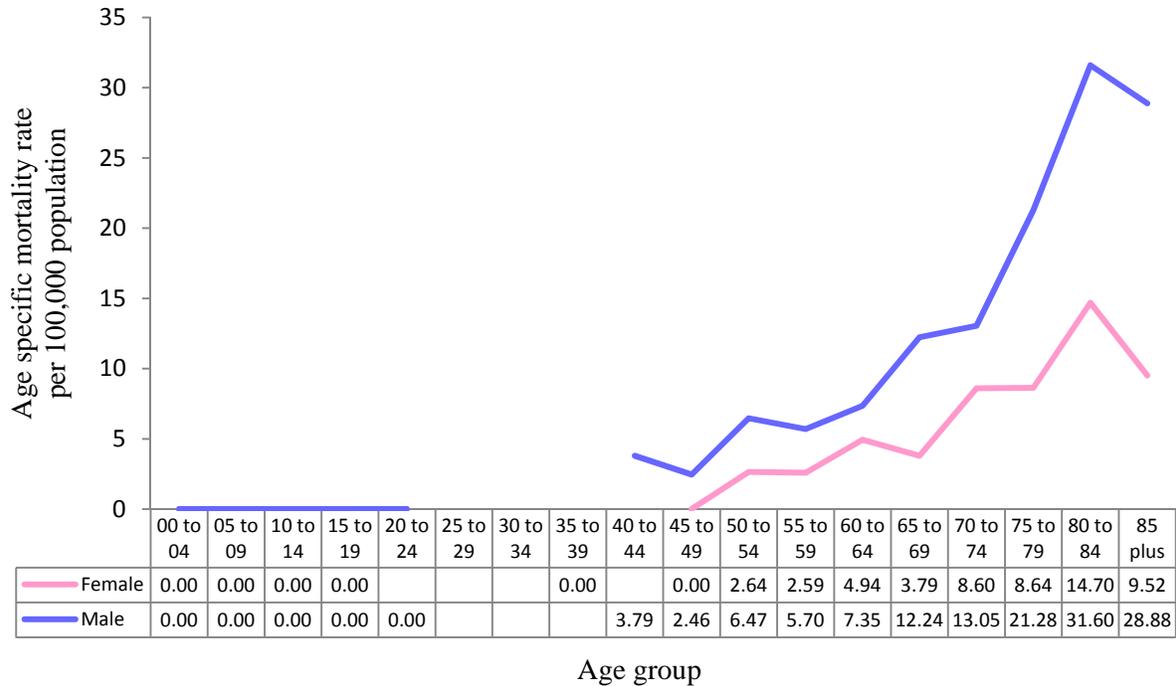


**Figure 2.6.2:** Melanoma age-specific incidence rates for NH male and female residents diagnosed between 2006 and 2010.

Rates are not displayed if incidence counts were reported between 1 and 9 as they tend to be unstable

### Age-Specific Mortality Rate

Melanoma mortality rate for NH residents increased steadily with age and peaked in 80 to 84 year olds in both genders. Mortality rate was not significantly different between males and females in any age groups.



**Figure 2.6.3:** Melanoma age-specific mortality rates for NH male and female residents diagnosed between 2006 and 2010.

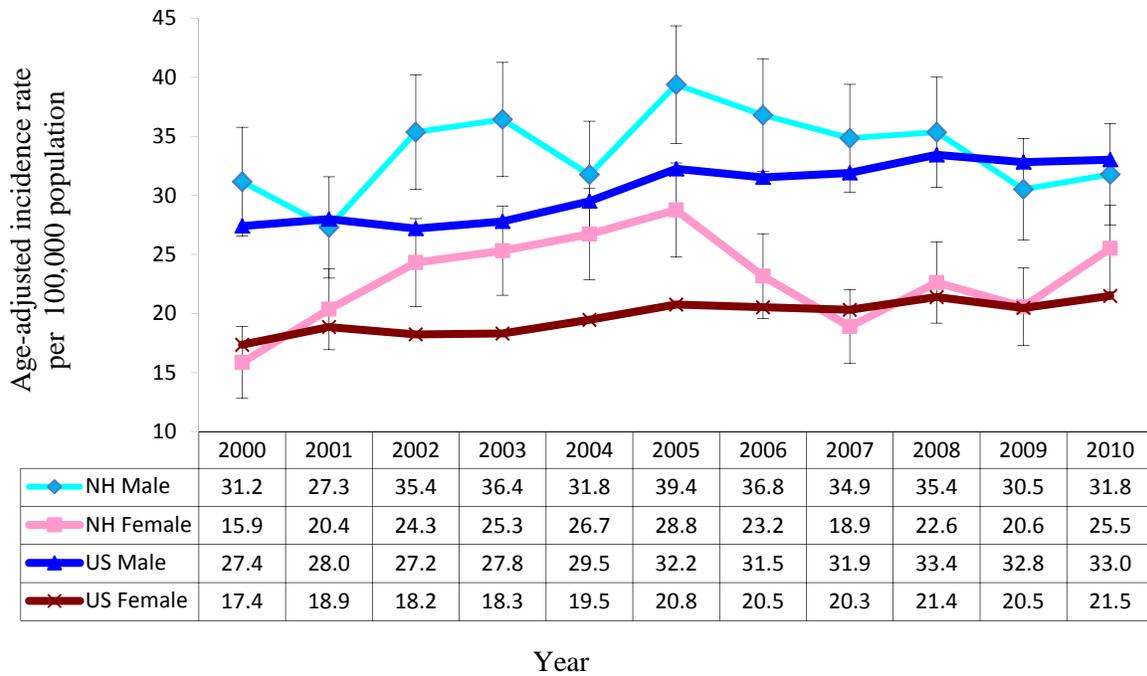
Rates are not displayed if mortality counts were reported between 1 and 4 as they tend to be unstable

*Age-adjusted incidence rate time trend*

The average annual percent change (AAPC) of melanoma incidence rate in NH fell between 2006 and 2010 but was not statistically significant (-1.9% per year, 95% CI= -7.3%, 3.9%).<sup>c</sup>

Melanoma age-adjusted incidence rates in NH male residents were similar to US male rates between 2006 and 2010.

Melanoma age-adjusted incidence rates in NH female residents were also similar to US female rates between 2006 and 2010.



**Figure 2.6.4:** Melanoma age-adjusted incidence rate time trends for NH male and female residents diagnosed between 2006 and 2010.

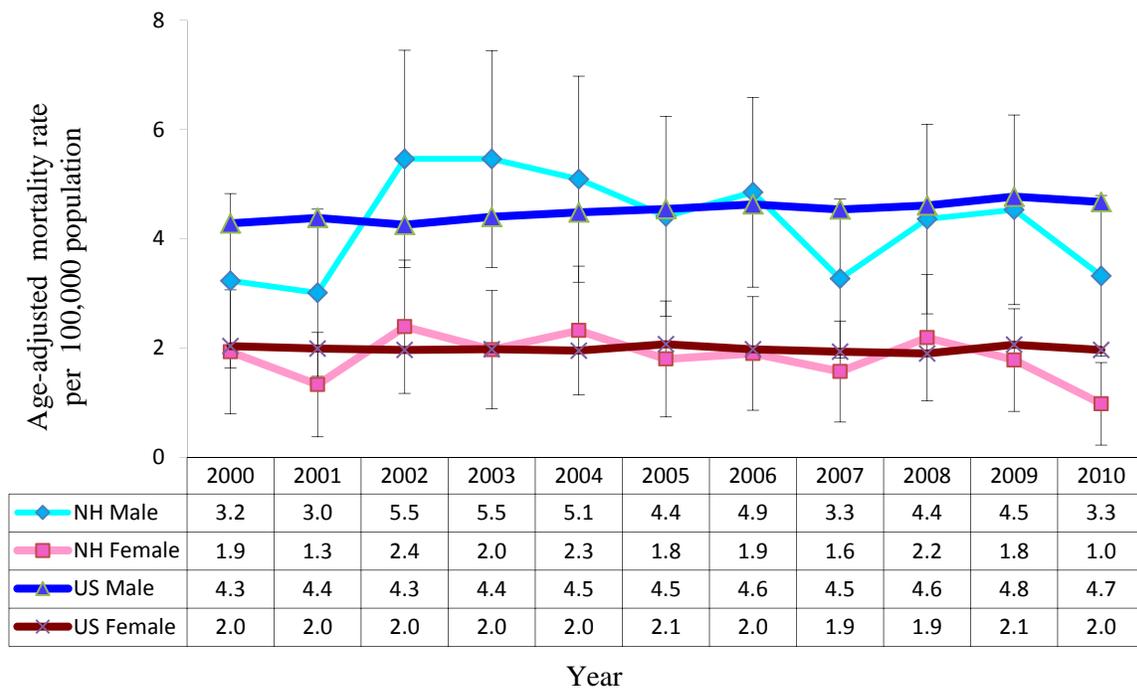
Vertical bars represent 95% confidence intervals around each measure.

**Age-adjusted mortality rate time trend**

The average annual percent change (AAPC) of melanoma mortality rate in NH fell between 2006 and 2010 but was not statistically significant (-0.1% per year, 95% CI= -1.6%, 1.4%).<sup>c</sup>

Melanoma age-adjusted mortality rates in NH male residents were similar to US white male rates between 2006 and 2010.

Melanoma age-adjusted mortality rates in NH female residents were similar to US female rates between 2006 and 2010 except for 2010 when the rate was significantly lower than the US white female rate.



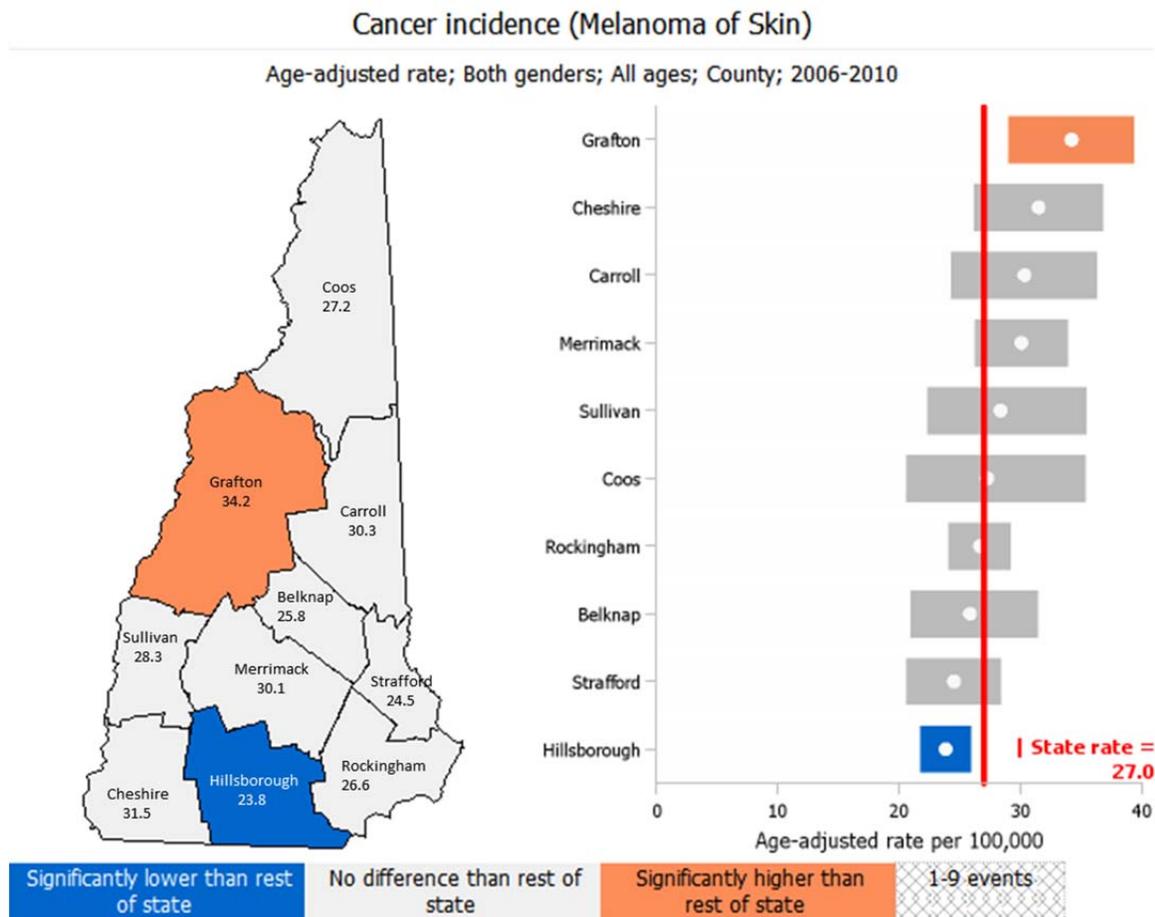
**Figure 2.6.5:** Melanoma age-adjusted mortality rate time trends for NH male and female residents diagnosed between 2006 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

**County level variability in melanoma incidence and mortality rates**

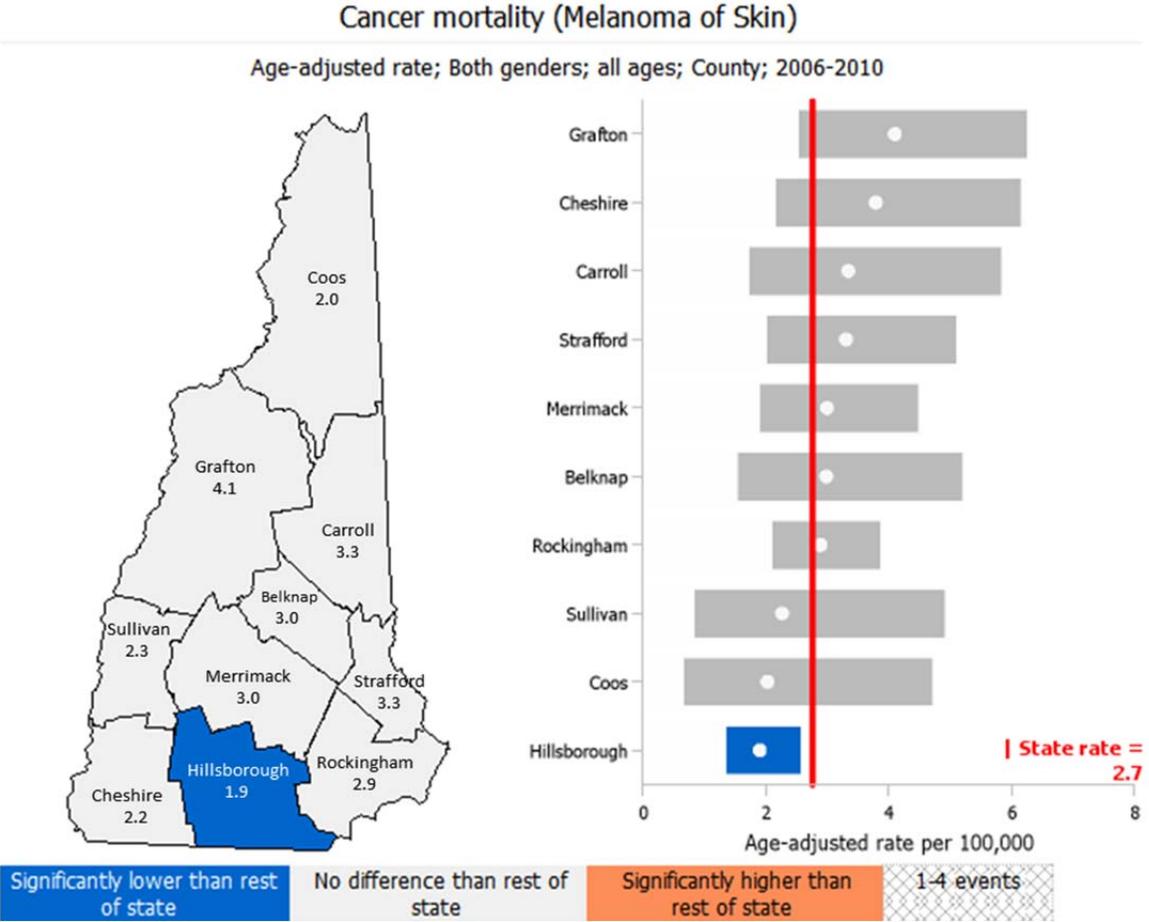
The melanoma incidence rate (age-adjusted) in Grafton County was higher than the residents in the rest of the state between 2006 and 2010 and this difference was statistically significant.

Melanoma incidence rate in Hillsborough County was lower than the residents in the rest of the state between 2006 and 2010 and this difference was statistically significant.



**Figure 2.6.6:** Melanoma age-adjusted incidence rates by NH counties for male and female residents diagnosed between 2006 and 2010.

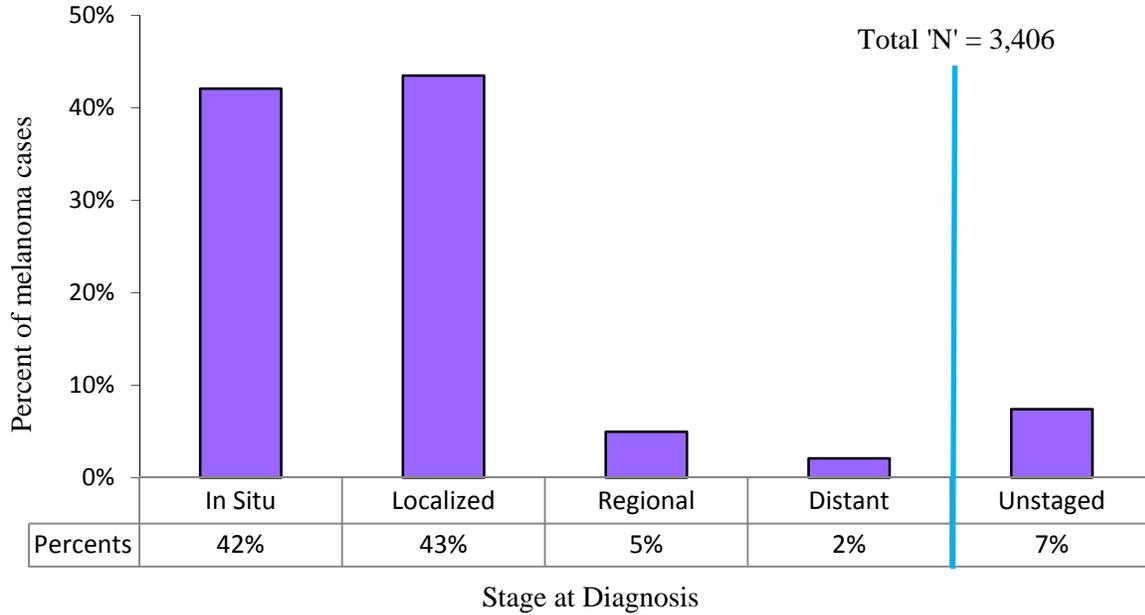
Melanoma mortality rate (age-adjusted) in Hillsborough County was lower than the residents in the rest of the state between 2006 and 2010 and this difference was statistically significant.



**Figure 2.6.7:** Melanoma age-adjusted mortality rates by NH counties for male and female residents diagnosed between 2006 and 2010.

**Stage at Diagnosis**

For staging purpose, we used all reportable cancer cases (in situ and malignant). There were 3,406 new melanoma cases (in situ and malignant) diagnosed between 2006 and 2010 among NH residents. Of them 85% were diagnosed at early stage (in situ and localized).



**Figure 2.6.8:** Stage at diagnosis for melanoma among NH male and female residents diagnosed between 2006 and 2010.

## Notes

### Data sources:

<sup>a</sup> American Cancer Society. Cancer statistics 2013:

<http://www.cancer.org/research/cancerfactsfigures/cancerfactsfigures/cancer-facts-figures-2013>

<sup>b</sup> National Cancer Institute. SEER Program: SEER Stat Fact Sheets: Melanoma of the skin

<http://seer.cancer.gov/statfacts/html/melan.html>

<sup>c</sup> Annual Percent Change (APC)- Incidence and Mortality:

Created by <http://www.statecancerprofiles.cancer.gov/recenttrend/recenttrend.html>

National Cancer Institute - Melanoma Home Page,

<http://www.cancer.gov/cancertopics/types/melanoma/>

Centers for Disease Control, Skin Cancer Prevention

[http://www.cdc.gov/cancer/skin/basic\\_info/prevention.htm](http://www.cdc.gov/cancer/skin/basic_info/prevention.htm)

New Hampshire Data Source:

Incidence: New Hampshire State Cancer Registry Program.

Mortality: New Hampshire Death Certificate Data, NH Dept. of State, Bureau Vital Records.

United States Incidence and Mortality Data Sources: Output, assessed on October 10, 2013.

<http://seer.cancer.gov/faststats/selections.php?#>

United States Incidence Data Source: Surveillance, Epidemiology and End Results (SEER) Program, 13 areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry and Rural Georgia).

United States Mortality Data Source: US Mortality Files, National Center for Health Statistics, CDC. Rates are per 100,000 and are age-adjusted to the 2000 US Std. Population (19 age groups - Census P25-1130). The modeled rates are the point estimates for the regression lines calculated by the Joinpoint Regression Program (Version 4.0.3, April 2013, National Cancer Institute).

## NON-HODGKIN'S LYMPHOMA

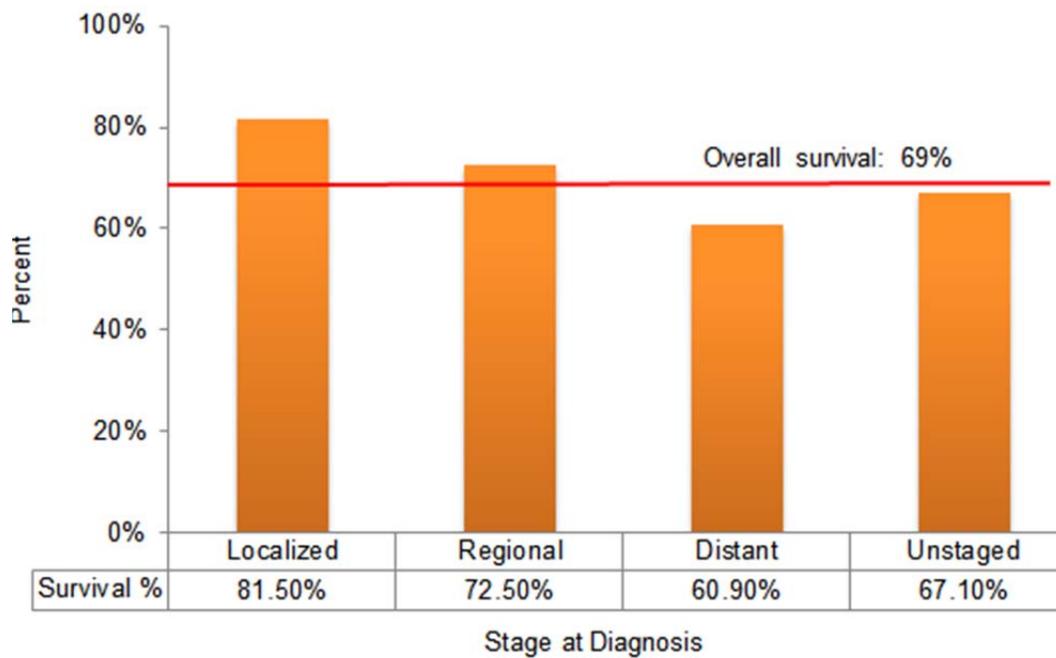
- It is estimated that Non-Hodgkin's Lymphoma (NHL) will be the seventh most common cancer in the US male population, and sixth most common cancer in the US female population in 2013.<sup>a</sup>
- Lifetime risk: Based on most recent data, 2.1% of the US population will be diagnosed with NHL at some point during their lifetime.<sup>b</sup>
- It is estimated that NHL will represent 4.2% of all new US cancer cases in 2013.<sup>b</sup>
- It is estimated that NHL will represent 3.3% of all US cancer deaths in 2013.<sup>b</sup>

### *Risk Factors:*

- Most of the risk factors of NHL are associated with severely reduced immune function.
- NHL risk is high in persons with organ transplants who receive immune suppressants to prevent rejections; in people with autoimmune conditions and people infected with Human Immunodeficiency Virus (HIV), Human T-cell Lymphotropic Viruses (HTLV-I) and probably Hepatitis C Virus (HCV).
- Epstein - Barr virus (EBV) is associated with Burkitt's lymphoma, sometimes with NHL and perhaps other related lymphomas. Infection with *Helicobacter pylori* also increases risk for gastric lymphomas.
- Occupational exposures to herbicides, chlorinated organic compounds, and certain other chemicals increase risk of NHL.
- Risk of lymphoma is increased among those with a family history of lymphoma.

### *Survival Rate:*

- Five-year relative survival for NHL in the US is 69% for all stages combined based on SEER 18 2003-2009 data.<sup>b</sup>



**Figure 2.7.1:** 5-year relative survival rates of Non-Hodgkin’s Lymphoma in the US by stage of diagnosis for people diagnosed between 2003 and 2009.

### *Non-Hodgkin's Lymphoma in NH between 2006 and 2010*

NHL was the eighth leading cancer diagnosed in NH residents between 2006 and 2010 (1,512 total invasive cases, average of 302 cases per year). NHL accounted for 4.0% of new cancer cases among NH residents, and 3.2% of cancer-related deaths in NH between 2006 and 2010.

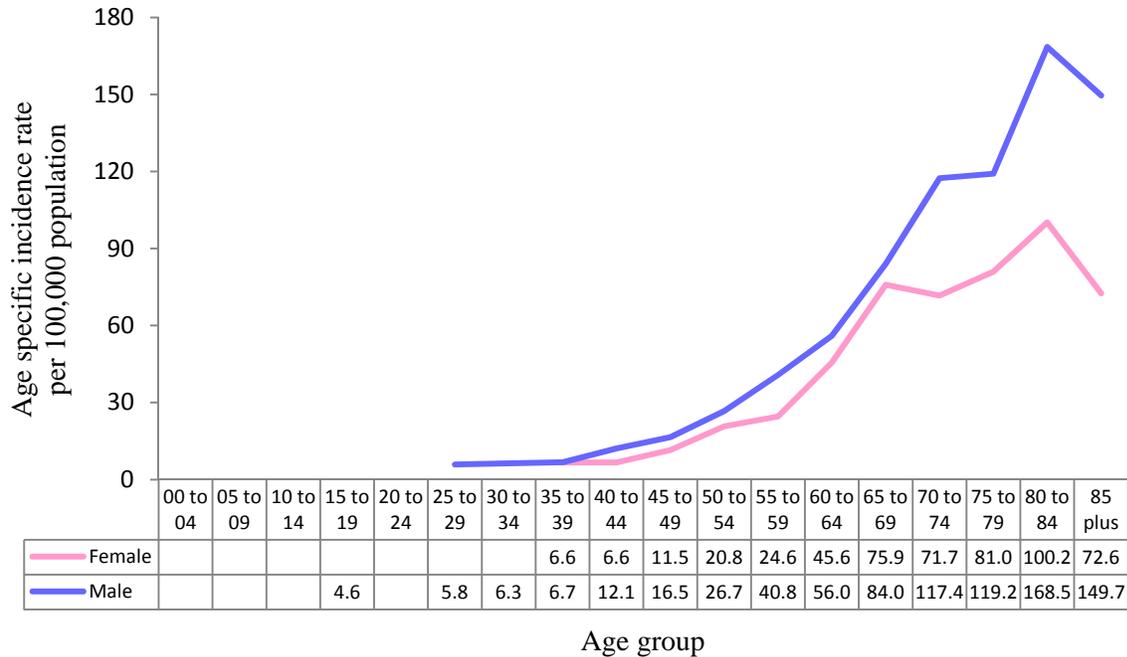
The age-adjusted incidence rate of NHL among NH residents was similar to the US white rate between 2006 and 2010. The mortality rate was lower than the US white rate and it was statistically significant.

**Table 2.7.1:** Age-adjusted Non-Hodgkin's Lymphoma incidence and mortality rates for NH and US residents between 2006 and 2010

	<b>NH (n)</b>	<b>NH rate per 100,000</b>		<b>US white rate per 100,000</b>	
Incidence					
Female	672	17.0	(15.7 – 18.3)	17.9	(17.6 – 18.2)
Male	840	25.5	(23.7 – 27.2)	26.5	(26.0 – 26.9)
<b>Total</b>	<b>1512</b>	<b>20.8</b>	<b>(19.7 – 21.8)</b>	<b>21.8</b>	<b>(21.5 – 22.0)</b>
Mortality					
Female	190	4.7	(4.0 – 5.3)	5.3	(5.3 – 5.4)
Male	219	7.2	(6.2 – 8.2)	8.5	(8.4 – 8.6)
<b>Total</b>	<b>409</b>	<b>5.7</b>	<b>(5.2 – 6.3)</b>	<b>6.7</b>	<b>(6.7 – 6.7)</b>

**Age-specific incidence rate**

NHL incidence rates in NH residents peaked in 80 to 84 year olds in both genders. Incidence rate was similar in both males and females in all age groups except for 70-74 year olds and 80 plus year olds when it was significantly higher in males than females.

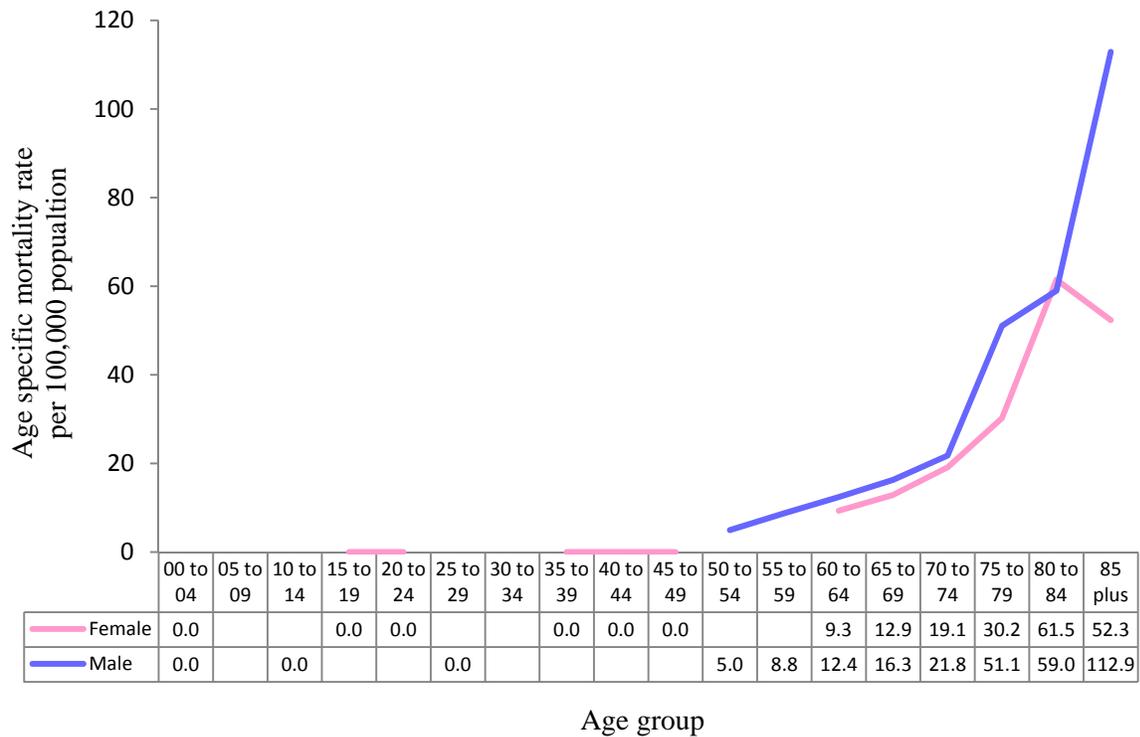


**Figure 2.7.2:** Non-Hodgkin’s Lymphoma age-specific incidence rates for NH male and female residents diagnosed between 2006 and 2010.

Rates are not displayed if incidence counts were reported between 1 and 9 as they tend to be unstable

**Age-specific mortality rate**

NHL mortality rate increased steadily with age in males and rose sharply after age 74. In females, the rate peaked in 80 to 84 year olds. Mortality rate was significantly different between males and females only in 85 plus year olds when males had significantly higher rate than females.



**Figure 2.7.3:** Non-Hodgkin’s Lymphoma age-specific mortality rates for NH male and female residents diagnosed between 2006 and 2010.

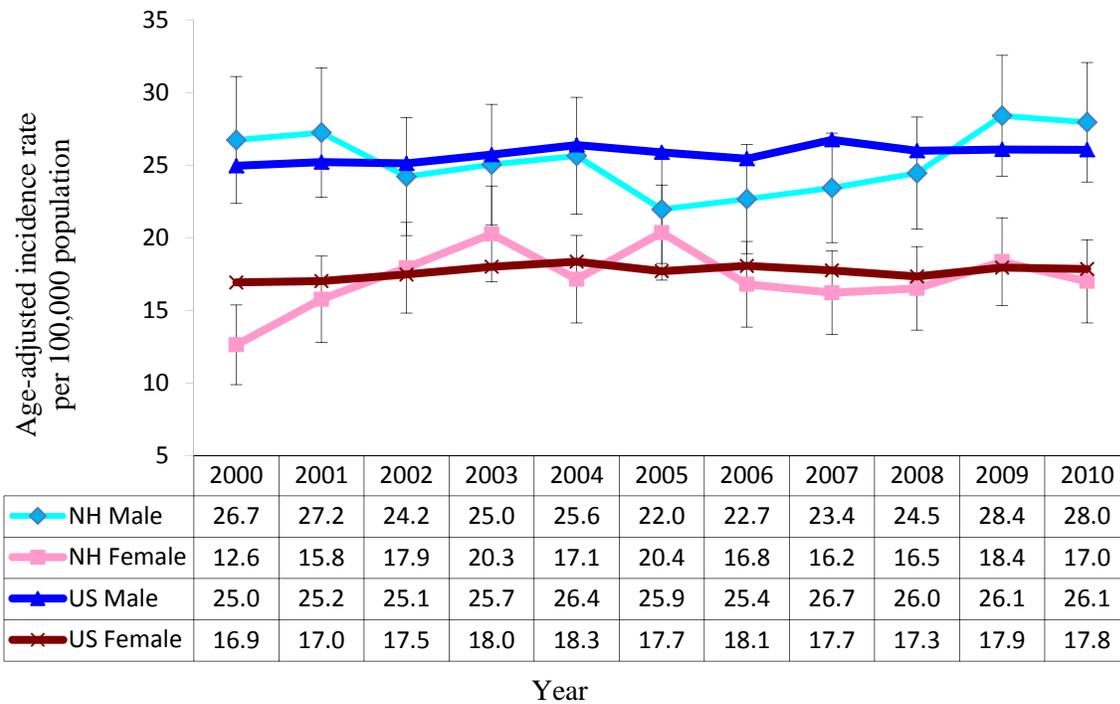
Rates are not displayed if mortality counts were reported between 1 and 4 as they tend to be unstable

**Age-adjusted incidence rate time trends**

The average annual percent change (AAPC) of NHL incidence rate in NH increased between 2006 and 2010, but was not statistically significant (2.8% per year, 95% CI= -1.9%, 7.7%).<sup>c</sup>

NHL age-adjusted incidence rates in NH males were similar to US white male rates between 2006 and 2010.

NHL age-adjusted incidence rates in NH females were similar to US white female rates between 2006 and 2010.



**Figure 2.7.4:** Non-Hodgkin’s Lymphoma age-adjusted incidence rate time trends for NH male and female residents diagnosed between 2006 and 2010.

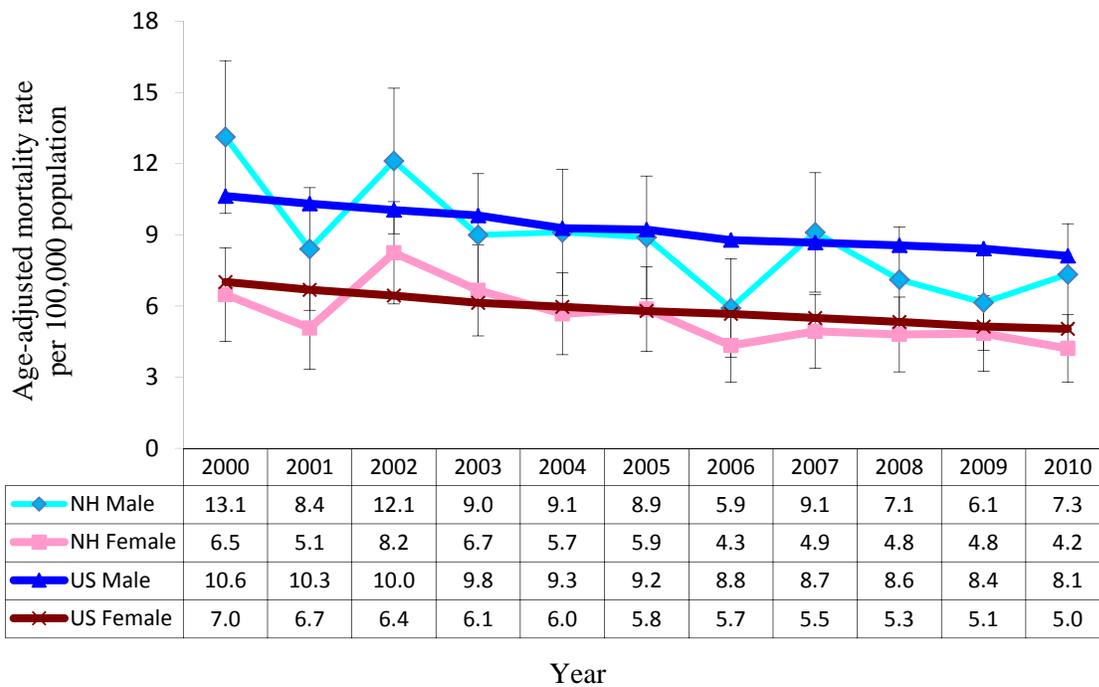
Vertical bars represent 95% confidence intervals around each measure.

**Age-adjusted mortality rate time trends**

The average annual percent change (AAPC) of NHL mortality rate in NH fell between 2006 and 2010 and was statistically significant (-2.5% per year, 95% CI= -3.6%, -1.4%).<sup>c</sup>

NHL mortality rates in NH males were similar to US white male rates between 2006 and 2010 except for 2006 when the rate was significantly lower than the US white male rate.

NHL mortality rates in NH females were relatively stable and similar to the US white female rates between 2006 and 2010.



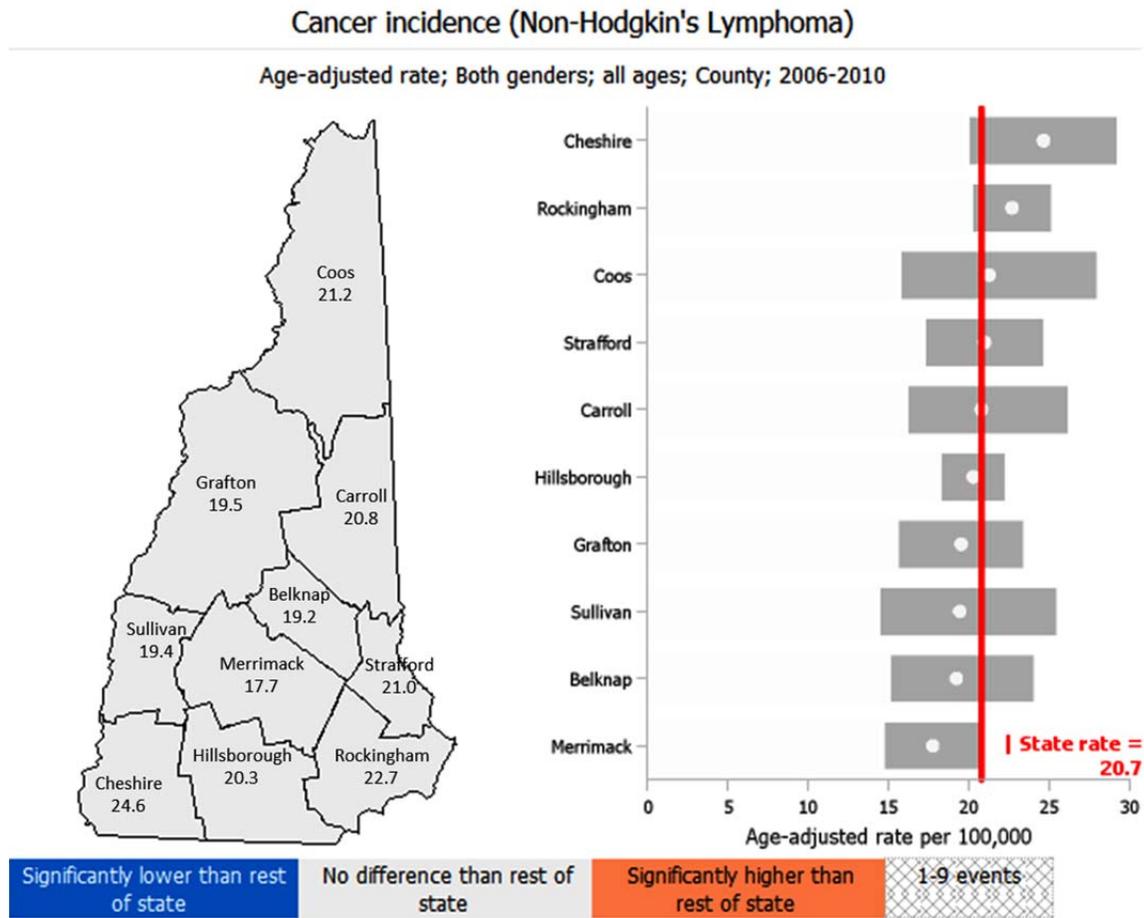
**Figure 2.7.5:** Non-Hodgkin’s Lymphoma age-adjusted mortality rate time trends for NH male and female residents diagnosed between 2000 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

**County level variability in Non-Hodgkin's Lymphoma incidence and mortality rates**

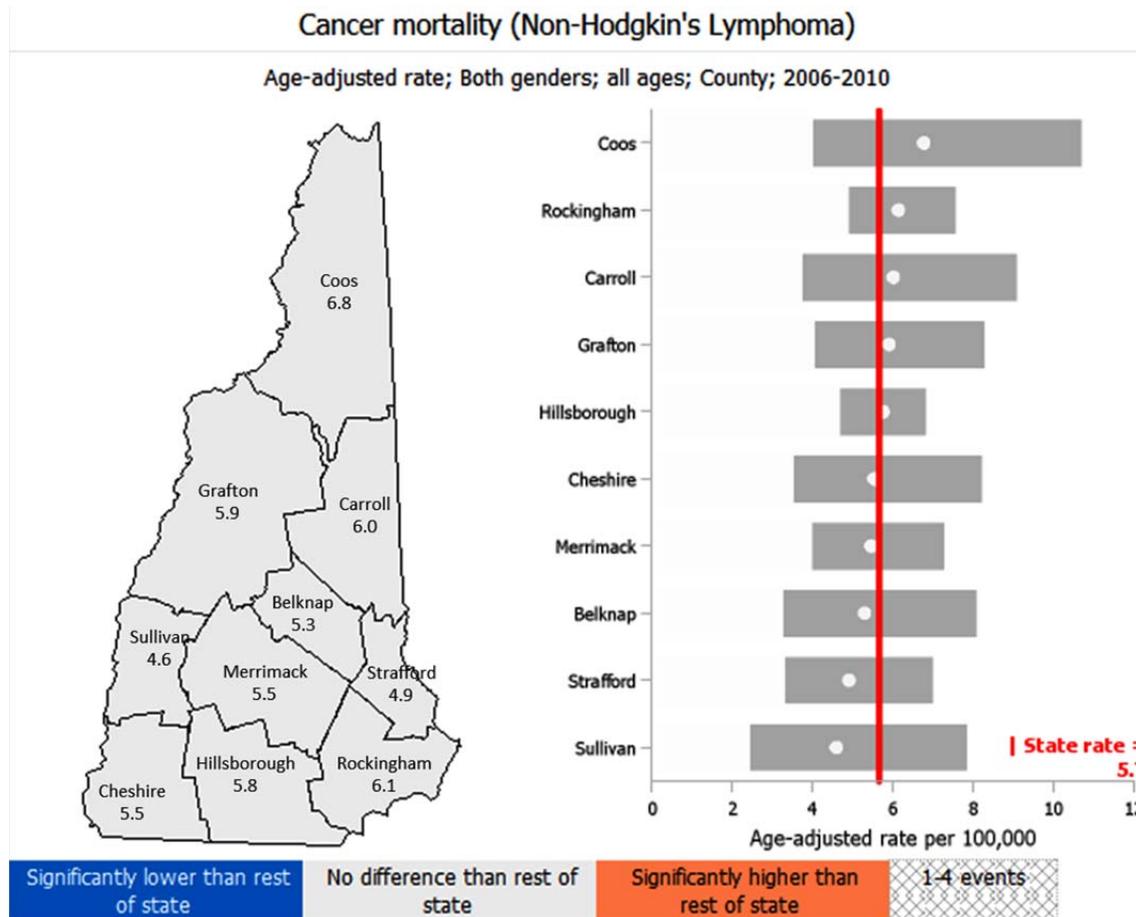
There was no significant geographic variability in NHL age-adjusted incidence rates between 2006 and 2010 by NH counties.

However, when stratified by gender, Belknap county male residents showed a lower incidence rate (age-adjusted) than male residents in the rest of the state; and this difference was statistically significant (not shown in Figure 2.7.6).



**Figure 2.7.6:** Non-Hodgkin's Lymphoma incidence rates (age-adjusted) by NH counties for male and female residents diagnosed between 2006 and 2010.

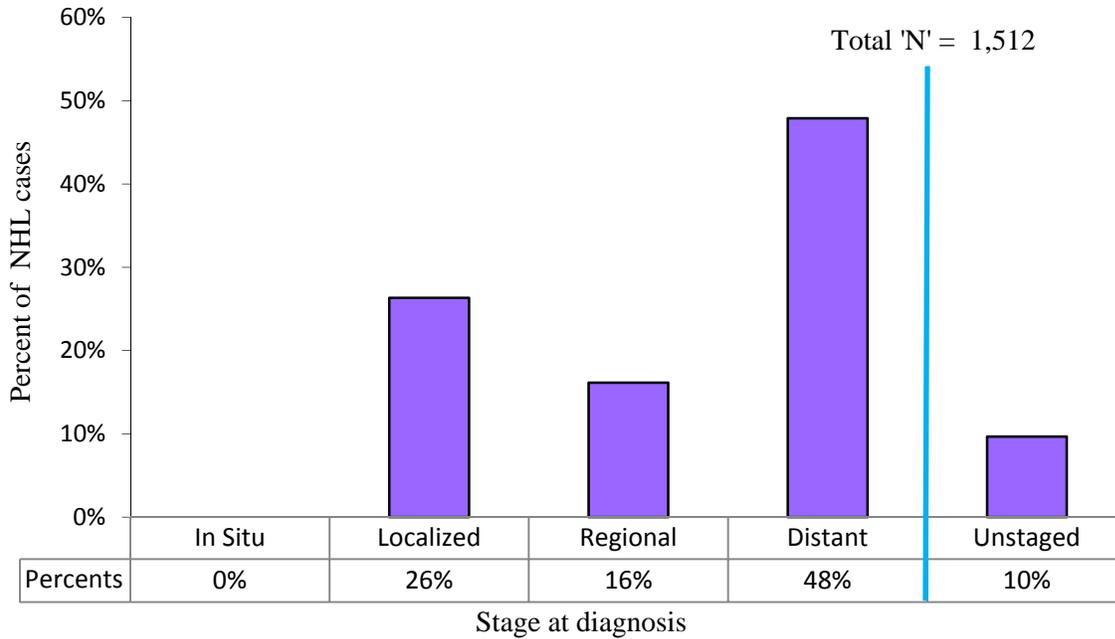
There was no significant geographic variability in NHL mortality rates by NH counties.



**Figure 2.7.7:** Non-Hodgkin’s Lymphoma mortality rates (age-adjusted) by NH counties for male and female residents diagnosed between 2006 and 2010.

### Stage at Diagnosis

For staging purpose, we used all reportable cancer cases (in situ and malignant). There were 1,512 new NHL cases diagnosed between 2006 and 2010 among NH residents. Of them 64% were diagnosed at late stage (regional and distant).



**Figure 2.7.8:** Stage at diagnosis for Non-Hodgkin’s Lymphoma among NH male and female residents diagnosed between 2006 and 2010.

## *Notes*

### **Data sources:**

<sup>a</sup> American Cancer Society. Cancer statistics 2013:

<http://www.cancer.org/research/cancerfactsfigures/cancerfactsfigures/cancer-facts-figures-2013>

<sup>b</sup> National Cancer Institute. SEER Program: SEER Stat Fact Sheets: Non-Hodgkin's Lymphoma

<http://seer.cancer.gov/statfacts/html/nhl.html>

<sup>c</sup> Annual Percent Change (APC)- Incidence and Mortality: Created by

<http://www.statecancerprofiles.cancer.gov/recenttrend/recenttrend.html> on 11/25/2013.

Leukemia and Lymphoma Society

<http://www.lls.org/#/diseaseinformation/lymphoma/nonhodgkinlymphoma/causesriskfactors/>

National Cancer Institute – Non-Hodgkin's Lymphoma Home Page,

<http://www.cancer.gov/cancertopics/types/non-hodgkin>

New Hampshire Data Source:

Incidence: New Hampshire State Cancer Registry Program.

Mortality: New Hampshire Death Certificate Data, NH Dept. of State, Bureau Vital Records.

United States Incidence and Mortality Data Sources: Output, assessed on October 10, 2013.

<http://seer.cancer.gov/faststats/selections.php?#>

United States Incidence Data Source: Surveillance, Epidemiology and End Results (SEER) Program, 13 areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry and Rural Georgia).

United States Mortality Data Source: US Mortality Files, National Center for Health Statistics, CDC. Rates are per 100,000 and are age-adjusted to the 2000 US Std. Population (19 age groups - Census P25-1130). The modeled rates are the point estimates for the regression lines calculated by the Joinpoint Regression Program (Version 4.0.3, April 2013, National Cancer Institute).

## **UTERINE CANCER**

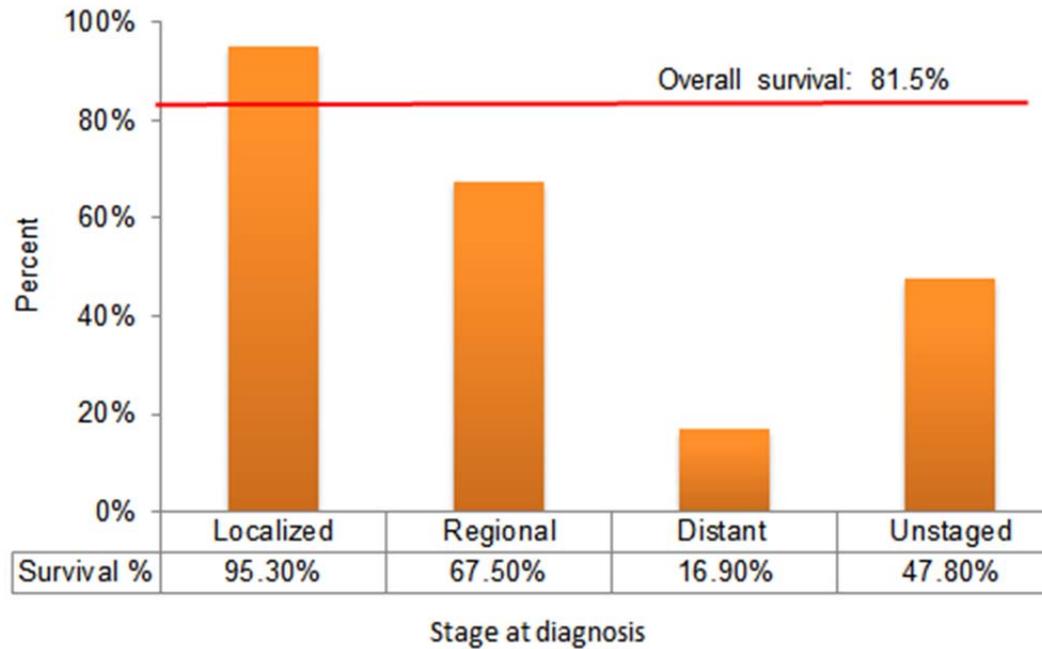
- It is estimated that uterine cancer will be the fourth most common cancer in US female population in 2013.<sup>a</sup>
- Life time risk: Based on most recent data, 2.7% of US female population will be diagnosed with uterine cancer at some point during their lifetime.<sup>b</sup>
- It is estimated that uterine cancer will represent 3.2% of all new US cancer cases in 2013.<sup>b</sup>
- It is estimated that uterine cancer will represent 1.4% of all US cancer-related deaths in 2013.<sup>b</sup>

### ***Risk Factors:***

- Risk is increased with cumulative exposure to high levels of estrogen often through estrogen replacement therapy (without progesterone) and obesity.
- Risk is also increased with use of tamoxifen, early onset of menstruation, late menopause, never having children, and a history of polycystic ovary syndrome.
- Other risk factors include infertility and hereditary non-polyposis colon cancer (HNPCC).
- Addition of progesterone to estrogen replacement therapy decreases the risk associated with use of estrogen alone.
- Pregnancy and use of oral contraceptives are inversely associated with the risk of uterine cancer.

### ***Survival Rate:***

- Five-year relative survival for uterine cancer in the US is 81.5% for all stages combined based on SEER 18 2003-2009 data.<sup>b</sup>



**Figure 2.8.1:** 5-year relative survival rates of uterine cancer in the US by stage of diagnosis for females diagnosed between 2003 and 2009.

### *Uterine Cancer in NH between 2006 and 2010*

Uterine cancer was the fourth most commonly diagnosed cancer among NH female residents between 2006 and 2010 (1,294 total invasive cases, average of 259 cases per year). It accounted for 7.3% of all new cancer cases among NH female residents. 189 female residents died from uterine cancer and it remained the eighth most common cause of cancer-related death among NH female residents.

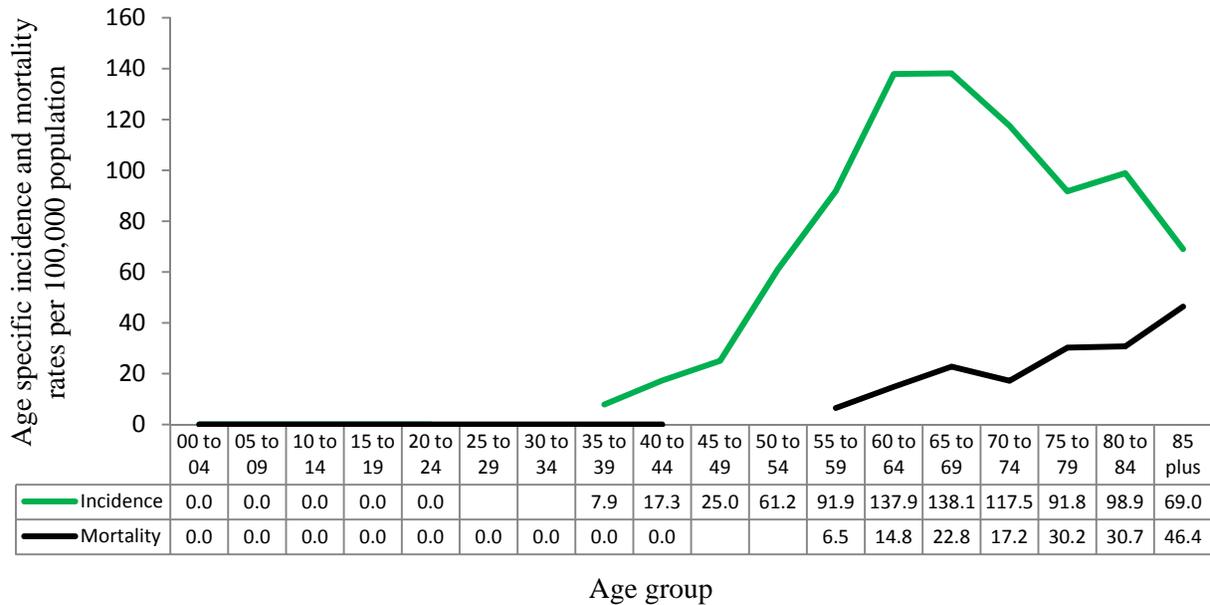
The age-adjusted incidence rate for uterine cancer among NH female residents was higher than US white female rates between 2006 and 2010 and was statistically significant. The uterine cancer mortality rate among NH female residents was similar to US white female rate.

**Table 2.8.1:** Age-adjusted uterine cancer incidence and mortality rates for NH and US female residents between 2006 and 2010

	<b>NH (n)</b>	<b>NH rate per 100,000</b>	<b>US white rate per 100,000</b>
Incidence	1,294	31.6 (29.9 – 33.4)	26.9 (26.5 – 27.3)
Mortality	189	4.6 (3.9 – 5.2)	4.0 (3.9 – 4.0)

**Age-specific incidence and mortality rate**

Uterine cancer incidence rate in NH female residents peaked in 60 and 69 year olds, but the mortality rate increased steadily with age.



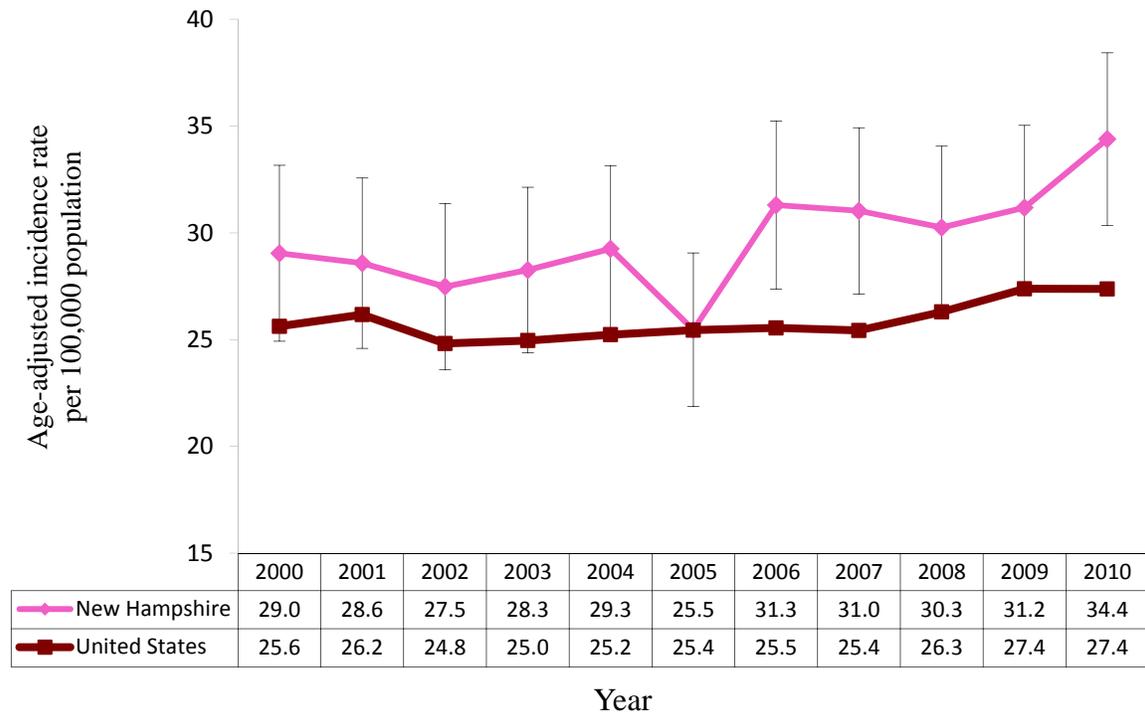
**Figure 2.8.2:** Uterine cancer age-specific incidence and mortality rates for NH female residents between 2006 and 2010.

Rates are not displayed if incidence counts were reported between 1 and 9 and mortality counts were reported between 1 and 4 as they tend to be unstable.

**Age-adjusted incidence rate time trends**

The average annual percent change (AAPC) of uterine cancer incidence rate in NH increased between 2006 and 2010 but was not statistically significant (1.2% per year, 95% CI= -3.1%, 5.7%).<sup>c</sup>

Uterine cancer age-adjusted incidence rates in NH female residents were significantly higher than the US white female rates in 2006, 2007 and 2010.



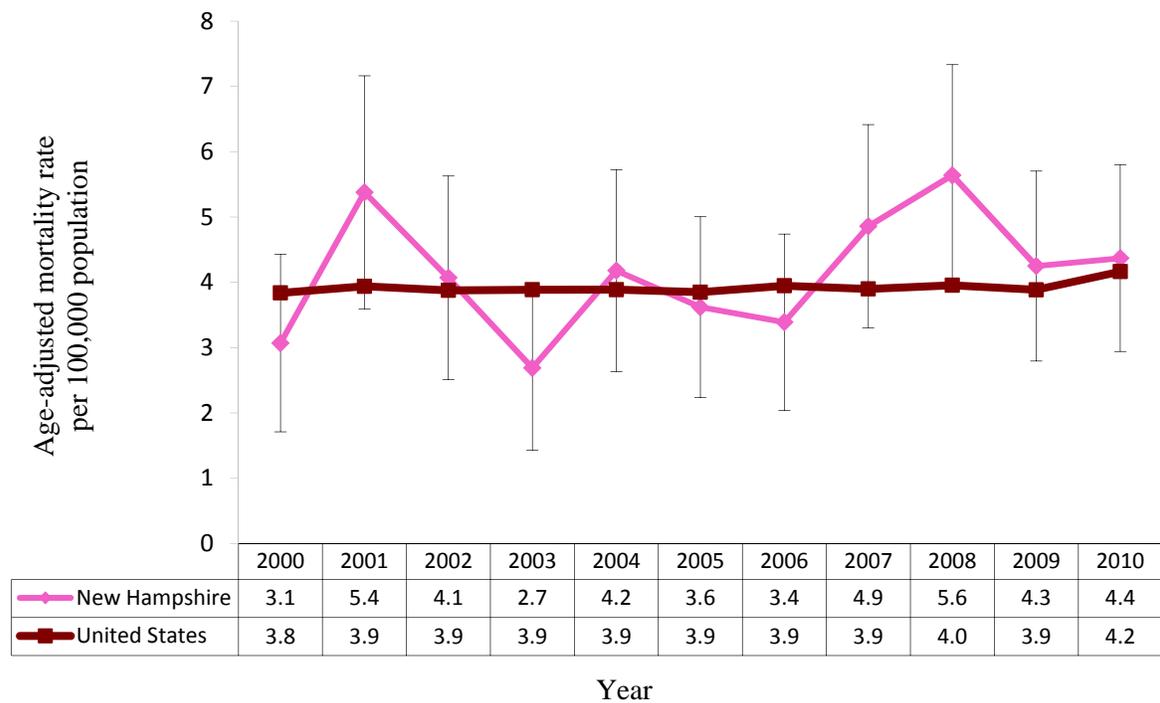
**Figure 2.8.3:** Uterine cancer age-adjusted incidence rate time trends for NH female residents diagnosed between 2006 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

**Age-adjusted mortality rate time trends**

The average annual percent change (AAPC) of uterine cancer mortality rate in NH increased between 2006 and 2010 but was not statistically significant (0.7% per year, 95% CI= -0.9%, 2.3%).<sup>c</sup>

Uterine cancer mortality rates for NH female residents were not significantly different from the US white female rates between 2006 and 2010.

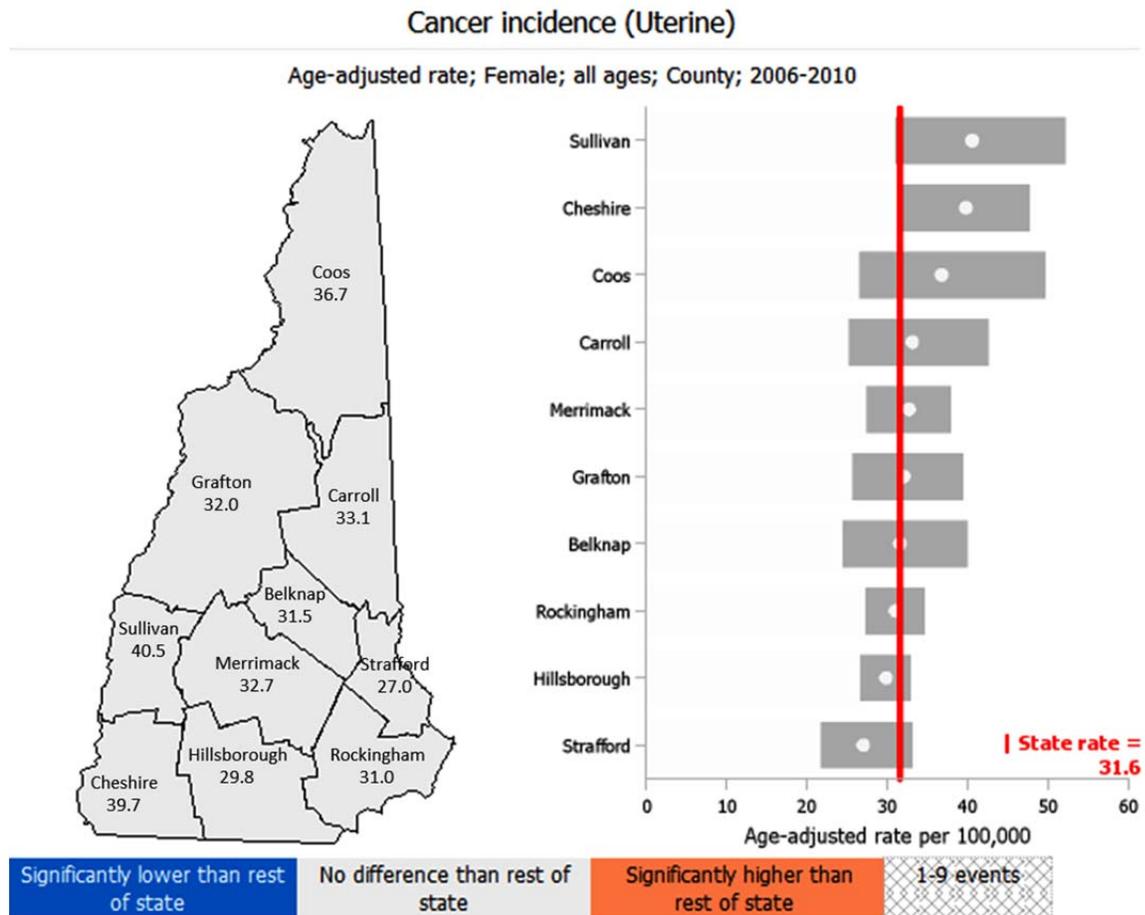


**Figure 2.8.4:** Uterine cancer age-adjusted mortality rate time trends for NH female residents between 2006 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

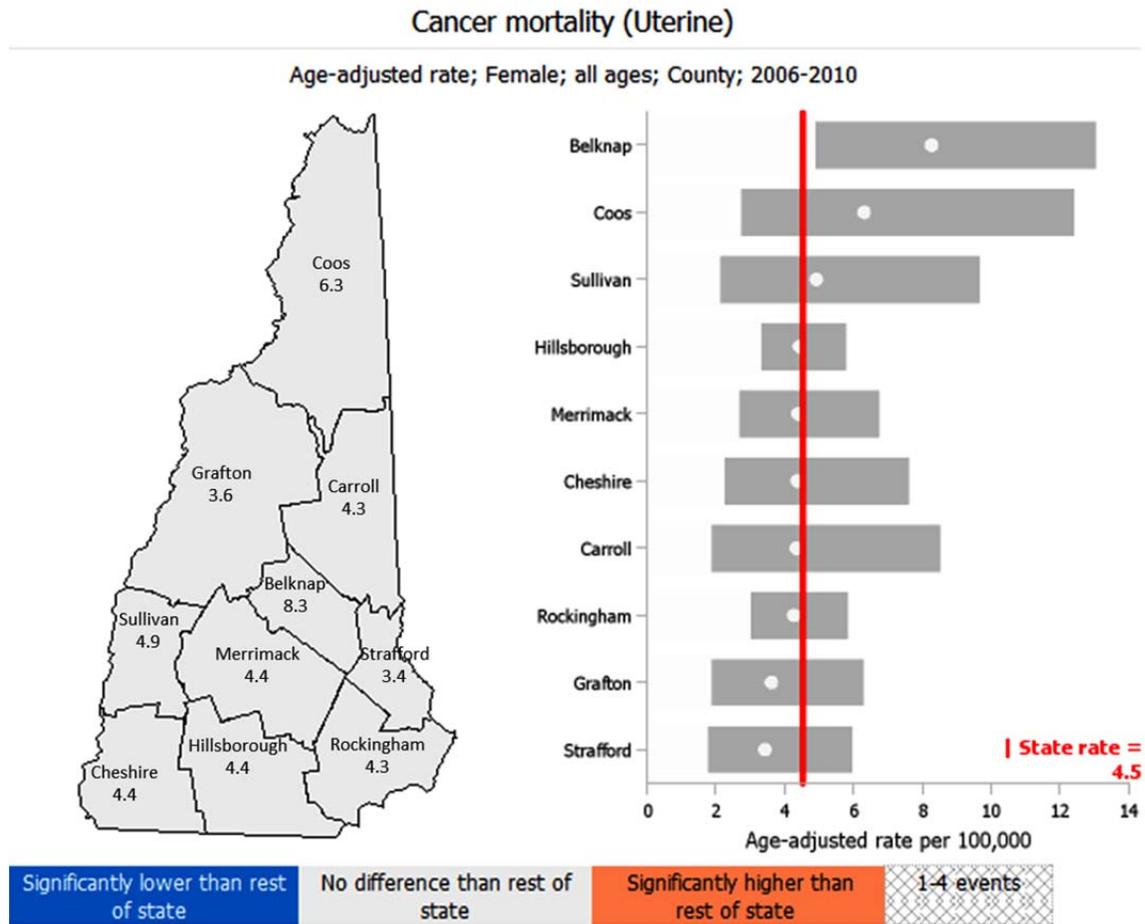
*County level variability in Uterine cancer incidence and mortality rates*

There was no significant geographic variability in uterine cancer age-adjusted incidence rates by NH counties.



**Figure 2.8.5:** Uterine cancer incidence rates (age-adjusted) by NH counties for female residents diagnosed between 2006 and 2010.

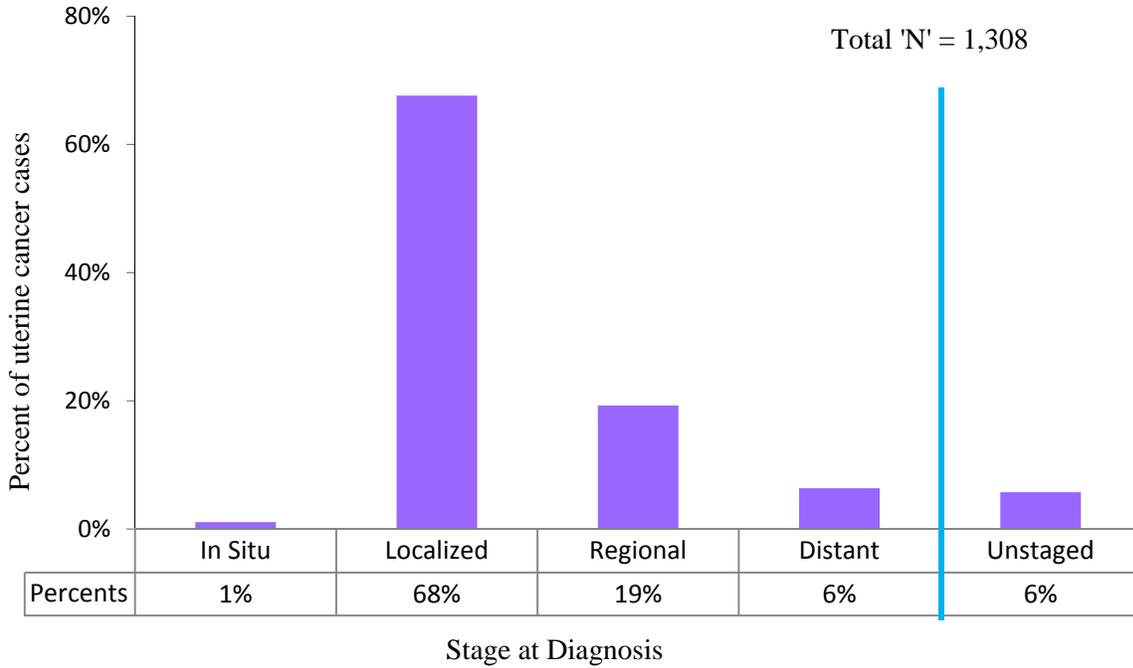
There was no significant geographic variability in uterine cancer mortality rates by NH counties.



**Figure 2.8.6:** Uterine cancer mortality rates (age-adjusted) by NH counties for female residents diagnosed between 2006 and 2010.

**Stage at Diagnosis**

For staging purpose, we used all reportable cancer cases (in situ and malignant). There were 1,308 new uterine cancer cases (in situ and malignant) diagnosed between 2006 and 2010 among NH female residents. Of these, 69% were diagnosed at early stage (in situ and localized).



**Figure 2.8.7:** Stage at diagnosis for uterine cancer among NH female residents diagnosed between 2006 and 2010.

## *Notes*

### **Data sources:**

<sup>a</sup> American Cancer Society. Cancer statistics 2013:

<http://www.cancer.org/research/cancerfactsfigures/cancerfactsfigures/cancer-facts-figures-2013>

<sup>b</sup> National Cancer Institute. SEER Program: SEER Stat Fact Sheets: Endometrial Cancer

<http://seer.cancer.gov/statfacts/html/corp.html>

<sup>c</sup> Annual Percent Change (APC)- Incidence and Mortality:

Created by <http://www.statecancerprofiles.cancer.gov/recenttrend/recenttrend.html> on 11/25/2013.

Centers for Disease Control, Gynecologic Cancers

[http://www.cdc.gov/cancer/uterine/basic\\_info/index.htm](http://www.cdc.gov/cancer/uterine/basic_info/index.htm)

National Cancer Institute, Endometrial Cancer

<http://www.cancer.gov/cancertopics/types/endometrial>

New Hampshire Data Source:

Incidence: New Hampshire State Cancer Registry Program.

Mortality: New Hampshire Death Certificate Data, NH Dept. of State, Bureau Vital Records.

United States Incidence and Mortality Data Sources: Output, assessed on October 10, 2013.

<http://seer.cancer.gov/faststats/selections.php?#>

United States Incidence Data Source: Surveillance, Epidemiology and End Results (SEER) Program, 13 areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry and Rural Georgia).

United States Mortality Data Source: US Mortality Files, National Center for Health Statistics, CDC. Rates are per 100,000 and are age-adjusted to the 2000 US Std. Population (19 age groups - Census P25-1130). The modeled rates are the point estimates for the regression lines calculated by the Joinpoint Regression Program (Version 4.0.3, April 2013, National Cancer Institute).

## **KIDNEY AND RENAL PELVIS CANCER**

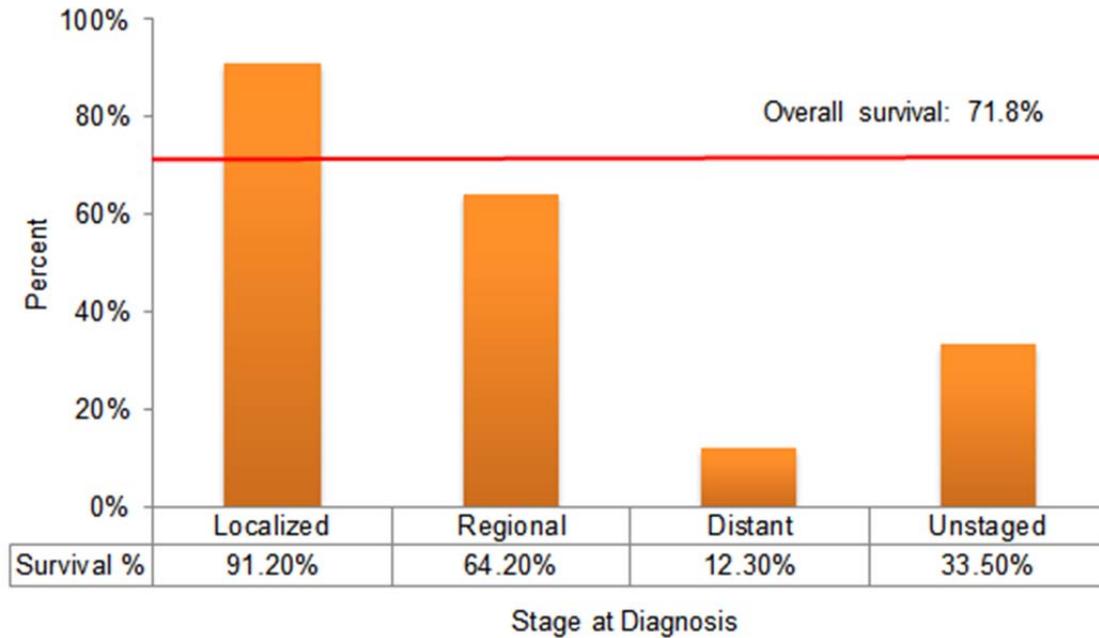
- It is estimated that kidney and renal pelvis cancer (henceforth it will be termed ‘kidney’ cancer) will be the sixth most common cancer in the US male population and eighth most common cancer in the US female population in 2013.<sup>a</sup>
- Life time risk: Based on most recent data, 1.6% of the US population will be diagnosed with kidney cancer at some point during their lifetime.<sup>b</sup>
- It is estimated that kidney cancer will represent 4.0% of all new US cancer cases in 2013.<sup>b</sup>
- It is estimated that kidney cancer will represent 2.4% of all US cancer-related deaths in 2013.<sup>b</sup>

### ***Risk Factors:***

- Smoking increases the risk of developing kidney cancer.
- Other risk factors of kidney cancer include occupational or workplace exposure to certain substances such as asbestos, cadmium (a type of metal), some herbicides, benzene, and organic solvents, particularly trichloroethylene increases the risk for kidney cell carcinoma.
- People who are very obese have a higher risk of developing kidney cancer.
- Genetic and hereditary factors such as such as von Hippel-Lindau disease increase the risk of developing kidney cancer.
- Family history of kidney cancer increases the risk of developing kidney cancer.
- Abuse (overuse) of drugs like Phenacetin increases the risk of developing kidney cancer.

### ***Survival Rate:***

- Five-year relative survival of kidney cancer in the US is 72% for all stages combined based on SEER 18 2003-2009 data.<sup>a</sup>



**Figure 2.9.1:** 5-year relative survival rates of kidney and renal pelvis cancer in the US by stage of diagnosis for people diagnosed between 2003 and 2009.

### ***Kidney Cancer in NH between 2006 and 2010***

There were 1,121 invasive kidney cancer cases diagnosed in NH between 2006 and 2010 (average of 224 cases per year). It accounted for 3.0% of new cancer cases diagnosed among NH residents. 254 NH residents died from kidney cancer between 2006 and 2010.

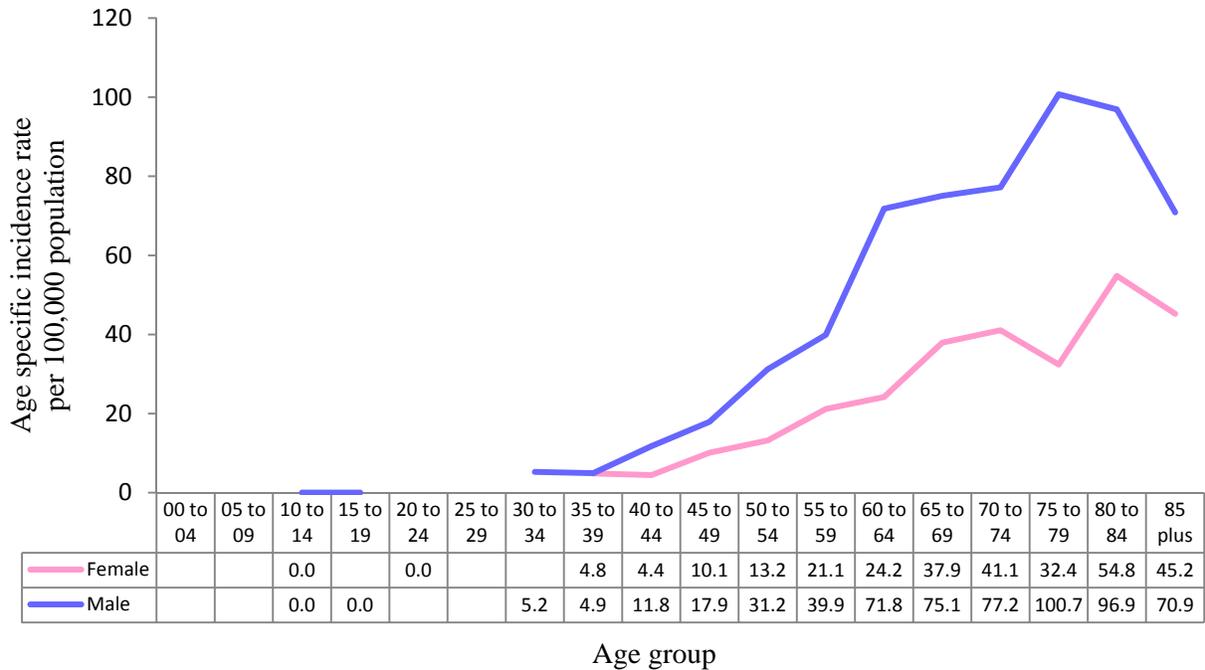
The age-adjusted incidence rate of kidney cancer among NH residents diagnosed between 2006 and 2010 was similar to the US white rate. The mortality rate of kidney cancer among NH residents was higher than the US white rates and it was statistically significant.

**Table 2.9.1:** Age-adjusted kidney & renal pelvis cancer incidence and mortality rates for NH and US residents between 2006 and 2010

	<b>NH (n)</b>	<b>NH rate per 100,000</b>		<b>US white rate per 100,000</b>	
Incidence					
Female	396	10.0	(9.0 – 11.0)	10.6	(10.4 – 10.9)
Male	725	20.8	(19.3 – 22.4)	20.7	(20.3 – 21.1)
<b>Total</b>	<b>1,121</b>	<b>15.0</b>	<b>(14.1 – 15.9)</b>	<b>15.3</b>	<b>(15.1 – 15.5)</b>
Mortality					
Female	82	2.0	(1.6 – 2.5)	2.6	(2.6 – 2.7)
Male	172	5.3	(4.5 – 6.1)	5.9	(5.8 – 5.9)
<b>Total</b>	<b>254</b>	<b>3.5</b>	<b>(3.1 – 3.9)</b>	<b>4.1</b>	<b>(4.0 – 4.1)</b>

**Age-specific incidence rate**

Kidney cancer incidence rates in NH male residents peaked in 75 to 79 year olds. Kidney cancer rates in NH female residents peaked in 80 to 84 year olds. Incidence rate in NH males were significantly higher than NH females between 50 and 79 year olds.

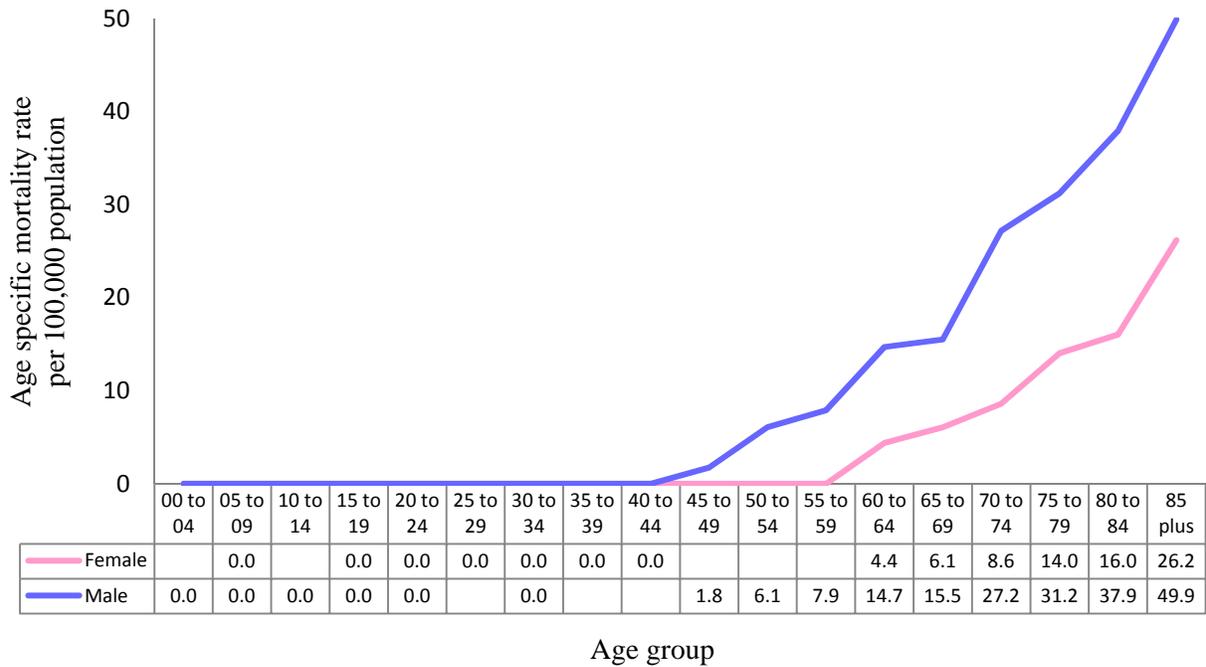


**Figure 2.9.2:** Kidney cancer age-specific incidence rates among NH male and female residents diagnosed between 2006 and 2010.

Rates are not displayed if incidence counts were reported between 1 and 9 as they tend to be unstable

**Age-specific mortality rate**

Kidney cancer mortality rates increased steadily with age in both genders.



**Figure 2.9.3:** Kidney cancer age-specific mortality rates among NH male and female residents diagnosed between 2006 and 2010.

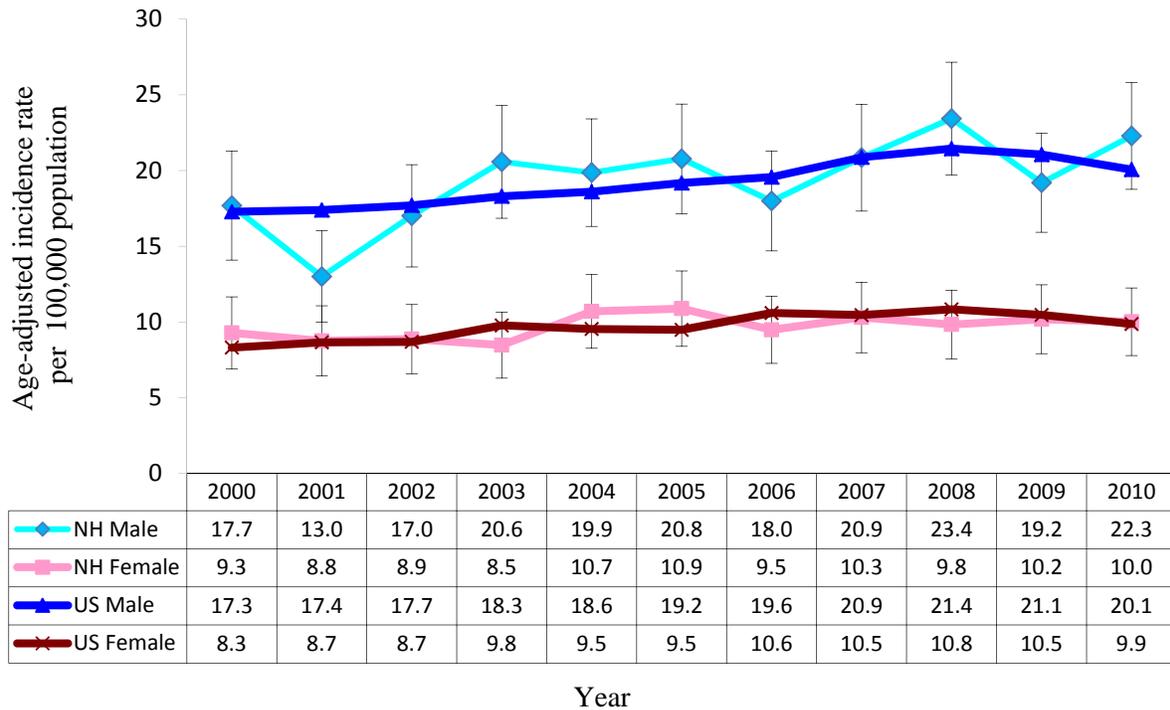
Rates are not displayed if mortality counts were reported between 1 and 4 as they tend to be unstable.

**Age-adjusted incidence rate time trends**

The average annual percent change (AAPC) of kidney cancer incidence rate in NH increased between 2006 and 2010 but was not statistically significant (1.7% per year, 95% CI= -5.2%, 9.1%).<sup>c</sup>

Kidney cancer age-adjusted incidence rates for NH male residents were similar to US white male rates between 2006 and 2010.

Kidney cancer age-adjusted incidence rates for NH female residents were relatively stable and similar to US white female rates between 2006 and 2010.



**Figure 2.9.4:** Kidney cancer age-adjusted incidence rate time trends among NH male and female residents diagnosed between 2006 and 2010.

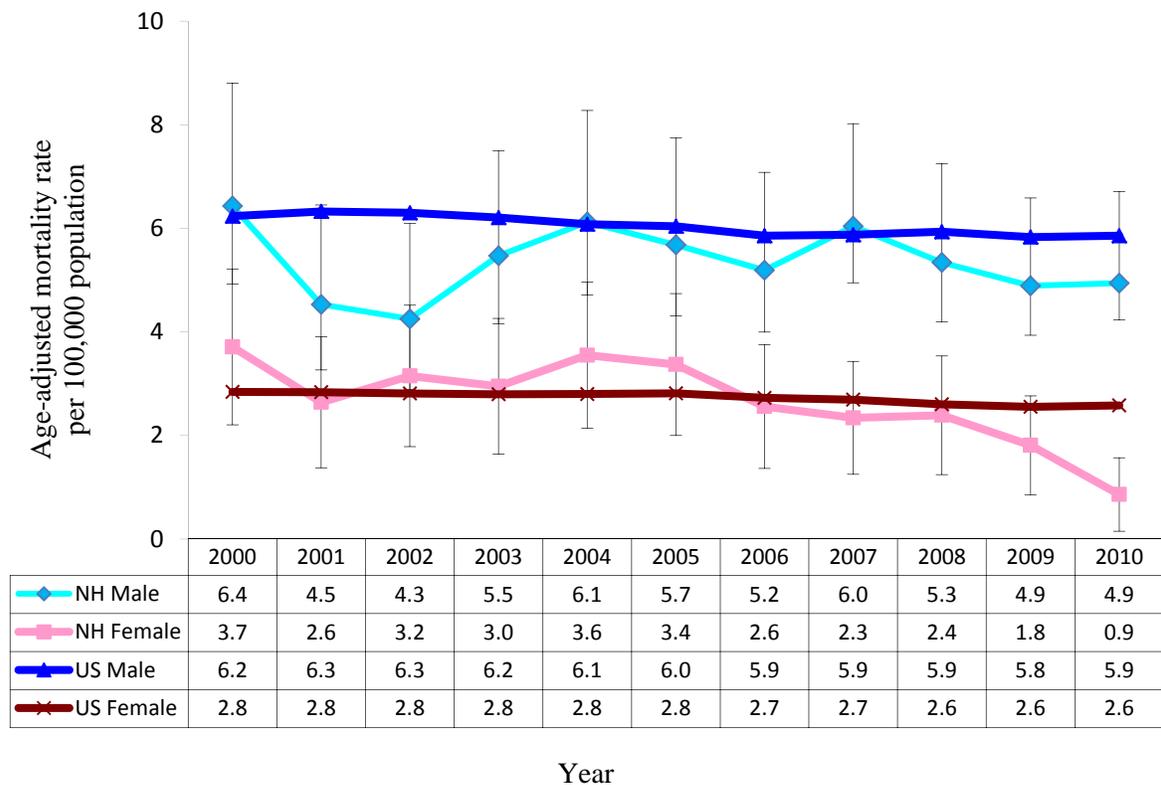
Vertical bars represent 95% confidence intervals around each measure.

**Age-adjusted mortality rate time trends**

The average annual percent change (AAPC) for kidney cancer mortality rate in NH residents decreased between 2006 and 2010 but was not statistically significant (-1.1% per year, 95% CI= -2.2%, 0.1%).<sup>c</sup>

Kidney cancer age-adjusted mortality rates for NH male residents were similar to US white male rates between 2006 and 2010.

Kidney cancer mortality rates for NH female residents were similar to US white female rates between 2006 and 2010 except for 2010 when it was significantly lower than the US white female rate.

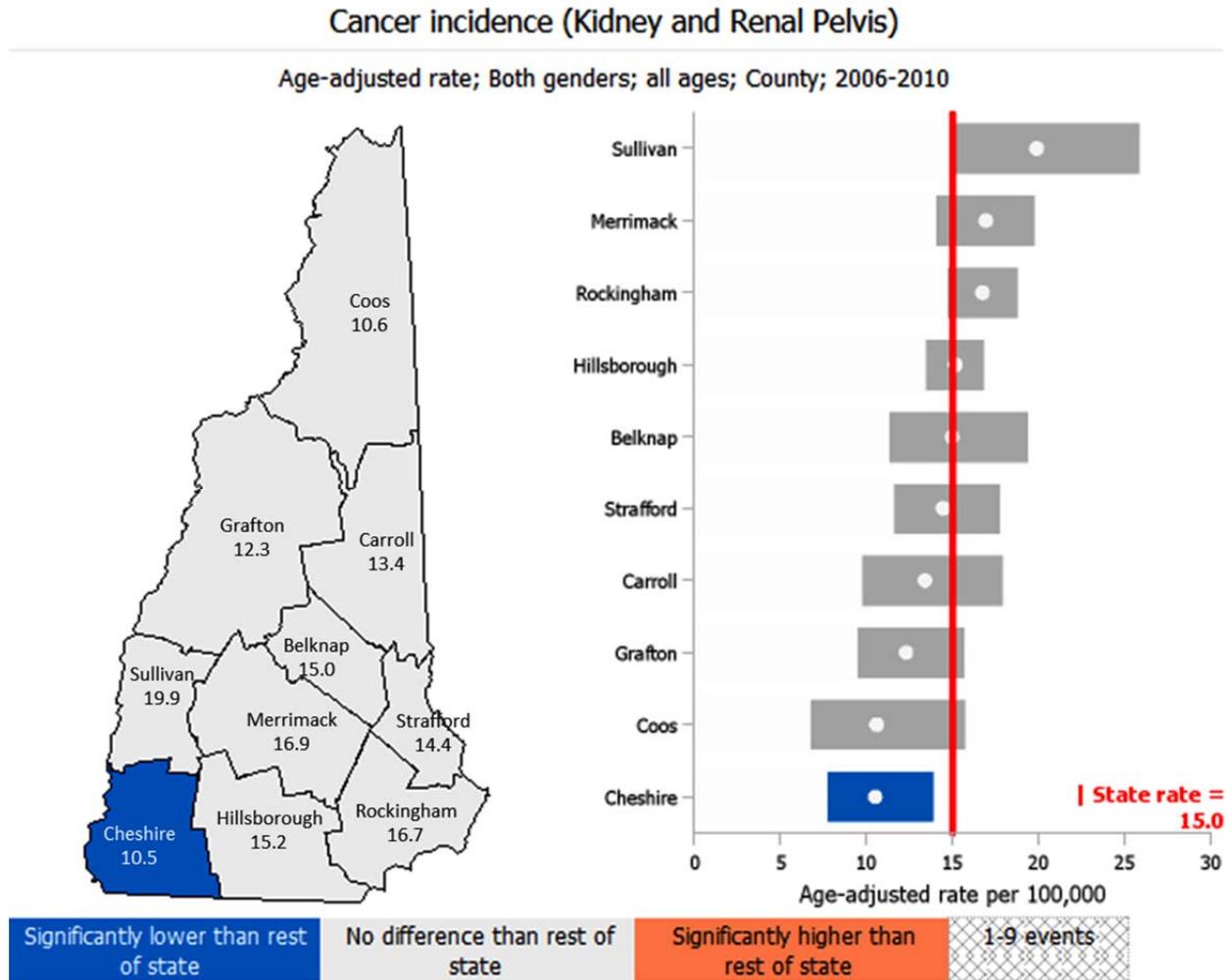


**Figure 2.9.5:** Kidney cancer mortality rate (age-adjusted) time trends among NH male and female residents diagnosed between 2006 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

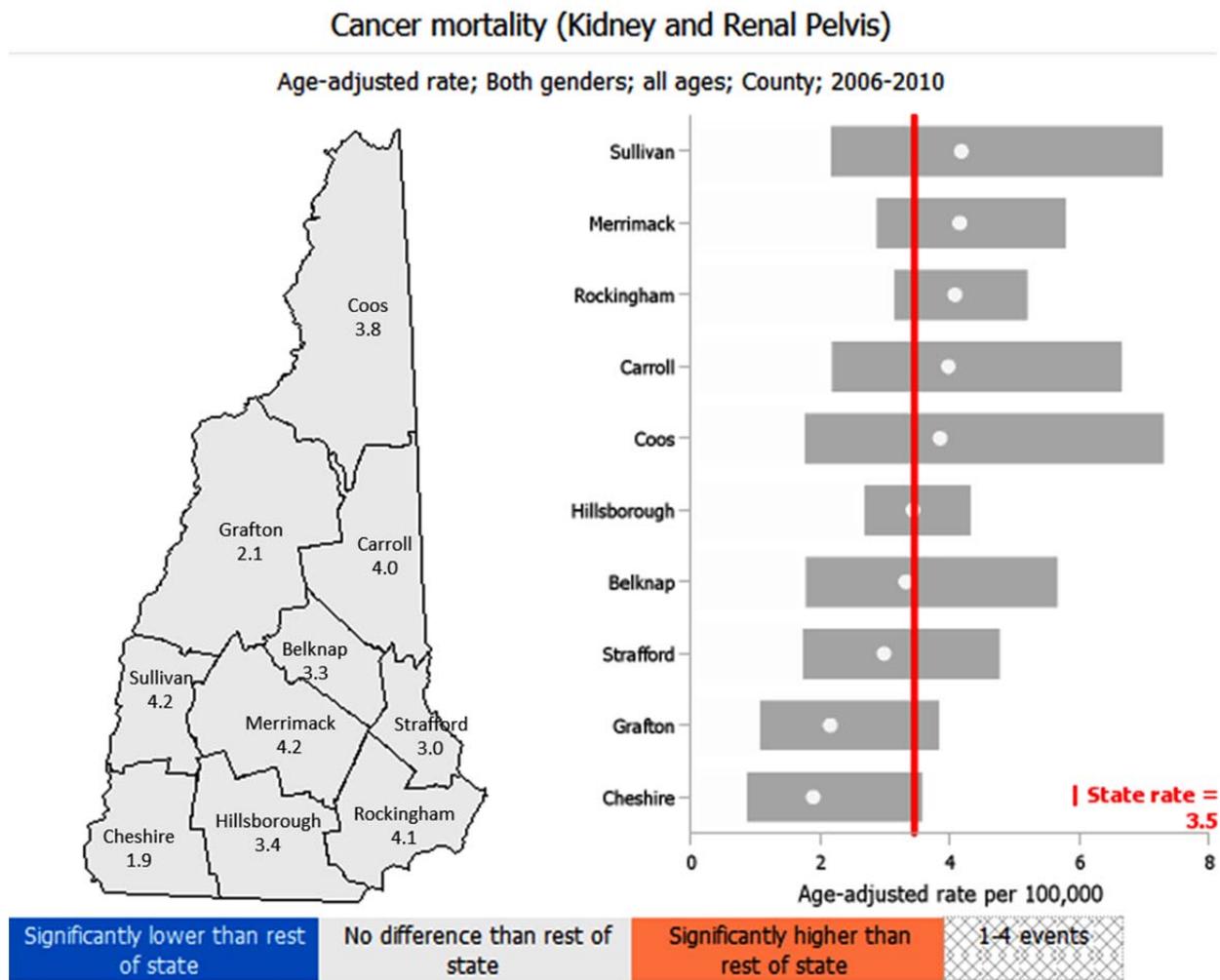
*County level variability in kidney cancer incidence and mortality rates*

Kidney cancer incidence rate in Cheshire County was lower than the residents in the rest of the state and this difference was statistically significant.



**Figure 2.9.6:** Kidney & renal pelvis cancer incidence rates (age-adjusted) by NH counties for male and female residents diagnosed between 2006 and 2010.

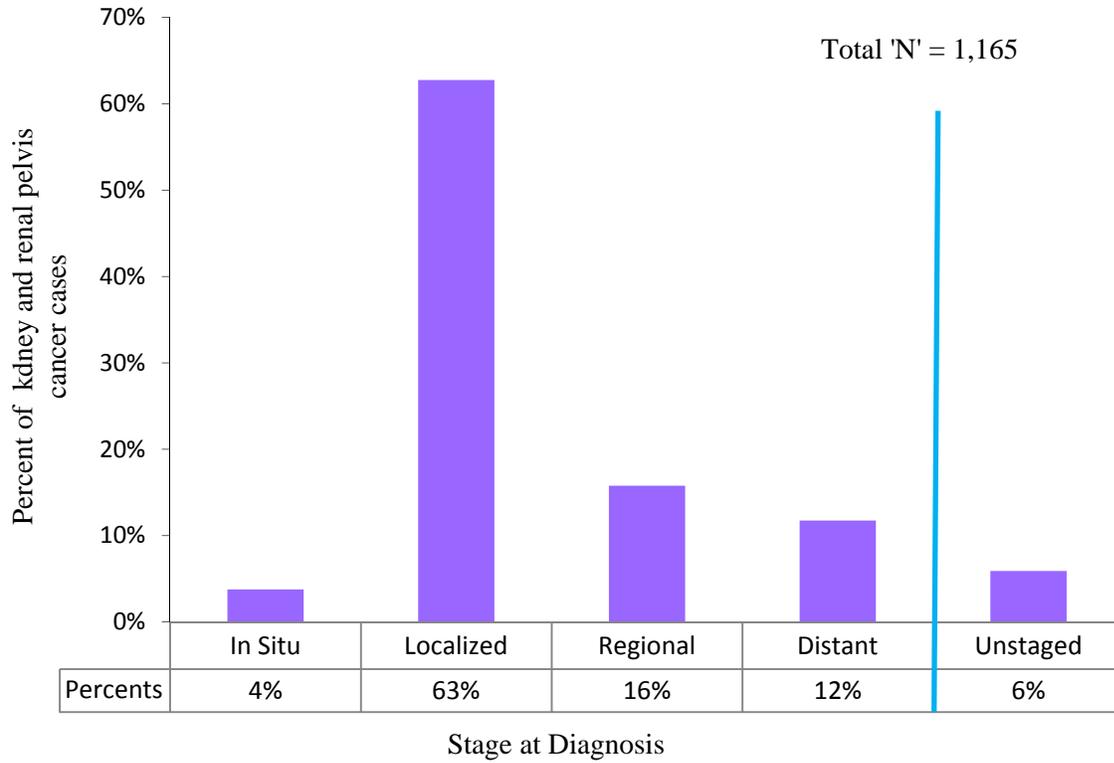
There was no significant geographic variability in kidney cancer mortality rates by NH counties.



**Figure 2.9.7:** Kidney & renal pelvis cancer mortality rates (age-adjusted) by NH counties for male and female residents between 2006 and 2010.

**Stage at Diagnosis**

For staging purpose, we used all reportable cancer cases (in situ and malignant). There were 1,165 new kidney cancer cases (in situ and malignant) diagnosed between 2006 and 2010 among NH residents. Of these, 67% were diagnosed at early stage (in situ and localized).



**Figure 2.9.8:** Stage at diagnosis for kidney and renal pelvis cancer among NH male and female residents diagnosed between 2006 and 2010.

## *Notes*

### **Data sources:**

<sup>a</sup> American Cancer Society. Cancer statistics 2013:

<http://www.cancer.org/research/cancerfactsfigures/cancerfactsfigures/cancer-facts-figures-2013>

<sup>b</sup> National Cancer Institute. SEER Program: SEER Stat Fact Sheets: Kidney and renal pelvis cancer

<http://seer.cancer.gov/statfacts/html/kidrp.html>

<sup>c</sup> Annual Percent Change (APC)- Incidence and Mortality:

Created by: <http://www.statecancerprofiles.cancer.gov/recenttrend/recenttrend.html> on 11/25/2013

National Cancer Institute, Kidney Cancer

<http://www.cancer.gov/cancertopics/types/kidney>

New Hampshire Data Source:

Incidence: New Hampshire State Cancer Registry Program.

Mortality: New Hampshire Death Certificate Data, NH Dept. of State, Bureau Vital Records.

United States Incidence and Mortality Data Sources: Output, assessed on October 10, 2013.

<http://seer.cancer.gov/faststats/selections.php?#>

United States Incidence Data Source: Surveillance, Epidemiology and End Results (SEER) Program, 13 areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry and Rural Georgia).

United States Mortality Data Source: US Mortality Files, National Center for Health Statistics, CDC.

Rates are per 100,000 and are age-adjusted to the 2000 US Std. Population (19 age groups - Census P25-1130). The modeled rates are the point estimates for the regression lines calculated by the Joinpoint Regression Program (Version 4.0.3, April 2013, National Cancer Institute).

## **LEUKEMIA**

- Although leukemia is often thought to be primarily a childhood disease, it is actually diagnosed 10 times more frequently in adults than children.
- Acute lymphocytic leukemia (ALL) is the most common type of leukemia in children (ages 0-19).<sup>a</sup>
- Lifetime risk: Based on most recent data, 1.4% of US population will be diagnosed with leukemia at some point during their lifetime.<sup>b</sup>
- It is estimated that leukemia will represent 2.9% of all new US cancer cases in 2013.<sup>b</sup>
- It is estimated that leukemia will represent 4.1% of all US cancer deaths in 2013.<sup>b</sup>

### ***Risk Factors:***

- Leukemia occurs more commonly in males than females.
- Persons with certain genetic abnormalities like Down syndrome have higher incidence of leukemia.
- Cigarette smoking and exposure to certain chemicals like benzene, a chemical in gasoline and cigarette smoke, are risk factors for myeloid leukemia.
- Exposure to ionizing radiation may cause certain leukemia.
- Leukemia may also be a side effect of cancer treatment.
- Viruses can cause certain types of leukemia.

### ***Survival Rate:***

- Five-year survival for leukemia in the US is 56% based on SEER 18 2003-2009 data.<sup>b</sup>

### Leukemia in NH between 2006 and 2010

Leukemia was the tenth most commonly diagnosed cancer in NH between 2006 and 2010 (968 total cases, average of 193 cases per year). It accounted for 2.6% of new cancer cases among NH residents diagnosed between 2006 and 2010. During this period, 481 NH residents died from leukemia and it remained the seventh leading cause of cancer-related deaths among NH males and females.

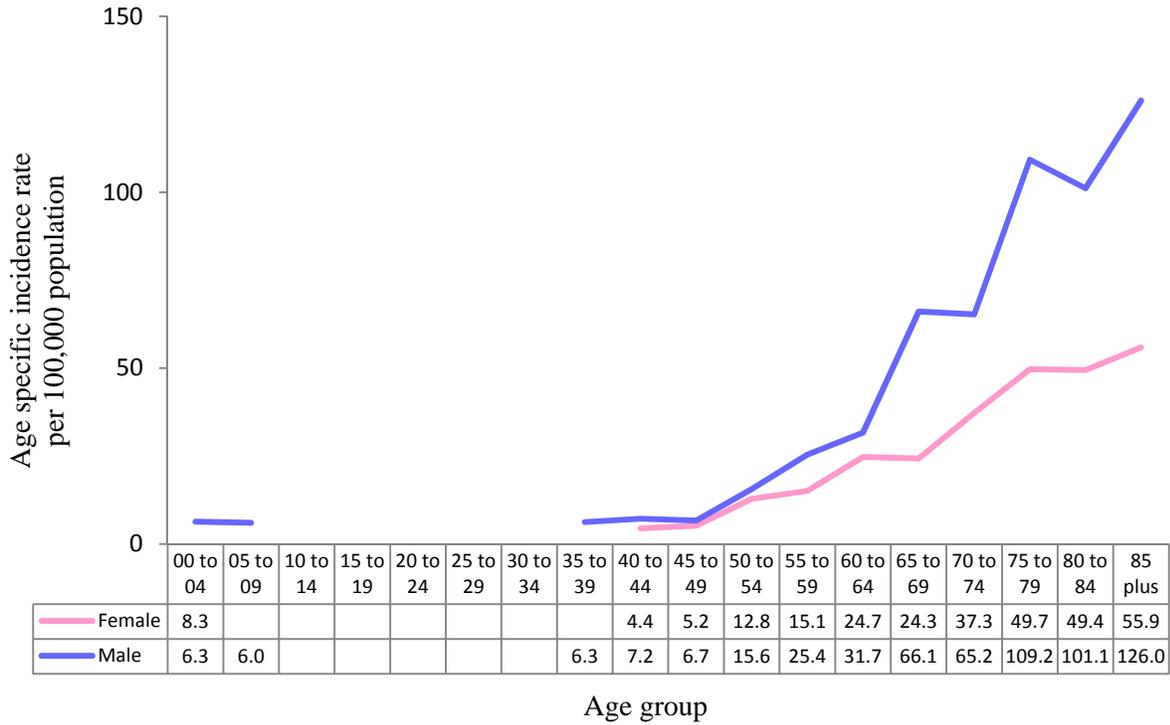
The age-adjusted incidence and mortality rates for leukemia among NH residents (both genders) were similar to the US white rates between 2006 and 2010.

**Table 2.10.1:** Age-adjusted leukemia incidence and mortality rates for NH and US residents between 2006 and 2010

	NH (n)	NH rate per 100,000		US white rate per 100,000	
Incidence					
Female	390	10.1	(9.0 – 11.1)	10.9	(10.6 – 11.2)
Male	578	18.0	(16.5 – 19.5)	18.2	(17.8 – 18.5)
<b>Total</b>	<b>968</b>	<b>13.6</b>	<b>(12.7 – 14.4)</b>	<b>14.1</b>	<b>(13.9 – 14.3)</b>
Mortality					
Female	231	5.8	(5.1 – 6.6)	5.5	(5.4 – 5.5)
Male	250	8.3	(7.3 – 9.4)	9.8	(9.7 – 9.9)
<b>Total</b>	<b>481</b>	<b>6.8</b>	<b>(6.2 – 7.4)</b>	<b>7.3</b>	<b>(7.3 – 7.4)</b>

### Age-specific incidence rate

Leukemia incidence rates for NH residents (both genders) increased with age. Males had significantly higher incidence rates than females after age 74.

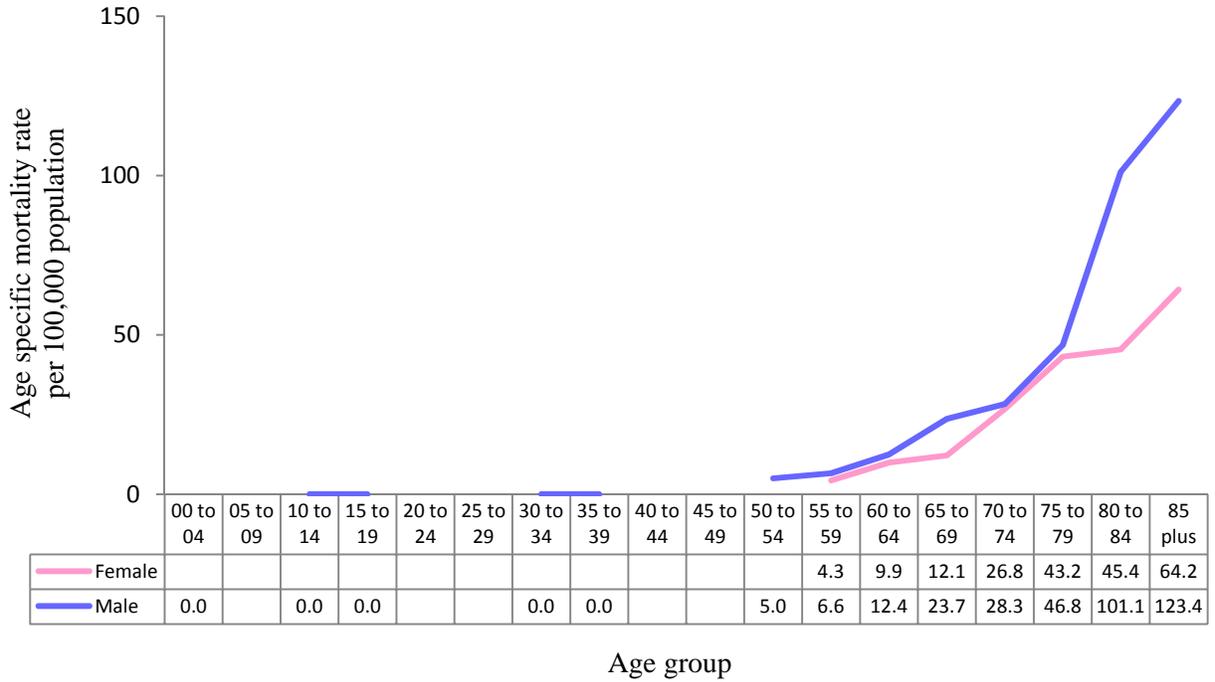


**Figure 2.10.1:** Leukemia age-specific incidence rates for NH male and female residents diagnosed between 2006 and 2010.

Rates are not displayed if incidence counts were reported between 1 and 9 as they tend to be unstable.

### Age-specific mortality rate

Leukemia mortality rates for NH males increased with age and rose sharply after age 79. In females, there was a steady rise in mortality rates with increasing age. Mortality rate was significantly higher in males than females after age 79.



**Figure 2.10.2:** Leukemia age-specific mortality rates for NH male and female residents diagnosed between 2006 and 2010.

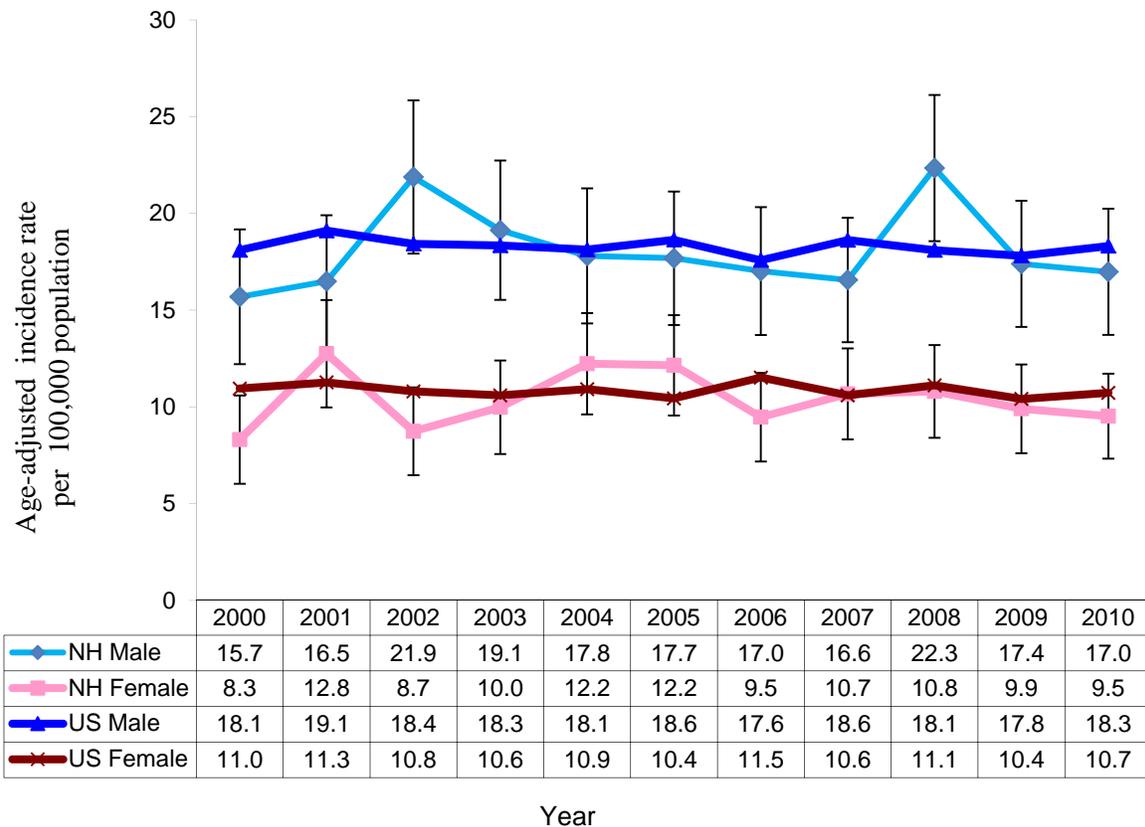
Rates are not displayed if mortality counts were reported between 1 and 4 as they tend to be unstable.

### Age-adjusted incidence rate time trends

The average annual percent change (AAPC) of leukemia incidence rate fell between 2006 and 2010 but was not statistically significant (-1.2% per year, 95% CI= -11.7%, 10.6%).<sup>c</sup>

Leukemia incidence rates in NH males were similar to the US white male rates between 2006 and 2010 except for 2008 when it was higher than the US white male rate.

Leukemia incidence rates were stable and similar to the US white female rates between 2006 and 2010.



**Figure 2.10.3:** Leukemia age-adjusted incidence rates for NH male and female residents diagnosed between 2006 and 2010.

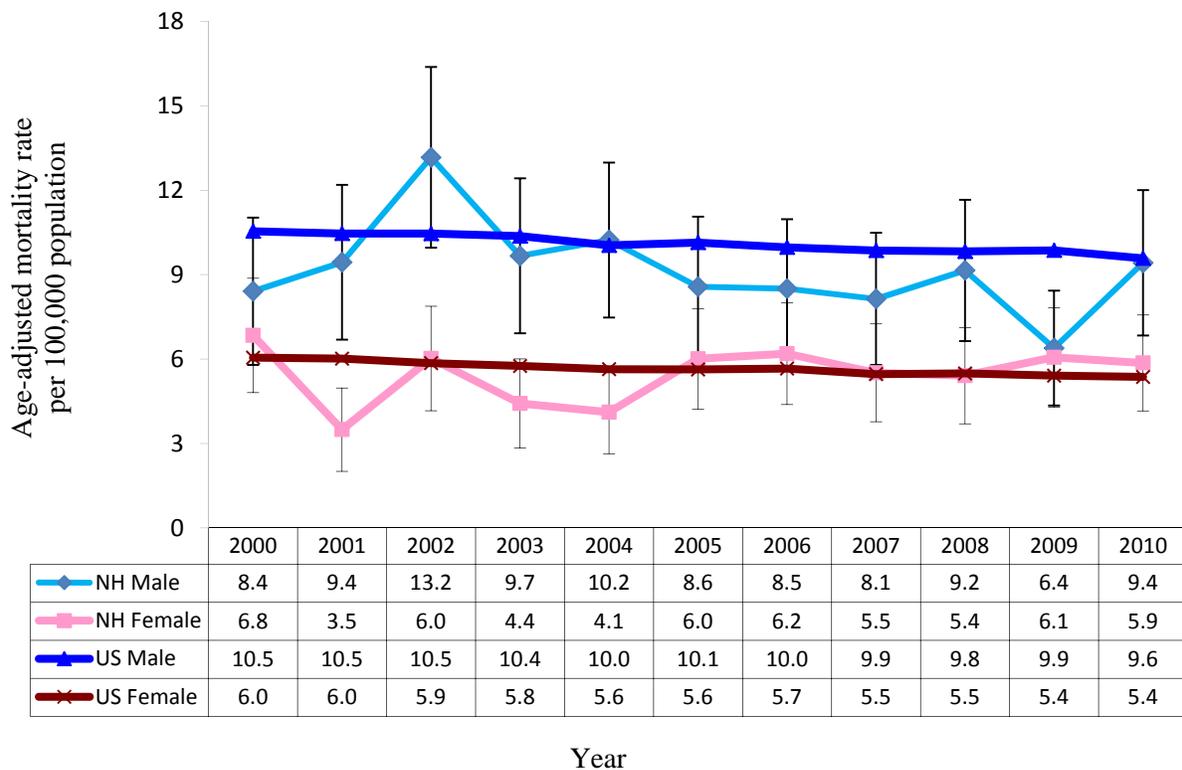
Vertical bars represent 95% confidence intervals around each measure.

### Age-adjusted mortality rate time trends

The average annual percent change (AAPC) of leukemia mortality rate fell between 2006 and 2010 but was not statistically significant (-0.7% per year, 95% CI= -1.5%, 0.2%).<sup>c</sup>

Leukemia mortality rates in NH males were not different from the US white male rates between 2006 and 2010 except for 2009 when it was lower than the US male rate.

Leukemia mortality rates in NH females were also relatively stable and were not different from the US white female rates between 2006 and 2010.

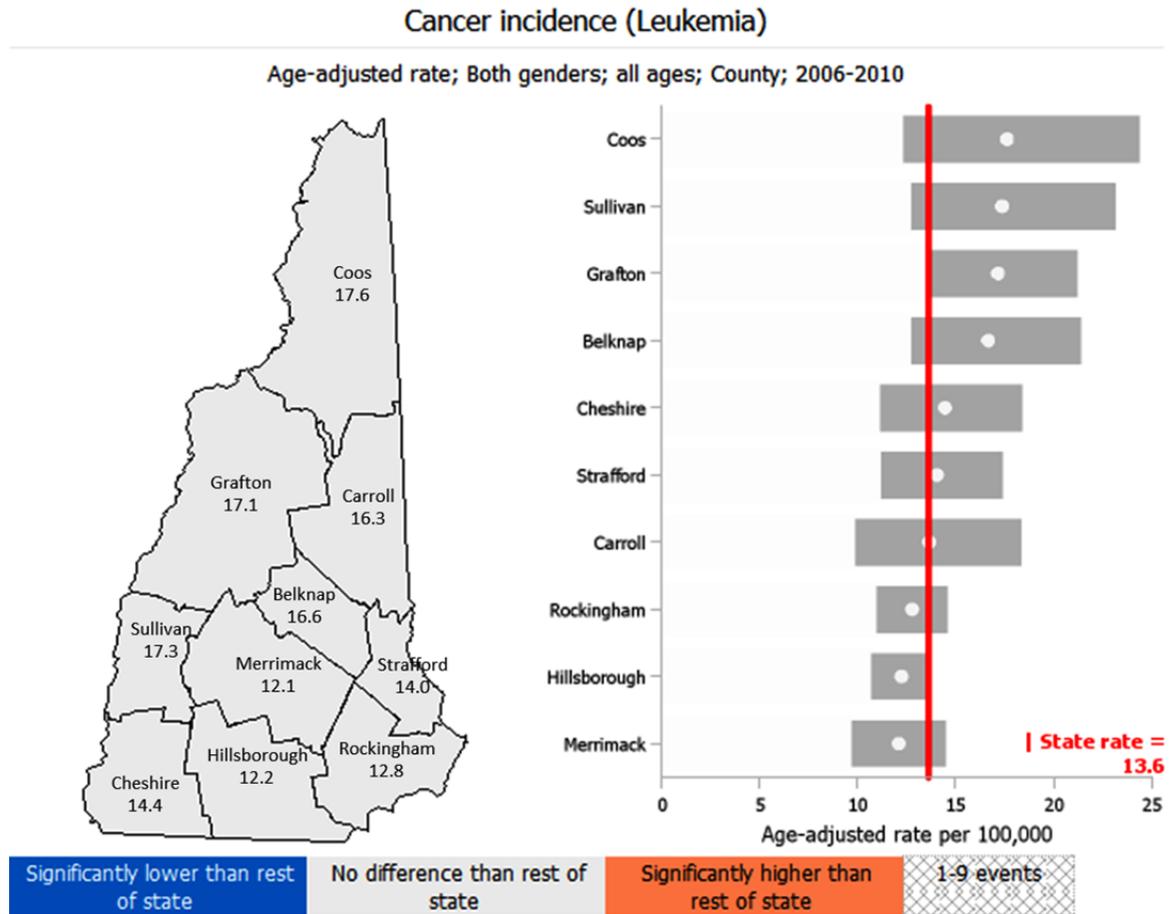


**Figure 2.10.4:** Leukemia age-adjusted mortality rates for NH male and female residents diagnosed between 2006 and 2010.

Vertical bars represent 95% confidence intervals around each measure.

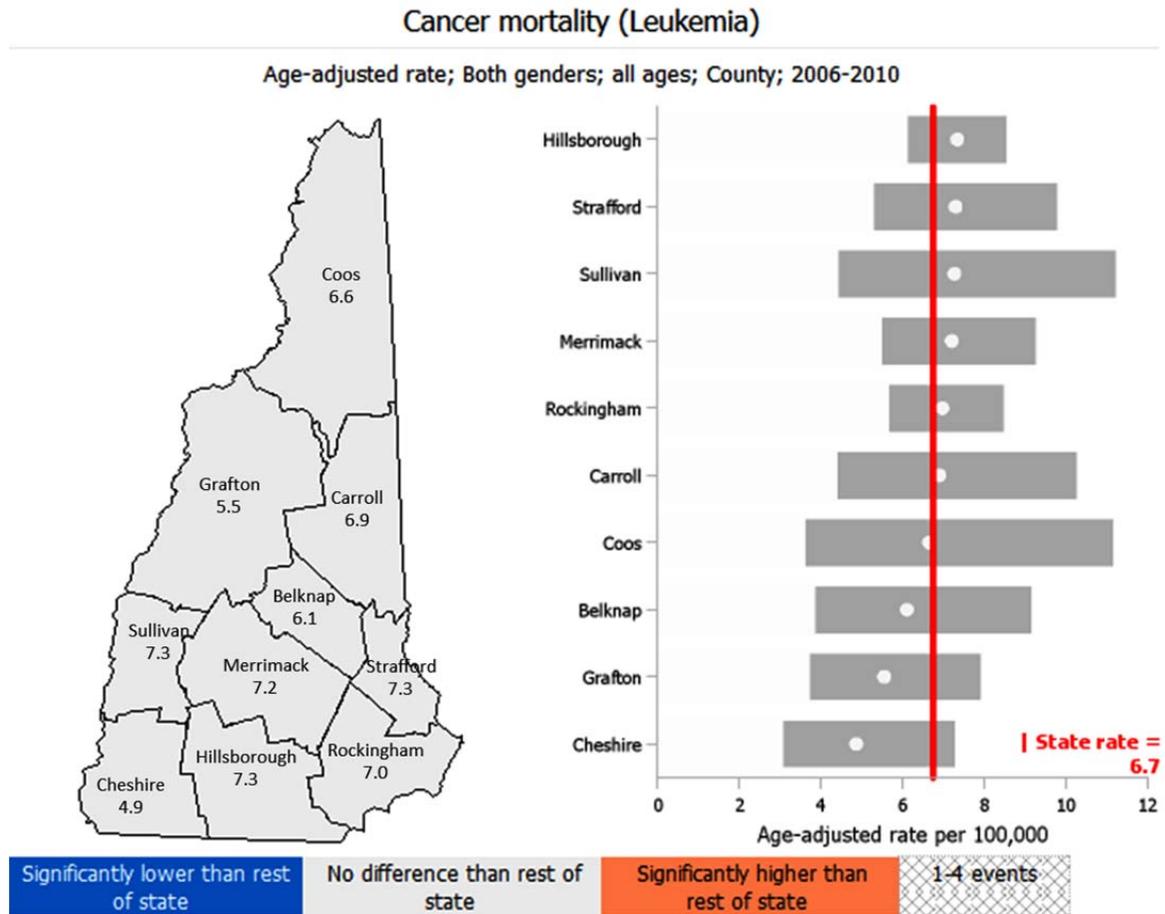
## County level variability in leukemia incidence and mortality rates

There was no significant geographic variability in leukemia incidence rates by NH counties.



**Figure 2.10.5:** Leukemia age-adjusted incidence rates by NH counties for male and female residents diagnosed between 2006 and 2010.

There was no significant geographic variability in leukemia mortality rates by NH counties.



**Figure 2.10.6:** Leukemia mortality rates (age-adjusted) by NH counties for male and female residents diagnosed between 2006 and 2010.

## Notes

### Data sources:

<sup>a</sup> American Cancer Society. Cancer Facts & Figures 2014: special edition  
<http://www.cancer.org/acs/groups/content/@research/documents/webcontent/acspc-041787.pdf>

<sup>b</sup> National Cancer Institute. SEER Program: SEER Stat Fact Sheets: Leukemia  
<http://seer.cancer.gov/statfacts/html/leuks.html>

<sup>c</sup> Annual Percent Change (APC)- Incidence and Mortality:  
Created by <http://www.statecancerprofiles.cancer.gov/recenttrend/recenttrend.html> on 11/25/2013.

Leukemia and Lymphoma Society  
<http://www.lls.org/#/diseaseinformation/leukemia/>

New Hampshire Data Source:  
Incidence: New Hampshire State Cancer Registry Program.  
Mortality: New Hampshire Death Certificate Data, NH Dept. of State, Bureau Vital Records.

United States Incidence and Mortality Data Sources: Output, assessed on October 10, 2013.  
<http://seer.cancer.gov/faststats/selections.php?#>

United States Incidence Data Source: Surveillance, Epidemiology and End Results (SEER) Program, 13 areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry and Rural Georgia).

United States Mortality Data Source: US Mortality Files, National Center for Health Statistics, CDC. Rates are per 100,000 and are age-adjusted to the 2000 US Std. Population (19 age groups - Census P25-1130). The modeled rates are the point estimates for the regression lines calculated by the Joinpoint Regression Program (Version 4.0.3, April 2013, National Cancer Institute).

## **RISK FACTORS, PREVENTION AND SCREENING**

## **RISK FACTORS**

Researchers have estimated that as many as 2 in 3 cases of cancer (67%) are linked to use or abuse of tobacco, alcohol, and food, as well as exposures to radiation, infectious agents, and substances in the air, water and soil. Risk factors for some cancers can be reduced although not all cancers can be prevented.<sup>1</sup>

### **Tobacco Use**

Tobacco use is the single largest preventable cause of disease and premature death in the United States and the American Cancer Society estimates that ~30% of cancer deaths and ~87% of lung cancer deaths annually in the US are attributable to tobacco exposure.<sup>2</sup> Smoking tobacco, in any form, is the leading cause of cancer in both genders and has been associated with cancers of the lung, mouth, nasal cavities, larynx, pharynx, esophagus, stomach, liver, pancreas, kidney, bladder, uterine cervix, and with myeloid leukemia. . Secondhand smoke, also known as Environmental Tobacco Smoke (ETS), is defined as smoke from a burning end of cigarette, cigar, or pipe tip (sidestream smoke) and (mainstream smoke) exhaled or breathed out by the person smoking. Exposure to ETS has been found to be harmful to people and particularly dangerous to children and seniors. Secondhand smoke is a mixture of gases and fine particles that includes more than 7,000 chemicals, including hundreds that are toxic and about 70 that can cause cancer. The U.S. Environmental Protection Agency classifies secondhand smoke as a Class “A” human carcinogen (cancer causing agents), the same class as asbestos Smokeless tobacco products such as chewing, sniffing, placing the product between the teeth and gum, and application to the skin has also been associated with cancer.

### ***State Indicators:***

- In 2013, about 13.8% of NH youths smoked cigarettes on one or more of the past 30 days. For boys it was 14.2% and for girls it was 13.2%.<sup>3</sup>
- In 2012, 17% of NH adults were current smokers and 32% were former smokers.<sup>4</sup>
- In 2012, NH adult males were more likely to be smokers (20%) than NH adult females (14.5%) and this difference was statistically significant.<sup>4</sup>

- In 2012, tobacco smoking in NH adults was highest in people 25-34 years old (28%) followed by the 35-44 year age group (20.7%). Smoking prevalence in the elderly (65+ age group) was significantly lower (6.9%) than in younger adults (25-34 and 35-44 years).<sup>4</sup>
- Smoking prevalence is closely related to levels of formal education in NH. 2012 BRFSS data shows that smoking is highest among people with less than high school education (38%) and was significantly higher than in people who completed high school or GED (27%), had some post high school education (16%), or had completed any college level education (6%).<sup>4</sup>
- Smoking prevalence is also closely related to socio-economic status. People engaged in certain occupation smoke more compared to some other occupation. 68% blue collar worker report being a current smoker and using OTP (other tobacco product) compared to 32% for white collar worker.<sup>5</sup>
- People with higher annual income smoke less compared to those with lower income. Smoking was highest (38%) among people with an annual income less than \$15,000, followed by the \$15,000 to \$24,000 income group (27%). Smoking rate was lowest (9%) among people with an annual income more than \$75,000.<sup>4</sup>
- In 2012, there was no significant geographic variability in NH adult tobacco smoking prevalence at the county level.<sup>4</sup>

### **Diet and Obesity**

Fruits and vegetables contribute important nutrients for the human body. Eating fruits and vegetables lowers the risk of developing many chronic diseases and can also help with weight management.<sup>6</sup> A poor diet can lead to obesity which is known to increase a person's risk for breast, colon, endometrium, esophagus, and kidney cancers.<sup>6</sup>

### ***Recommendations:***

It's recommended that people eat at least two cups of fruit and three cups of vegetables daily.<sup>7</sup>

***State Indicators:***

In 2012, about 35% and 27% of NH adults were overweight and obese, respectively. In the USA, the corresponding numbers were 36% and 28%, respectively.<sup>8</sup> Among the adolescents, in 2011, 14% were overweight and 12% were obese.<sup>9</sup>

**Table 3.1:** Fruit and vegetable intake by NH adults and youths in 2011

	NH Adult <sup>7</sup>	US Adult <sup>7</sup>	NH Youth <sup>9</sup>	US Youth <sup>10</sup>
Median intake of Fruit (per day)	1.3 times	1.1 times	1.0 times	1.0 times
Median intake of Vegetable (per day)	1.8 times	1.6 times	1.3 times	1.3 times
No intake of Fruits (less than once daily)	30%	38%	37%	36%
No intake of Vegetables (less than once daily)	18%	23%	32%	38%

**Physical Activity**

Exercise not only helps to manage a person’s weight but also influences hormone levels. Regular physical activity reduces the risk of many adverse health outcomes. More exercise has been found to be beneficial in reducing the risk of breast and colon cancer.

***Recommendations:***

For substantial health benefits, adults should do per week at least 150 minutes (2 hours and 30 minutes) moderate-intensity, or 75 minutes (1 hour and 15 minutes) of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous intensity aerobic activity. Aerobic activity should be performed in episodes of at least 10 minutes spread throughout the week.<sup>10</sup>

Adults should also do muscle-strengthening activities that are moderate or high intensity and involve all major muscle groups on 2 or more days a week as these activities provide additional health benefits.

***State Indicators:***

- In 2011, 71% of NH adults did 30 or more minutes of moderate physical activity five or more days per week and 24% of NH adults did 20 or more minutes of vigorous physical activity three or more days per week.<sup>7</sup>
- In 2011, 56% of NH adults met aerobic exercise guidelines and another 30% met muscle-strengthening guidelines. Overall, 22% of NH adults met both aerobic and muscle-strengthening guidelines.<sup>8</sup>
- In 2011, 20% of NH adults reported no leisure time physical activity during the preceding month.<sup>7</sup>

**Alcohol**

People who consume more than two alcoholic drinks per day have an increased risk of cancer.<sup>11</sup> The risk is compounded if they also smoke.<sup>12</sup> Heavy drinking is linked to cancers of the mouth, throat, esophagus, larynx, liver, and breast. Smokers who drink more than two drinks per day further intensify the risk of cancer of the mouth, larynx, and esophagus.

***State indicators:***

- In 2012, 8% of NH adult males had more than two drinks per day and 7% of NH adult females had more than one drink per day. The proportion of heavy drinkers was not significantly different between NH males and females.<sup>4</sup>
- In 2012, 7% of NH adults reported heavy drinking in the preceding month. Heavy drinking means averaging two or more drinks per day for males and one per day for females.<sup>4</sup>

## **Radon**

In NH, an estimated 14% of all lung cancer cases are radon related.<sup>13</sup> NH has higher than average radon exposure potential due to radioactive gas in the bedrock. Approximately 195,000 individuals live in homes (78,000 homes) with elevated radon levels that have not been mitigated.<sup>14</sup> Statistically, over 50 individuals will die from radon-related lung cancer each year unless mitigation occurs. Smoking tobacco compounds the risk of developing lung cancer for those who live in a home with high radon concentrations.<sup>15</sup>

## **Ultraviolet (UV) Rays**

Exposure to ultraviolet (UV) rays is a major risk factor for most melanomas. Sunlight is the main source of UV rays. Tanning lamps and beds are also sources of UV rays. People who get UV exposure from these sources are at greater risk for skin cancer, including melanoma.<sup>16</sup>

State indicators:

1. In 2013, 9% of NH adolescents had used an indoor tanning device one or more times during the 12 months before the survey (i.e. a sunlamp, sunbed, or tanning booth). Girls had significantly higher tanning rates than the boys (13.5% vs. 3.8%) (using 95% confidence interval comparison method).<sup>3</sup>
2. In 2010, 24% percent of NH adults reported having a red or painful sunburn that lasted a day or more at least one time in the last 12 months (26% of males and 22% of females).<sup>17</sup>

## **PREVENTION**

### **Human Papillomavirus (HPV) Vaccination**

HPV causes cervical cancer and can also cause some vaginal, vulvar, anal, penile, and oropharyngeal cancers. There are approximately 40 types of genital HPV and the HPV vaccine works by preventing the most common, high risk types of HPVs.

### ***Recommendation:***

The HPV vaccine is given through a series of three injections administered over a 6 month period. The HPV vaccination is recommended for preteen girls and boys aged 11 or 12 years. All three vaccine doses and sufficient time to develop an immune response are required for the vaccine to be most effective before the individual becomes sexually active.

***State indicator:***

- In 2012, 70% of NH female adolescents aged between 13 and 17 years had received the complete HPV 3-dose series. The HPV vaccination rate for NH females was higher than the overall US female estimates of 67% but this difference was not statistically significant.<sup>18</sup>

**Hepatitis B Virus (HBV) Vaccination**

Hepatitis B is a serious disease caused by a virus that attacks the liver. HBV can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death. Hepatitis B vaccine is available for all age groups to prevent HBV infection.

***Recommendation***

The vaccination schedule most often used for adults and children has been three intramuscular injections with the second and third administered 1 and 6 months after the first.

***State indicator:***

- In 2012, 97% of NH adolescents aged between 13 and 17 years had received greater than 3 doses of Hepatitis B vaccine and this is significantly higher than the overall US estimates of 93%.<sup>18</sup>

## **SCREENING AND EARLY DETECTION**

Early detection is available for many types of cancers through standard screening procedures. Many types of screening amenable cancers can be treated effectively if they are detected at an early stage.

### **Breast Cancer Screening**

The goal of mammography is the early detection of breast cancer typically through detection of characteristic masses and/or microcalcifications.

#### ***Current recommendations:***

- The USPSTF recommends biennial screening mammography for women aged 50-74 years.<sup>19</sup>
- The decision to start regular, biennial screening mammography before the age of 50 years should be an individual one and take patient context into account, including the patient's values regarding specific benefits and risks.<sup>19</sup>

#### ***State indictors:***

- In 2012, 85% of NH females aged between 50 and 74 years reported having a mammogram within the past two years.<sup>4</sup>
- In 2012, 2% of NH females aged between 50 and 74 years reported never having had a mammogram.<sup>4</sup>

#### ***Disparity:***

- In 2012, NH females with an annual income under \$15,000 or with income between \$15,000 and \$24,999 were significantly less likely to report having a mammogram in the past 2 years (68% and 74%, respectively) than females with income between \$35,000 and \$49,999 or with an income over \$50,000 or more (87% and 89%, respectively) and the difference was statistically significant.<sup>4</sup>

- In 2012, there was no statistically significant variation in mammography screening rates when stratified by education or age.<sup>4</sup>
- There was no statistically significant county level geographic variation in mammography screening rates for NH female residents.<sup>4</sup>

### **Colorectal Cancer Screening**

Colorectal cancer is highly curable if diagnosed at an early stage. It is one of the few cancers that doctors can prevent. Most colon cancer starts out as small growths (polyps). Finding and removing these polyps through colonoscopies dramatically reduces the chances of developing colorectal cancer.

#### ***Current recommendations:***

- The USPSTF recommends screening for colorectal cancer using:<sup>20</sup>
  1. annual high-sensitivity fecal occult blood testing for average-risk individuals, or
  2. sigmoidoscopy every 5 years combined with high-sensitivity fecal occult blood test every three years for average-risk individuals, or
  3. screening colonoscopy at intervals of 10 years beginning at age 50 years and continuing until age 75 years.
- The decision to be screened after age 75 should be made on an individual basis.

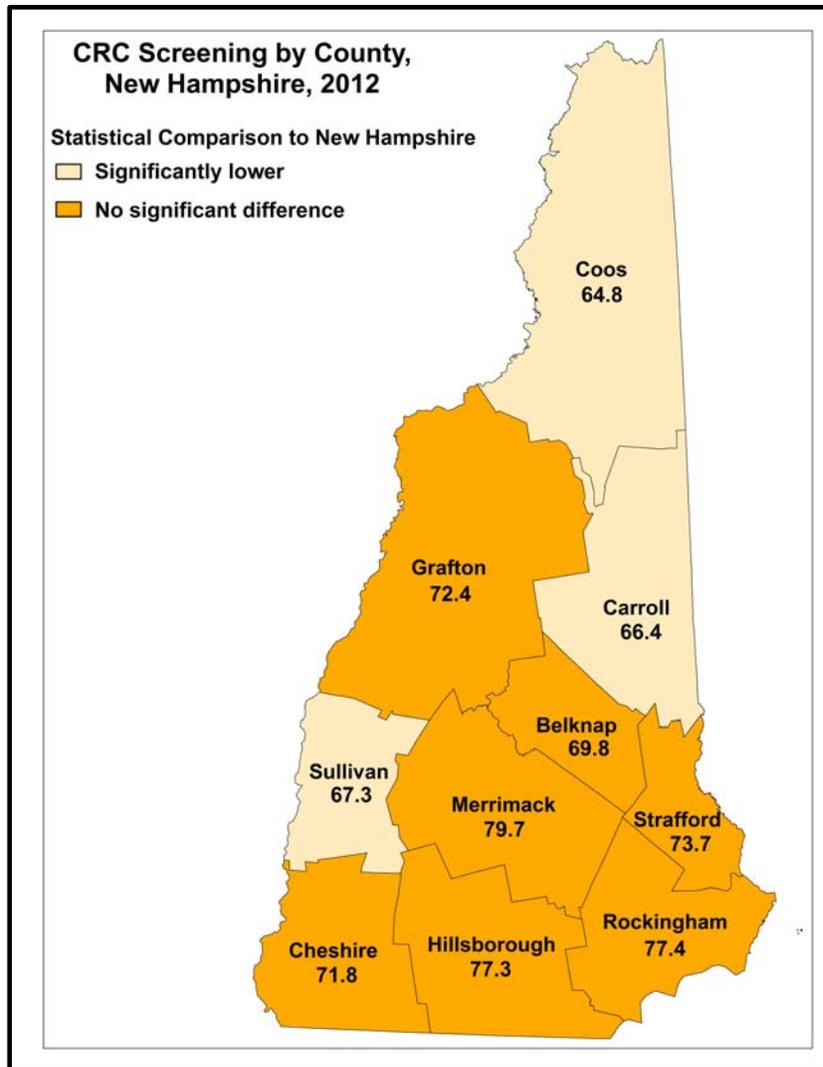
#### ***State indicators:***

- In 2012, 75.2% of NH adults aged between 50 and 75 were up-to-date with colorectal cancer screening.<sup>4</sup>

#### ***Disparities:***

- In 2012, colorectal screening was significantly lower in NH adults 50-54 years old (59%) or 55-59 years old (73%) than adults 70-75 years old (82%).<sup>4</sup>
- In 2012, residents with high school education (72%) or less than high school education (66%) had significantly lower screening rates than college graduates (80%).<sup>4</sup>

- In 2012, NH adults with an annual income under \$15,000 (61%) or with income between \$15,000 and \$24,999 (65%) were significantly less likely to report having a colonoscopy than who earned \$50,000 or more (80%).<sup>4</sup>
- In 2012, the screening rates were found to be very similar between NH males and females (74% vs. 76.5%).<sup>4</sup>
- There was statistically significant geographic variation in colorectal cancer screening rates in NH. In 2012, Coos, Carroll and Sullivan counties had a lower screening rate than the rest of the state.<sup>4</sup>



**Figure 3.1:** Colorectal cancer screening rates among 50 to 75 year old male and female residents by NH counties in 2012.

Significance was assessed by comparing each county to the rest of the state.

***Colorectal cancer screening barriers:***

In 2012, the following barriers were reported by NH residents (age 50 and up) who never had colonoscopy or sigmoidoscopy, or had it more than 10 years ago.<sup>4</sup>

**Table 3.2:** Important colorectal cancer screening barriers as reported by NH residents (age 50 and up) in 2012

Colorectal Cancer Screening barriers	Percent
Doctor didn't order or advise	13.1
Didn't need or didn't know was needed	11.8
Never thought about it or no reason	9.8
No Insurance coverage	7.8
Putting off or didn't get around to	7.1
Too painful, unpleasant or embarrassing	6.9
Preparation for test	2.7
Insurance deductible or co-payment too high	1.9
Don't have doctor	0.7

**Cervical Cancer Screening**

Cervical cancer is usually a slow-growing cancer that may not have symptoms but can be found with regular Pap tests. Cervical cancer is almost always caused by human papillomavirus (HPV) infection.

***Current recommendation:***

These recommendations apply to women who have a cervix, regardless of sexual history. These recommendations do not apply to women who have received a diagnosis of a high-grade precancerous cervical lesion or cervical cancer, women with in utero exposure to

diethylstilbestrol, or women who are immuno-compromised (such as those who are HIV positive).

- The USPSTF recommends screening for cervical cancer in women ages 21 to 65 years with cytology (Pap test) every 3 years or, for women ages 30 to 65 years who want to lengthen the screening interval, screening with a combination of cytology and human papillomavirus (HPV) testing every 5 years.<sup>21</sup>

***State indicators:***

- In 2012, 86.9% of NH adult females aged between 21 and 65 had a Pap test within the past three years.<sup>4</sup>
- In 2012, 4% of NH adult females aged between 21 and 65 never had a Pap test.<sup>4</sup>

***Disparities:***

- In 2012, Pap tests in NH females 21-24 year olds (64%) was significantly lower than any other age groups.<sup>4</sup>
- In 2012, NH adult females with an annual income under \$15,000 (72%), or income between \$15,000 and \$24,999 (76%), or income between \$25,000 and \$34,999 (78%) were significantly less likely to report having a Pap test in the past three years than females who earns \$50,000 or more (92%).<sup>4</sup>
- In 2012, NH adult females with a high school diploma or GED (81%) had a significantly lower screening rate (Pap test) than college or technical school graduates (92%).<sup>4</sup>
- There was no statistically significant geographic variation in Pap testing rates.<sup>4</sup>

**Prostate Cancer Screening**

One in six American men will be diagnosed with prostate cancer in their lifetimes. In most cases, the disease grows so slowly it doesn't reach a symptomatic state. A test for prostate-specific antigen (PSA test) can provide early warning signs of prostate cancer but the test has a high rate of false positives. More than one million unnecessary biopsies occur every year in the US due to false positive PSA tests. More than 80% of men opt for surgery, radiation or hormone therapy

when cancer is found. These treatments can cause incontinence or impotence, even though the cancer may not have been life-threatening.

***Current recommendation:***

USPSTF recommends against PSA-based screening for prostate cancer.<sup>22</sup> This recommendation applies to men in the general US population, regardless of age. This recommendation does not include the use of the prostate-specific antigen (PSA) test for surveillance after diagnosis or treatment of prostate cancer.

However, The American Cancer Society (ACS) recommends that men have a chance to make an informed decision with their health care provider about whether to be screened for prostate cancer. The decision should be made after getting information about the uncertainties, risks, and potential benefits of prostate cancer screening. Men should not be screened unless they have received this information.<sup>23</sup>

***State indicators:***

- In 2012, 62% of NH males age 40 and older reported having ever discussed the advantages of prostate cancer screening test with their healthcare provider, but only 31% reported having ever discussed the disadvantages.
- In 2012, 43.2% of NH males age 40 and older reported having a PSA test in the past two years.



## **New Hampshire State Health Improvement Plan (SHIP), 2013-2020**

The New Hampshire State Health Improvement Plan (NH SHIP), “Charting a Course to Improve the Health of New Hampshire”, highlights 10 key health areas and their health outcome indicators that describe the most significant health issues currently facing our population. The NH SHIP’s goals are to assist state and community leaders in focusing their work to improve the public’s health and to promote coordination and collaboration among public health partners. Strategies proposed for each priority are evidence-based and designed to have a high impact on the health of the population.

Cancer is one of the 10 key health areas, and targets have been set for key indicators:

### ***Where do we want to be as per New Hampshire State Health Improvement Plan, 2013-2020?***

- Increase the percent of females between the ages of 40-64 who had a mammogram in the past year from 80.4% to 82% by 2015 and 84% by 2020
- Increase the percent of adults age 50 and older who report being screened for colorectal cancer from 75.2% to 80% by 2015 and 82% by 2020.
- Reduce the melanoma cancer death rate from 3.1 deaths per 100,000 in 2007 to 2.8 per 100,000 by 2015 and 2.5 by 2020.
- Reduce the lung cancer death rate from 49.8 per 100,000 to 47.8 by 2015 and 45.5 per 100,000 by 2020.

### ***Where we are right now:***

- Mammogram: In 2012, 85.1% of NH females aged between 50 and 74 had a mammogram within the past two years.<sup>4</sup>

- Colorectal cancer screening: In 2012, 75.2% of NH adults aged between 50 and 75 were up-to-date with colorectal cancer screening.<sup>4</sup>
- Melanoma cancer deaths: In 2011, melanoma mortality rate in NH was 3.2 per 100,000 population.
- Lung cancer deaths: In 2011, lung cancer mortality rate in NH was 46.4 (95% CI= 42.9-50.0) per 100,000 population.

## **New Hampshire Comprehensive Cancer Control Program (CCC):**

Funded by the Centers for Disease Control and Prevention, the NH CCC was first established in 2007.

The overarching goal of the program is to reduce the burden of cancer in NH. This goal is achieved through:

- Reducing cancer risk (e.g., decreased tobacco use, decreased UV exposure, increased physical activity and improved nutrition)
- Finding cancer earlier
- Improving cancer treatments
- Improving the quality of life of cancer survivors

The program reports the following outcomes and successes:

- Development and implementation of the 2010-2014 New Hampshire Comprehensive Cancer Control Plan
- Support of the New Hampshire Comprehensive Cancer Collaboration a backbone organization coordinating the collective impact of individuals and organizations involved in the prevention and treatment of cancer.
- Developed an evaluation tool for palliative care services in NH
- Provided a toolkit on palliative care services to providers in NH
- Developed a template for survivorship care plan and treatment summary
- Convened clinical trial coordinators in NH to identify barriers to enrollment in trials and develop a best practices toolkit
- Supported the Melanoma Foundation of New England's Teens on Tanning Forum and Your-Skin-Is-In Pledge
- Support the state cancer screening programs in their efforts to increase screening among low-income individuals in NH
- Developed a Public Policy and Education Committee to monitor and support legislation related to reducing the cancer burden
- Released a number of "Emerging Issue Briefs" to share information about emerging issues in cancer control (e.g., radon-related lung cancer, overdiagnosis of cancer, and e-cigarettes)

Future goals include:

- Release of a revised New Hampshire Comprehensive Cancer Control Plan for 2015-2020
- Increased emphasis on ensuring access to preventive services for the hardest to reach populations
- Increased emphasis on health systems changes that promote preventive services



For more information about how to access breast and cervical cancer screening services in New Hampshire, contact:

The NH DHHS' "Let No Woman Be Overlooked" program at 1-800-852-3345 ext. 4931 (in NH) or 1-603-271-4931.

## **New Hampshire Breast and Cervical Cancer Program**

CDC provides funding to each state for the National Breast and Cervical Cancer Early Detection Program. In New Hampshire the program is called Let No Woman Be Overlooked, Breast and Cervical Cancer Program (BCCP) and started in 1997.

### **Current 5-year goals of this plan:**

- To expand and maximize partnerships to reach priority populations and promote the delivery of comprehensive breast and cervical cancer screening to priority populations.
- To enhance and coordinate a system to detect pre-cancerous or cancerous lesions at their earliest stage to reduce morbidity and mortality from breast and cervical cancers for low income, uninsured/underinsured women in NH. Meet annual screening projections: year 1- 3,700 women, year 2- 3,700 women, year 3- 2,700 women, year 4- 1,700 women, and year 5- 700 women.
- To ensure the quality of services delivered through the BCCP meets CDC's quality indicator standards.
- To affect health care providers' knowledge, attitudes, skills and behaviors regarding evidence based best practice breast and cervical cancer screening guidelines.

The BCCP provides free breast and cervical cancer screening and diagnostic services, and case management to women who are:

- New Hampshire residents
- Age 21 to 64
- Age 65+ and not eligible for Medicare, or are not enrolled in Medicare Part B
- Uninsured or insured with a deductible
- Living at or below 250% of the federal poverty level (i.e. family of 2 with a monthly income of \$3,277 as of 4/2014)

Achievement/Outcome:

About 12,000 cervical cancer screening tests (Pap tests) and over 11,000 breast cancer screening tests (mammography) were provided free to NH residents between 2009 and 2012.

**Table 3.3:** Breast and Cervical Cancer Screening testing conducted through the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) between 2009 and 2012

NH State Fiscal Year	Pap test	Mammography
2009	3,013	2,379
2010	2,973	2,638
2011	2,903	2,967
2012	3,067	3,303

## **New Hampshire Colorectal Cancer Screening Program**

New Hampshire was awarded a grant in 2009 by the Centers for Disease Control and Prevention (CDC) to increase colorectal cancer (CRC) screening for New Hampshire (NH) residents.

The grant has two goals.

- To increase high-quality CRC screening among persons 50 years and older to 80% statewide.
- To reduce disparities in CRC burden, screening and access to care.

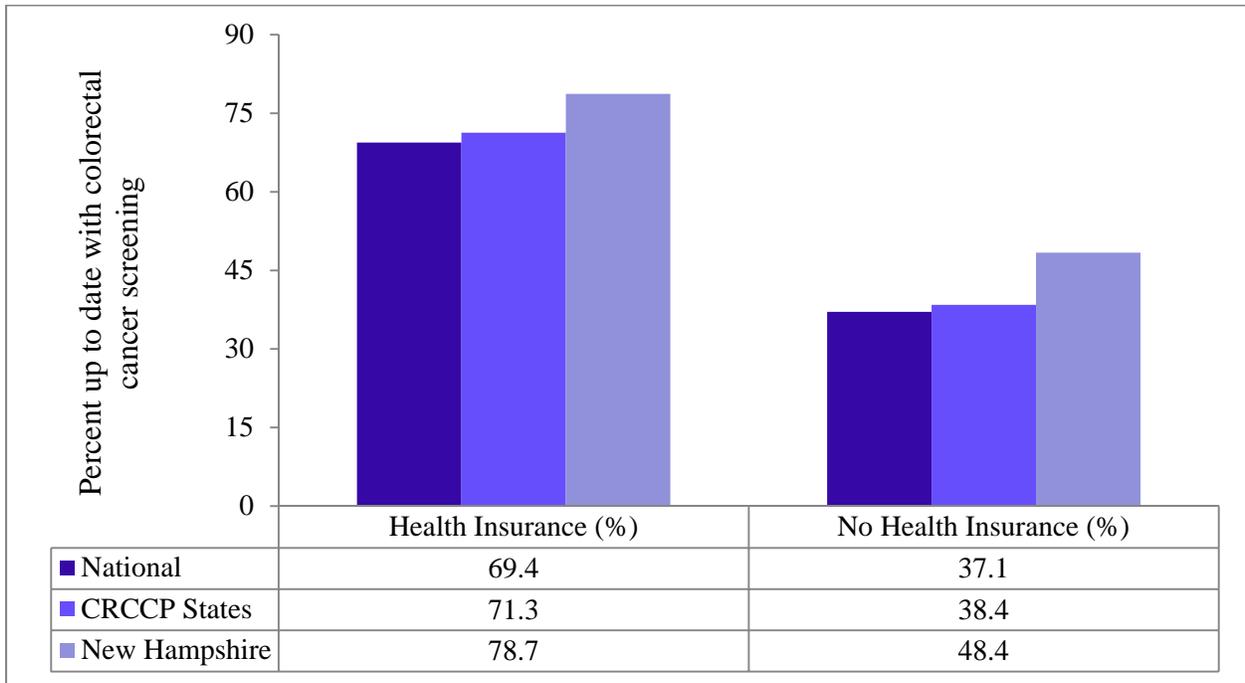
Outcomes of the NHCRCSP include:

- Provision of free colonoscopy screening services to low-income NH residents who are underinsured or uninsured for a total of over 1500 high quality screening or surveillance colonoscopies.
- Development of an effective patient navigation service which includes (i) education about the test, (ii) reducing barriers to screening such as transportation and taking the preparation solution as directed for the colonoscopy, (iii) ensuring the clients understand the results of their test, (iv) referral to a medical home if they do not have one, (v) referral of women to the NH Breast and Cervical Cancer Early Detection Program if they have not used that resource, (vi) and referral to Quitworks-NH if they are a smoker.
- NHCRCSP clients enrolled in the program who have completed their colonoscopy have had 0 no shows and less than 2% inadequate preparation rate.
- Thirty percent of NHCRCSP clients have had a pre-cancerous polyp removed; this reduces the likelihood of future cancer, which is the goal of colonoscopy screening.
- Leveraging existing resources with partner organizations including NH Department of Health and Human Services Chronic Disease Program in order to increase and improve screening policies, practices, and systems throughout the state.
- Implementation of evidence- based initiatives such as those found in the Community Guide with primary care providers throughout the state including the Federally Qualified Health Centers and Community Health Centers to implement system changes that

promote CRC screening and have resulted in an average of a 10% increase in CRC screening rates within those systems.

- NH now has the second highest CRC screening rate in the country as measured by the 2012 Behavioral Risk Factor Surveillance Survey at 75.2% for NH residents who are up to date on CRC screening.<sup>24</sup>

The program’s future goal is to expand and maximize partnerships to reach priority populations in New Hampshire and utilize opportunities such as the Affordable Care Act and Medicaid expansion to increase CRC screening for all.



**Figure 3.2:** Percentages of adults reported up to date with colorectal cancer screening aged 50-75 years by insurance status in New Hampshire

*Notes*

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## **APPENDICES**

## **APPENDIX 1: CANCER TERMINOLOGY**

### **Definition of Cancer**

Cancer is defined as a disease in which abnormal cells develop, divide, grow, and have the potential to spread throughout the body. Carcinogenesis (the process by which normal cells are transformed into cancer cells) involves a series of changes within cells that may occur over many years. If the spread of these cancer cells is not controlled, death may result. However, cancer is not just one disease; it is an umbrella term for at least 100 different but related diseases.

The cancer is defined as invasive or malignant if the cancer cells from a tumor can invade nearby tissues either by direct growth into adjacent tissue or by migration through the bloodstream and lymphatic system to other parts of the body. This process is called metastasis. For example, cancer that started in the stomach and spread to the pancreas is still stomach cancer. Benign tumors are not considered invasive because they do not metastasize.

### **Sites**

The cells in which they originate define cancers, and they are termed: carcinoma, sarcoma, lymphoma or leukemia. Carcinoma is the most common type of cancer and arises from the cells that cover external and internal body surfaces. After non-melanoma skin cancers the most frequent carcinomas in the US are of the lung, breast and colon. Sarcomas are cancers that arise from cells found in the supporting tissues of the body, such as bone, cartilage, fat, connective tissue and muscle. Lymphomas are cancers that arise in the lymph nodes and tissues of the body's immune system. Leukemia is a cancer of the immature blood cells that grow in the bone marrow and tend to accumulate in large numbers in the bloodstream.

### **Stage**

Stage is a precise clinical and pathological documentation of the extent of disease, or in lay terms it is the way to categorize the extent to which cancer cells have spread from the original site to another part of the body. Knowledge of cancer stage helps physicians and patients in considering options for treatment and in understanding the prognosis. For some cancers, diagnosis at an earlier stage can increase a person's chance of survival. For instance, people

diagnosed with colorectal cancer at a localized stage have a 90 percent five-year survival rate, meaning that 90% of patients with localized colorectal cancer survive for at least five years. People diagnosed with distant stage colorectal cancer have a 10 percent five-year survival rate. Stage can be grouped into the following categories: in situ, localized, regional, distant and unknown.

**In Situ** – This term means “in place”; it is also known as “non-invasive”. Cancer cells are present within the cell group from which they have arisen, but the tumor has not penetrated the basement membrane and there is no stromal invasion. It comes under criteria of malignant cancer except for not invading the supporting structure of the organ on which it arose. These stage cancers are not included in the incidence for different sites except for bladder cancer.

**Localized** - A tumor restricted to the organ of origin. The cancer has gone through the basement membrane and spread to the functional part of the organ, but there is no spread further than the boundaries of the organ.

**Regional** - The tumor has extended beyond the limits of the organ of origin, and there is potential for spread by lymphatic (lymph nodes) or vascular (blood) supply. Regional stage cancers extend beyond the primary site, directly or involve regional lymph nodes or both.

**Distant** - Distant metastases are tumor cells that have broken away from the primary tumor, have traveled to other parts of the body, and have begun to grow at the new location. Cancer cells can travel by extension lymph nodes, vascular and fluid of body cavity. Frequent sites of distant spread are liver, lung, brain and bones. These organs receive blood flow from all parts of the body and thus are a target for distant metastases.

**Unknown/Unstaged** - There is not enough information to classify a cancer into any of the above stages.

## Causation

Each type of cancer has certain known and/or suspected risk factors associated with it. In many cases, the exact cause of cancer is unknown, and researchers continue to study how and why normal cellular growth becomes uncontrolled. Cancer is almost always caused by a combination of factors that interact in ways that are not yet fully understood. The long period of time between the first cellular abnormality and the clinical recognition that cancer is present, defined as “latency period”, often makes it difficult to pinpoint the cause of the cancer.

## Race, Gender and Ethnicity

Cancer rates can vary by race and ethnicity. Although the reasons for this are largely unknown, socioeconomic factors are probably more important than biological or inherited characteristics in explaining the differences in cancer risk observed among major racial and ethnic populations in the US. Cigarette smoking, physical inactivity, obesity and other risk factors vary by race/ethnicity and socioeconomic status. Rates of use of recommended screening tests and stage at diagnosis also vary by race and ethnicity. Following are examples of how cancer rates differ among people according to race and ethnicity based on American Cancer Society 2005-2009 data:

<http://www.cancer.org/acs/groups/content/@epidemiologysurveillance/documalests/documalest/a/cspc-036845.pdf>

- **Alaska Native and American Indian:** These groups experience lower cancer incidence rates compared to whites for all sites combined, but they have higher incidence of stomach and, liver cancer than whites in 2005-2009.
- **Asian:** The incidence of liver cancer among Asians was higher than whites in 2005-2009. But lower for kidney and renal pelvis.
- **African American:** African American males have the highest incidence and mortality rates of colorectal, prostate, and lung and bronchus cancers. Mortality rates are higher among black females for breast cancer.
- **White:** Among females, non-Hispanic white females have the highest cancer incidence rate, due mainly to their excess of breast cancer. Hispanic/Latina females have a higher rate of cervical cancer incidence than the US non-Hispanic population.

The NH Department of Health and Human Services (DHHS) is committed to presenting its data by race and ethnicity whenever possible. Statistics presented in this report are not broken out by race due to the small number of events among non-white minority groups. DHHS will continue to monitor the burden of cancer on minority populations and will present results by race and ethnicity in future reports when statistically appropriate.

## **Treatment**

Cancer treatment decisions involve a team of specialists, which may include a medical oncologist, surgeon, radiation oncologist, nurse, nutritionist and social worker. Cancer may be treated with surgery, radiation, chemotherapy, hormones and immunotherapy. Working together, health care providers and people diagnosed with cancer may decide to use a single treatment method or a combination of methods.

Cancer treatment depends not only on the type and location of the cancer, the stage of the disease, the patient's age and general health, but also on other factors such as the place of residence, distance traveled for treatment and health insurance, etc. The financial costs of cancer are thus high for both the person with cancer and for society as a whole. The National Institutes of Health estimated that the overall cost of cancer in 2008 was around \$201.5 billion. Of this, \$77.4 billion were in direct medical costs (medical expenses), and another \$124 billion for indirect mortality costs (cost of lost productivity due to premature death)

(ref: <http://www.cancer.org/cancer/cancerbasics/economic-impact-of-cancer>).

## **Survival**

One way to determine treatment success is by survival, or how long a person lives after being diagnosed with cancer. A five-year relative cancer survival rate is the proportion of patients surviving cancer five years after their diagnosis. The survival rate includes those who are disease-free, in remission or under treatment. Medical advances in cancer diagnosis and treatment have improved survival rates for many cancers.

SEER estimates that for people of all races diagnosed with cancer (all sites), 65.8% percent survived cancer after five years compared with a 53% five-year survival rate for people diagnosed with cancer from 1983 through 1985. (ref: <http://seer.cancer.gov/statfacts/html/all.html>)

According to the ACS, children of all races diagnosed with cancer (all sites) from 2002 through 2008, 83% of children survive at least five years following a cancer diagnosis. (ref: <http://www.cancer.org/research/cancerfactsstatistics/cancerfactsfigures2013/index>). With advanced treatment, people are now living longer with a cancer diagnosis; as of 2010, the SEER estimated that approximately 13 million were cancer survivors, compared to 10.5 million in 2003. (ref: <http://seer.cancer.gov/statfacts/html/all.html>)

## **Surveillance**

Cancer surveillance is the systematic collection, analysis and interpretation of cancer data. The goal of cancer surveillance is to improve our understanding of the prevention and treatment of cancer, and ultimately, to reduce illness and death from cancer.

Cancer registries at the local, state and national level collect and analyze data on the diagnosis, stage and treatment of cancer. Operated by the New Hampshire Department of Health and Human Services, the New Hampshire State Cancer Registry (NHSCR) is part of a national effort to gain a better understanding of cancer at the state and national levels. The NHSCR is a statewide population-based cancer surveillance system. The registry collects information about all cancers diagnosed in NH residents (except benign tumors, non-melanoma skin cancers and carcinoma in situ of the cervix). The goals of the registry are to:

- Determine the incidence of cancer in the NH population

- Monitor cancer incidence and mortality trends among state residents
- Identify high-risk populations
- Report findings to health care professionals and the public
- Contribute data for cancer prevention, control and treatment programs
- Support and participate in special studies and research into cancer-related issues specifically related to NH

Cancer registry data can help identify specific populations that could benefit from increased education and access to cancer prevention and screening. Public health officials use cancer registry data to guide cancer prevention and control programs that are focused on minimizing cancer-related risks. The data can be used in clinical, epidemiological and health services research.

## APPENDIX 2: GLOSSARY OF TERMS, DEFINITIONS AND NOTES

### Invasive Versus Total Counts

Cancer rates are based on invasive cases which exclude all in situ cases with the exception of bladder cancer. This means that the count of invasive cases reported in cancer rate tables may differ from the count of total cases reported elsewhere.

### Age Adjustment and Rates

All rates in this document are age-adjusted to the 2000 US standard population. This allows the comparison of rates among populations having different age distributions by standardizing the age-specific rates in each population to one standard population. Age-adjusted rates refer to the number of events that would be expected per 100,000 persons in a selected population if that population had the same age distribution as a standard population. Age-adjusted rates were calculated using the direct method as follows:

Where,

m = number of age groups

$d_i$  = number of events in age group i

$P_i$  = population in age group i

$S_i$  = proportion of the standard population in age group i

This is a weighted sum of Poisson random variables, with the weights being ( $S_i / p_i$ )

$$\hat{R} = \sum_{i=1}^m s_i (d_i / p_i) = \sum_{i=1}^m w_i d_i$$

### Age Specific Rate

The age-specific rate is the number of individuals diagnosed as having cancer per year within a specific age group, divided by the estimated number of individuals of that age living in NH at the midpoint of the year.

## Population Weights

Many of the rates presented are "age-adjusted"; that is, the given rates are those that would occur if the population of NH had the same age distribution as that of a United States reference population. Age adjustment allows for comparisons between populations with different age distributions.

For comparison purposes, the 2000 US standard population weights used in calculating age-adjusted rates in this report are shown here. Please contact Health Statistics and Data Management section for more information on methodology.

Age Group	2000 weight
0-4	0.0691
5-9	0.0725
10-14	0.0730
15-19	0.0722
20-24	0.0665
25-29	0.0645
30-34	0.0710
35-39	0.0808
40-44	0.0819
45-49	0.0721
50-54	0.0627
55-59	0.0485
60-64	0.0388
65-69	0.0343
70-74	0.0318
75-79	0.0270
80-84	0.0178
85 +	0.0155
All Ages	1.0000

## Annual Percent Change

Annual Percent Change (APC) is one way to characterize trends in cancer rates over time. This means that the cancer rates are assumed to change at a constant percentage of the rate of the previous year. For example, if the APC is 1%, and the rate is 50.000 per 100,000 in 1990, the rate is  $50 \times 1.01 = 50.500$  in 1991 and  $50.5 \times 1.01 = 51.005$  in 1992. Rates that change at a

constant percentage every year change linearly on a log scale. For this reason, to estimate the AAPC for a series of data, regression model is used.

### **Confidence Intervals (CI)**

The standard error can be used to evaluate statistically significant differences between two rates by calculating the confidence interval. If the interval produced for one rate does not overlap the interval for another, the probability that the rates are statistically different is 95% or higher.

The formula used is:

Where,

R=age-adjusted rate of one population

z = 1.96 for 95% confidence limits

SE= standard error as calculated below

$$R \pm z (SE)$$

A confidence interval is a range of values within which the true rate is expected to fall. If the confidence intervals of two groups (such as NH and the US) overlap, then any difference between the two rates is not statistically significant. All rates in this report are calculated at a 95 percent confidence level. For example, the age-adjusted NH males lung cancer incidence rate is 82.1 (95% CI, 78.6-85.6) per 100,000 population. There is a 95 percent probability that the confidence interval contains the true adjusted rate.

### **Data Collection**

The New Hampshire State Cancer Registry is covered by state statute Title X Chapter 141-B under code of administrative rules of Part He-P 304. These rules require physicians and hospitals to report information on all cases of cancer that they diagnose or treat, with the exception of squamous and basal carcinomas of the skin, benign neoplasms except brain, and in situ carcinomas of the cervix or skin. Through interstate agreements, information on NH residents diagnosed or treated in other states is also included in registry data. The information is not collected directly from patients.

Cancer was the leading cause of death in NH residents and the second leading cause of death in the United States during 2010.

### **5 Year Data Aggregation**

As NH is a small state with a population of just over 1.3 million, in a given year, the number of newly diagnosed cancers or cancer deaths is too small to generate meaningful results.

Calculating a rate based on small numerators creates an unstable estimate that is not statistically reliable and varies greatly from year to year by chance alone. Therefore, generating rates based on small numbers can lead to misinterpretation. For this reason, 5 years of data are aggregated to create a more stable rate.

### **Data Confidentiality**

All individuals working with the Registry database are governed by the confidentiality policy implemented under the New Hampshire Rules and Regulations governing the Registry. Release of confidential cancer data for research or other purposes is governed by RSA 141B. The law requires reporting for public health purposes, and does not allow people to opt out of the reporting. However, the Cancer Registry keeps all information that is required under the rules that could possibly be used to identify an individual, confidential. This includes identifying information regarding individual patients, health care providers and health care facilities. The law permits disclosure of certain confidential data to other cancer registries and federal cancer control agencies to collaborate in a national cancer registry and to health researchers for cancer control and prevention research studies. However, strict requirements, including prior approval of the researcher's academic Institutional Review Board for the protection of human subjects, must be met. Public data releases, such as published statistical reports, are carefully designed in order to provide data to the fullest extent possible while still realizing the mandate to protect patient confidentiality.

## **Data Quality**

Data quality is directly related to the completeness and accuracy of the information reported. New Hampshire State Cancer Registry (NHSCR) data tabulated in this report are based on information received and edited by the NHSCR as of January 2006 and reflects at least 95% of the true cancer incidence rate for the state. Delays in reports from out-of-state hospitals and incomplete medical records account for the balance of the cases. The NHSCR follows standard procedures for ensuring the accuracy of data. A comprehensive set of standard national edits are applied to all case reports received by the NHSCR prior to including those cases in the central database. New case reports are then merged with old case reports to ensure that only primary incident tumors are included. The NHSCR tumor registrars contact registrars at reporting institutions to resolve any outstanding edits. In addition to these quality assurance activities for case processing, the NHSCR conducts quarterly case re-abstraction reviews to ensure that professional standards for case abstraction are consistently met across all reporting institutions. To ensure complete case reporting, the NHSCR performs quarterly independent audits of pathology and cytology reports at hospitals, free standing labs, and selected out-of-state laboratories performing microscopic reviews for physician offices. In addition, the NHSCR performs death clearance by linking incident cancer cases with vital statistics death certificates and follows up on all deaths with cancer as a diagnosis that were not previously reported to the Cancer Registry.

## **Incidence**

Incidence refers to the number or rate of newly diagnosed cases of cancer. Rates are age-adjusted to 2000 US standard population and exclude basal cell and squamous skin cancers and in situ (malignant but non-invasive) carcinomas except urinary bladder. Some of the rates also include age-specific rates. Rates based on 10 or fewer cases are not calculated, as they are not reliable.

## **Mortality**

Mortality refers to the number or rate of deaths from cancer. Rates are age-adjusted to the 2000 US standard population. Some of the rates also include age-specific rates. Rates based on 4 or

fewer cases are not calculated. Cancer mortality site groupings are defined by the National Center for Health Statistics and are based on ICD-10 classification.

### **New Hampshire / US Comparison**

US incidence and mortality rates for whites, rather than those for all races, are used for comparison because racial minority groups were estimated to make up around six percent of the total NH population compared with the total US non-white population of 27 percent in 2010 as reported by the American census. Nationwide, whites have a higher risk compared to people of other races for female breast, melanoma and bladder cancer incidence. Whites have a lower risk compared to other races for prostate, colorectal and cervical cancer. The much smaller populations of NH residents of other races may have very different risks of these cancers. Combining data over many years will be required to determine cancer rates for these groups.

### **Rate Comparisons**

To determine if there is a statistically significant difference between cancer incidences in NH compared to the US, the NH rate is compared to the US SEER rate. If the SEER 95% confidence interval overlaps with the 95% confidence interval for the state rate, it suggests that the rates are not statistically different from one another. For example, the NH female breast cancer mortality rate is 24.1 (20.5, 27.6) per 100,000 populations, and the SEER rate is 25.3 (24.5, 26.1). Since the SEER confidence interval overlaps with state confidence interval of the NH rate, no statistically significant difference exists between the two rates.

### **Reliability of Rates**

Several important notes should be kept in mind when examining rates. Rates based on small numbers of events (e.g. less than 10 events) can show considerable variation. This limits the usefulness of these rates in comparisons and estimations of future occurrences. Unadjusted rates are not reliable for drawing definitive conclusions when making comparisons because they do not take factors such as age distribution among populations into account. Age-adjusted rates offer a more refined measurement when comparing events over geographic areas or time periods.

When a difference in rates appears to be significant, care should be exercised in attributing the difference to any particular factor or set of factors. Many variables may influence rate differences. Interpretation of a rate difference requires substantial data and exacting analysis.

### **Small Numbers**

With very small counts, it is often difficult to distinguish between random fluctuation and meaningful change. According to the National Center for Health Statistics, considerable caution must be observed in interpreting the data when the number of events is small (perhaps less than 100) and the probability of such an event is small (such as being diagnosed with a rare disease). The limited number of years of data in the registry and the small population of the state require policies and procedures to prevent the unintentional identification of individuals. To protect patient privacy, county-specific data are published only for commonly diagnosed cancer sites. Data on rare cancer sites, race, and other variables that could potentially identify individuals are not published.

### **US Incidence and Mortality Rates**

The National Cancer Institute funds a network of Surveillance, Epidemiology and End Results (SEER) registries. The SEER Program that collected cancer incidence and survival data from population-based cancer registries were used for US white rates. It covers approximately a quarter of the US population. These rates are used to estimate US cancer incidence rates (2006-2010). We picked US white incidence data rates for our (NH) comparison that were obtained from *SEER Cancer Statistics, 2006-2010*.

The US Public Use Database Vital Statistical System maintains US mortality rates. Based on the US Public Use Database Vital Statistical System, US cancer mortality rates are 2006-2010 white population rates. The National Cancer Institute funds a network of SEER registries. The SEER Program currently collects and publishes cancer incidence and survival data. We picked US white mortality data rates for our (NH) comparison that were obtained from *SEER Cancer Statistics, 2006-2010*.

## APPENDIX 3: REFERENCES, RESOURCES AND CONTACT INFORMATION

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<https://www.nh.gov/epht/publications/documalests/radon-issue.pdf>

## **Resources**

### ***United States***

American Cancer Society, [www.cancer.org](http://www.cancer.org).

American Society of Clinical Oncology (ASCO) and People Living With Cancer  
[www.oncology.com](http://www.oncology.com)

Centers for Disease Control and Prevention, [www.cdc.gov/cancer](http://www.cdc.gov/cancer)

Harvard Center for Cancer Prevention, Your Disease Risk Index  
<http://www.diseaseriskindex.harvard.edu/update/>

National Cancer Institute, <http://www.cancer.gov/cancertopics>.

National Center for Health Statistics, <http://www.cdc.gov/nchs/Default.htm>

National Program of Cancer Registries, <http://www.cdc.gov/cancer/npcr/index.htm>

North American Association of Central Cancer Registries, [www.naacr.org](http://www.naacr.org)

Sexually Transmitted Disease. Centers for Disease Control and Prevention.  
<http://www.cdc.gov/std/hpv/stdfact-hpv.htm>

State Cancer Profiles, [www.statecancerprofiles.cancer.gov](http://www.statecancerprofiles.cancer.gov)

Surveillance Epidemiology and End Results (SEER) Program, [www.seer.cancer.gov](http://www.seer.cancer.gov)

SEER interactive tools, <http://www.seer.cancer.gov/faststats/selections.php?series=cancer>  
United States Cancer Statistics: 2006-2010 Incidence,  
[www.cdc.gov/cancer/npcr/uscs/index.htm](http://www.cdc.gov/cancer/npcr/uscs/index.htm)

US Department of Health and Human Services Agency for Healthcare Research and Quality  
<http://www.ahrq.gov/>

US Preventive Services Task Force, <http://www.uspreventiveservicestaskforce.org/>

### ***New Hampshire***

New Hampshire Department of Health and Human Services. Division of Public Health Services.  
Health Statistics and Data Management.  
<http://www.dhhs.nh.gov/dphs/hsdm/index.htm>

New Hampshire State Cancer Registry <http://www.dartmouth.edu/~nhscr/>

New Hampshire Vital Records Administration [http://sos.nh.gov/vital\\_records.aspx](http://sos.nh.gov/vital_records.aspx)

### ***Breast Cancer***

US Preventive Services Task Force, Screening for Breast Cancer  
<http://www.uspreventiveservicestaskforce.org/uspstf/uspsbrca.htm>

Centers for Disease Control, Breast Cancer

[http://www.cdc.gov/cancer/breast/basic\\_info/index.htm](http://www.cdc.gov/cancer/breast/basic_info/index.htm)

National Cancer Institute - Breast Cancer Home Page,

<http://www.cancer.gov/cancertopics/prevention-genetics-causes/breast>

New Hampshire Department of Health & Human Services –Chronic Disease Control Prevention & Control–Breast and Cervical Cancer Program: Breast Cancer Screening,

<http://www.dhhs.nh.gov/dphs/cdpc/bccp/index.htm>

### ***Prostate Cancer***

Centers for Disease Control, Prostate Cancer Screening

[http://www.cdc.gov/cancer/prostate/basic\\_info/screening.htm](http://www.cdc.gov/cancer/prostate/basic_info/screening.htm)

US Preventive Services Task Force, screening for Prostate cancer

<http://www.uspreventiveservicestaskforce.org/prostatecancerscreening.htm>

National Cancer Institute Prostate Cancer Home Page,

<http://www.cancer.gov/cancertopics/prevention-genetics-causes/prostate>

### ***Bladder Cancer***

National Cancer Institute, Bladder Cancer Home Page,

<http://www.cancer.gov/cancertopics/types/bladder>

### ***Colorectal Cancer***

National Cancer Institute - Colon and Rectal Cancer Home Page,

<http://www.cancer.gov/cancertopics/types/colon-and-rectal/>

Centers for Disease Control, Colon and Rectal Cancer

[http://www.cdc.gov/cancer/colorectal/basic\\_info/risk\\_factors.htm](http://www.cdc.gov/cancer/colorectal/basic_info/risk_factors.htm)

US Preventive Services Task Force, Colorectal cancer screening

<http://www.uspreventiveservicestaskforce.org/uspstf/uspscolo.htm>

### ***Lung Cancer***

National Cancer Institute - Lung Cancer Home Page,

<http://www.cancer.gov/cancertopics/types/lung/>

Centers for Disease Control, Lung Cancer

<http://www.cdc.gov/cancer/lung/>

US Preventive Services Task Force, Lung cancer screening

<http://www.uspreventiveservicestaskforce.org/uspstf/uspslung.htm>

### ***Leukemia***

Leukemia and Lymphoma Society

<http://www.lls.org/#/diseaseinformation/leukemia/>

### ***Melanoma***

National Cancer Institute - Melanoma Home Page,

<http://www.cancer.gov/cancertopics/types/melanoma/>

Centers for Disease Control, Skin Cancer Prevention

[http://www.cdc.gov/cancer/skin/basic\\_info/prevention.htm](http://www.cdc.gov/cancer/skin/basic_info/prevention.htm)

### ***Non-Hodgkin's Lymphoma***

Leukemia and Lymphoma Society

<http://www.lls.org/#/diseaseinformation/lymphoma/nonhodgkinlymphoma/causesriskfactors/>

National Cancer Institute – Non-Hodgkin Lymphoma Home Page,

<http://www.cancer.gov/cancertopics/types/non-hodgkin>

### ***Kidney and Renal Pelvis Cancer***

National Cancer Institute, Kidney Cancer

<http://www.cancer.gov/cancertopics/types/kidney>

### ***Uterine Cancer***

Centers for Disease Control, Gynecologic Cancers

[http://www.cdc.gov/cancer/uterine/basic\\_info/index.htm](http://www.cdc.gov/cancer/uterine/basic_info/index.htm)

National Cancer Institute, Endometrial Cancer

<http://www.cancer.gov/cancertopics/types/endometrial>

## **CONTACT INFORMATION**

New Hampshire Department of Health & Human Services  
Bureau of Disease Control and Health Statistics  
Health Statistics and Data Management  
29 Hazen Drive  
Concord NH 03301  
Phone: (800) 852-3345 ext. 4988 or 603-271-4988  
E-mail: healthstats@dhhs.state.nh.us

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