

Cancer in Northeastern Pennsylvania: Incidence and Mortality of Common Cancers

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*“Easing the burden of cancer in
Northeastern Pennsylvania”*



Dear Community Members,

The Northeast Regional Cancer Institute, a community-based nonprofit organization, is pleased to present this report on cancer incidence and mortality in Northeastern Pennsylvania. For more than 20 years, the Cancer Institute has worked to ease the burden of cancer by focusing on the areas of community & patient services, survivorship, and epidemiology research. The Cancer Institute invests 100% of its resources in this region.

The Epidemiology Research Department at the Cancer Institute compiled this report using data from the organization's Regional Cancer Registry and the Bureau of Health Statistics and Research of the Pennsylvania Department of Health. Characterized in this report are cancer incidence and mortality in Northeastern Pennsylvania relative to the United States for the 23 most common cancer sites. Additionally, Table 4 presents the results of an analysis of trends in cancer incidence over the past 10 years.

The Northeast Regional Cancer Institute uses the local cancer surveillance data it generates to focus the organization's community and patient services so that they may have the greatest possible impact. Similarly, we hope that the information contained in this report is helpful to you in your efforts against cancer.

Sincerely,

A handwritten signature in black ink that reads "Samuel M. Lesko". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

*Samuel Lesko, MD, MPH
Medical Director/Director of Research*

Table 1. Standardized incidence ratios by primary cancer site and sex, Northeastern Pennsylvania[†], 2005-2009

Primary site	Cases No.	SIR [†]		
		Both Sexes	Men	Women
All sites	23,088	107*	105*	109*
Brain	298	110	107	114
Breast, female	2,887	-	-	93*
Bronchus & lung	3,349	115*	132*	99
Colon & rectum	2,649	123*	127*	120*
Esophagus	317	145*	156*	113
Hodgkin's lymphoma	135	124*	120	129
Kidney & renal pelvis	727	108	110	104
Larynx	215	143*	140*	157*
Leukemia	612	106	103	110
Liver/intra-hepatic bile duct	262	77*	78*	74*
Melanoma of the skin	701	73*	72*	75*
Multiple myeloma	280	99	109	89
Non-Hodgkin's Lymphoma	874	94*	92	95
Oral cavity & pharynx	552	113*	121*	97
Ovary	362	-	-	113*
Pancreas	590	98	104	92
Prostate	2,638	-	78*	-
Stomach	367	107	109	104
Testis	122	-	128*	-
Thyroid	751	157*	117	170*
Urinary bladder	1,230	123*	121*	129*
Uterine cervix	193	-	-	144*
Uterine corpus	875	-	-	137*

[†] Limited to Lackawanna, Luzerne, Pike, Susquehanna, Wayne and Wyoming counties.

[†] Standardized incidence ratio = observed / expected cases X 100.

* Significantly different from 100, p < 0.05.

Table 1 Summary

The five most commonly diagnosed cancer sites in Northeastern Pennsylvania were (starting with the most common): bronchus and lung, breast, colon and rectum, prostate, and urinary bladder.

Incidence was significantly elevated in Northeastern Pennsylvania for all sites combined and for 12 specific cancer sites for both sexes (unless otherwise noted): bronchus and lung (men), colon and rectum, esophagus (men), Hodgkin's disease (men), larynx, oral cavity and pharynx (men), ovary, testis, thyroid (women), urinary bladder, uterine cervix, and uterine corpus.

Reported incidence was significantly lower in Northeastern Pennsylvania than the United States rate for five sites for both sexes combined (unless otherwise noted): breast (women), liver and intra-hepatic bile duct, melanoma, non-Hodgkin's lymphoma, and prostate.

Table 2. Standardized mortality ratios by primary cancer site and sex, Northeastern Pennsylvania[†], 2005-2009

Primary site	Deaths No.	SMR [†]		
		Both Sexes	Men	Women
All sites	9,304	109*	113*	104*
Brain	176	92	93	90
Breast, female	618	-	-	100
Bronchus & lung	2,426	100	109*	89*
Colon & rectum	945	116*	120*	113*
Esophagus	254	124*	133*	94
Hodgkin's lymphoma	25	132	170	89
Kidney & renal pelvis	224	117*	114	123
Larynx	65	114	132	54*
Leukemia	370	111	107	115
Liver/intra-hepatic bile duct	236	91	95	84
Melanoma of the skin	143	113	117	104
Multiple myeloma	148	89	99	78*
Non-Hodgkin's Lymphoma	327	103	99	106
Oral cavity & pharynx	130	111	123	88
Ovary	277	-	-	121*
Pancreas	553	104	107	101
Prostate	464	-	107	-
Stomach	205	118*	124*	112
Testis	8	-	267	-
Thyroid	17	65*	50*	75
Urinary bladder	229	107	112	94
Uterine cervix	55	-	-	100
Uterine corpus	160	-	-	136*

[†] Limited to Lackawanna, Luzerne, Pike, Susquehanna, Wayne and Wyoming counties.

[†] Standardized mortality ratio = observed / expected deaths X 100.

* Significantly different from 100, p < 0.05.

Table 2 Summary

The five cancer sites resulting in the highest number of cancer deaths in Northeastern Pennsylvania were (starting with the most common): bronchus and lung, colon and rectum, breast (women), pancreas, and prostate.

Cancer mortality was significantly higher in Northeastern Pennsylvania than in the United States for all sites combined and for seven specific sites: bronchus and lung (men), colon and rectum, esophagus (men), kidney, ovary, stomach (men), uterine corpus.

Mortality in Northeastern Pennsylvania was significantly lower than the United States rate for four sites: bronchus and lung (women), larynx (women), multiple myeloma (women), and thyroid (men).

Table 3. Standardized incidence and mortality ratios by primary cancer site, both sexes, Northeastern Pennsylvania[†], 2005-2009

Primary site	Cases No.	SIR (95% CI*)	Deaths No.	SMR (95% CI*)
All sites	23,088	107 (105.7, 108.4)	9,304	109 (106.3, 110.7)
Brain	298	110 (97.8, 122.9)	176	92 (78.1, 105.2)
Breast, female	2,887	93 (90.0, 96.8)	618	100 (98.1, 107.5)
Bronchus & lung	3,349	115 (111.2, 118.9)	2,426	100 (95.8, 103.8)
Colon & rectum	2,649	123 (118.4, 127.8)	945	116 (108.7, 123.5)
Esophagus	317	145 (129.4, 161.4)	254	124 (108.7, 139.1)
Hodgkin's lymphoma	135	124 (103.0, 144.8)	25	132 (80.0, 183.2)
Kidney & renal pelvis	727	108 (99.7, 115.4)	224	117 (101.9, 132.6)
Larynx	215	143 (124.2, 162.5)	65	114 (86.3, 141.8)
Leukemia	612	106 (97.5, 114.3)	370	111 (99.5, 122.1)
Liver/intra-hepatic bile duct	262	77 (67.5, 86.1)	236	91 (79.5, 102.8)
Melanoma of the skin	701	73 (67.8, 78.7)	143	113 (94.1, 131.1)
Multiple myeloma	280	99 (87.7, 110.9)	148	89 (74.3, 102.9)
Non-Hodgkin's lymphoma	874	94 (87.5, 99.9)	327	103 (91.4, 113.6)
Oral cavity & pharynx	552	113 (103.5, 122.3)	130	111 (92.0, 130.2)
Ovary	362	113 (101.2, 124.4)	277	121 (106.7, 135.2)
Pancreas	590	98 (90.1, 105.9)	553	104 (95.5, 112.8)
Prostate	2,638	78 (74.7, 80.7)	464	107 (97.6, 117.2)
Stomach	367	107 (96.3, 118.3)	205	118 (102.3, 134.7)
Testis	122	128 (105.6, 151.2)	8	267 (81.9, 451.5)
Thyroid	751	157 (145.6, 168.0)	17	65 (34.3, 96.5)
Urinary bladder	1,230	123 (115.8, 129.5)	229	107 (92.7, 120.3)
Uterine cervix	193	144 (123.7, 164.4)	55	100 (73.6, 126.4)
Uterine corpus	875	137 (127.5, 145.6)	160	136 (114.6, 156.6)

[†] Limited to Lackawanna, Luzerne, Pike, Susquehanna, Wayne and Wyoming counties.

* Confidence interval.

Figures in **bold font** are significantly different from 100.

Table 3 Summary

Cancer incidence and mortality were significantly elevated in Northeastern Pennsylvania for all sites combined and at four specific sites for both sexes combined (unless otherwise noted): colon and rectum, esophagus, ovary, uterine corpus.

Some notable disparities between incidence and mortality include: mortality was significantly elevated, but incidence was not significantly elevated for cancers of the kidney and stomach, incidence was significantly depressed but mortality was not significantly different from United States rates for breast (women), liver, melanoma, non-Hodgkin's lymphoma, and prostate, and incidence was significantly elevated but mortality was not for cancers of the bronchus and lung, bladder, larynx, oral cavity and pharynx, cervix, testis, and Hodgkin's lymphoma.

Table 4. Average change in age-adjusted incidence rate by cancer site and sex, Northeastern Pennsylvania[†], 2000-2009

Site	Both Sexes		Men		Women	
	ACI*	p-value	ACI*	p-value	ACI*	p-value
All	3.02	0.03	0.51	0.57	4.64	0.03
Brain	0.03	0.63	0.05	0.69	0.05	0.70
Breast, female	-	-	-	-	-0.30	0.78
Bronchus & lung	1.01	0.01	0.14	0.84	1.71	0.002
Colon & rectum	-1.82	0.002	-2.40	0.006	-1.43	0.008
Esophagus	0.15	0.19	0.29	0.17	0.05	0.37
Hodgkin's lymphoma	-0.03	0.68	-0.11	0.052	0.05	0.67
Kidney & renal pelvis	0.40	0.02	0.50	0.11	0.26	0.21
Larynx	-0.02	0.77	-0.06	0.74	0.01	0.88
Leukemia	0.25	0.05	0.17	0.42	0.29	0.09
Liver/intra-hepatic bile duct	0.27	0.01	0.40	0.02	0.14	0.11
Melanoma of the skin	0.59	0.002	0.64	0.004	0.52	0.01
Multiple myeloma	0.23	0.004	0.41	0.06	0.08	0.48
Non-Hodgkin's Lymphoma	0.16	0.45	0.41	0.26	-0.06	0.78
Oral cavity & pharynx	0.43	0.003	0.67	0.003	0.20	0.048
Ovary	-	-	-	-	-0.46	0.04
Pancreas	0.29	0.09	0.37	0.16	0.25	0.19
Prostate	-	-	-1.83	0.07	-	-
Stomach	-0.06	0.48	-0.02	0.91	-0.08	0.45
Testis	-	-	0.12	0.62	-	-
Thyroid	1.18	0.0008	0.41	0.06	1.97	0.0006
Urinary bladder	-0.13	0.51	-0.18	0.71	-0.10	0.43
Uterine cervix	-	-	-	-	0.03	0.88
Uterine corpus	-	-	-	-	0.03	0.89

[†] Limited to Lackawanna, Luzerne, Pike, Susquehanna, Wayne and Wyoming counties.

* Average change in incidence rate, in cases per 100,000 per year.

Figures in **bold font** are significantly different from 0.

Table 4 Summary

During the period 2000-2009, cancer incidence increased significantly for all sites combined, and the following specific sites: bronchus and lung (women), kidney, liver (men), melanoma, multiple myeloma, oral cavity and pharynx, and thyroid (women).

Incidence decreased significantly during this period for cancers of the colon and rectum, and ovary.

Average Change in Age-Adjusted Incidence

The change in age-adjusted incidence shown in Table 4 in this report represents the average yearly increase (or decrease) in incidence rate, in cases per 100,000, during the period 2000-2009. Statistical significance was assessed using linear regression analyses. Trends in incidence were highlighted where the average change in incidence was significantly different from 0, i.e., different from no change in incidence.

Confidence Interval

The standardized incidence and mortality ratios described in this report are point estimates of cancer incidence and mortality in Northeastern Pennsylvania compared to the United States. Although these are the best estimates of cancer experience in Northeastern Pennsylvania, it is important to recognize the potential for uncertainty in these estimates due to random or sampling error or variability. The size of the uncertainty in these ratios is reflected in confidence interval. The 95% confidence interval is the range of values that will include the true ratio 95% of the time. Compared to narrow confidence intervals, wider confidence intervals reflect greater uncertainty in value of the true ratio.

Primary Site

The cancer cases in this report were examined by primary site. The primary site is the tissue or organ where the cancer was shown to originate as evidenced by microscopic examination of tissue, radiologic examination (x-ray, CT scan, or MRI), endoscopy (e.g., colonoscopy), or clinical examination.

Standardized Incidence and Mortality Ratios

The incidence ratios in this report (Tables 1 & 3) are the calculated best estimates of the incidence of each cancer in Northeastern Pennsylvania relative to the corresponding incidence in the United States and take the age and racial make-up of the population into account. Similarly, mortality ratios (shown in Tables 2 & 3) compare cancer mortality rates in NEPA to the United States mortality. These ratios are calculated by dividing the number of cancer cases (or deaths) that actually occurred in Northeastern Pennsylvania by the number of cases (or deaths) expected if Northeastern Pennsylvania had exactly the same cancer risk (or mortality) as the United States. The ratios shown in Tables 1-3 are expressed as a percentage of the corresponding United States rate. For example, the standardized incidence ratio (SIR) for colon and rectal cancer, shown in Table 1, was 123. This means that the incidence of cancers of the colon and rectum in Northeastern Pennsylvania was 23% higher than the same figure for the United States.

This report uses data provided by the Bureau of Health Statistics and Research, Pennsylvania Department of Health. The Department specifically disclaims responsibility for any analyses, interpretations or conclusions.



The Northeast Regional Cancer Institute is a non-profit, community-based agency working to ease the burden of cancer in Northeastern Pennsylvania. Focusing on research, education & survivorship the Cancer Institute invests all of its resources in this region.

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