

This document was prepared by NJDHSS for discussion with the Pompton Lakes Health Community Advisory Group. The analyses are preliminary and will be incorporated into a forthcoming Community Health Profile report.

Preliminary Analyses of Cancer Incidence Community Health Profile Pompton Lakes, New Jersey

Presented to Pompton Lakes Health CAG
August 9, 2011

The following analysis presents cancer distributions by gender for the State of New Jersey, Pompton Lakes and six surrounding municipalities combined (Oakland Borough, Pequannock Township, Riverdale Borough, Bloomingdale Borough, Wanaque Borough, and Wayne Township). Additionally, this report presents Standardized Incidence Ratio analyses (SIR) for Pompton Lakes, the part of Pompton Lakes above the Dupont-related groundwater contamination area, and the six surrounding municipalities. Both analyses present total cancer incidence and selected specific cancer types for the time period from 1990-2008. These analyses update cancer incidence statistics which had previously been reported to the Pompton Lakes community.

Case Ascertainment

The New Jersey State Cancer Registry (NJSCR) was used to determine cancer cases. The NJSCR is a population-based cancer incidence registry that has been in operation since October 1, 1978 and maintains complete years of data from 1979 to 2008. Data for 2009 to 2011 are currently being collected but are not yet complete. By law, all cases of newly diagnosed cancer are reportable to the NJSCR. All primary invasive and in situ neoplasms are reportable to the NJSCR, except cervical cancer in situ diagnosed after 1995 and certain carcinomas of the skin. Benign and borderline intracranial and Central Nervous System tumors are also collected, effective with cases diagnosed on and after January 1, 2004. In addition, the NJSCR has reporting agreements with the states of New York, Pennsylvania, Delaware, Maryland, North Carolina, and Florida.

The NJSCR has been awarded the North American Association of Central Cancer Registrars (NAACCR) Gold Standard, the highest standard possible, for the quality of data since the inception of this award several years ago. The criteria used to judge the quality of the data are timeliness, completeness of cancer case ascertainment, completeness of specific information on the cancer cases, percent of death certificate only cases, percent of duplicate cases, in addition to passing the data through a stringent edit program. For additional information on the NJSCR please visit the website at <http://www.state.nj.us/health/ces/njscr.shtml>.

A "case" was defined as an individual who was diagnosed with a new primary malignant cancer during the survey period while residing in the survey area. NJSCR cases identified only through search of death or autopsy records were excluded from this evaluation. The reason for this exclusion was that the majority of these cases do not include accurate address information and therefore could not be accurately assigned to the survey area of interest. To control for this exclusion, the cancer rates used to generate the expected cases also excluded the autopsy/death certificate only cases. It should be noted that information on important cancer risk

factors, such as genetics, personal behaviors (e.g., diet and smoking), or occupational history, is not available from the NJSCR.

A. Cancer Count Distribution by Sex

Data Analysis

Cancer count distributions for the State of New Jersey, Pompton Lakes and the six surrounding towns combined are presented separately for males and females. The select cancer types analyzed include prostate, female breast, ovarian, cervix, lung, colorectal, bladder, non-Hodgkin lymphoma (NHL), melanoma of the skin, leukemia, kidney, pancreas, thyroid, brain and central nervous system (CNS) and liver. These cancer types account for over 80% of all cancer diagnoses in New Jersey and the U.S.

Results of Cancer Count Distribution

Within each sex, the distributions of cancer counts are similar for the State of New Jersey, Pompton Lakes and the six surrounding towns combined (see Figure 1).

B. Standardized Incidence Ratio Analyses

Survey Area and Population

The survey area for this analysis consisted of the entire municipality of Pompton Lakes, the part of Pompton Lakes above the contaminated groundwater area, and the six surrounding municipalities combined. Population counts were obtained from the 1990, 2000 and 2010 censuses (U.S. Census Bureau). At the time of this report, 2010 census population by 5 year age groups were not available at the census tract/ block group and therefore could not be used for the groundwater contamination area; instead, populations were estimated based on 1990 and 2000 census data only.

When comparing cancer incidence data in two communities, it is important to “age-adjust” the rates. Because increased age is by far the biggest risk factor for cancer, communities with higher distributions of older individuals will have a higher cancer incidence. Age-adjustment allows the reviewer to compare cancer incidence rates for geographic regions by removing the affect that the age distribution has on the rates.

One way to adjust rates for age differences is to compute standardized incidence ratios (SIRs). SIRs were used for the quantitative comparison of cancer incidence between the survey areas (Pompton Lakes, the groundwater contamination area, and the six surrounding towns) in comparison to the State of New Jersey. The SIR is calculated by dividing the observed number of cases (from the NJSCR) by an expected number for the surveyed population separately for 1990 to 2008. The expected number was derived by multiplying a comparison population's age-sex specific cancer incidence rates and the survey area age-sex-specific population

figures. The comparison rates used to derive the expected number of cases were the New Jersey average annual incidence rates for the total survey period (1990 to 2008). The use of the word “expected” in this report, refers to statewide comparisons and should not be construed to mean acceptability.

The observed and expected numbers are evaluated by interpreting the ratio of these numbers. If the observed number of cases equals the expected number of cases, the SIR will equal 1.0. An SIR less than 1.0 indicates that fewer cases are observed than expected. An SIR greater than 1.0 indicates that more cases are observed than expected. Random fluctuations may account for some SIRs being higher or lower than 1.0. The statistical significance of deviations from SIR equal to 1.0 was evaluated using a 95% confidence interval (CI). The 95% CI was used to evaluate the probability that the SIR may be greater or less than 1.0 due to chance alone. If the confidence interval includes 1.0, then the estimated SIR is not considered to be statistically significantly different than 1.0.

Data Analysis

Males and females were evaluated separately for all races combined. The select cancer types analyzed include prostate, female breast, lung, colorectal, bladder, non-Hodgkin lymphoma (NHL), melanoma of the skin, leukemia, kidney, pancreas, thyroid, brain and central nervous system (CNS) and liver. Following standard practice in the presentation of cancer types, liver cancer includes cancers of the intrahepatic bile duct and brain cancer includes cancers of the central nervous system.

Results of Standardized Incidence Ratio Analyses

Table 1 presents the standardized incidence ratio (SIRs) results for Pompton Lakes, the Ground Water Contamination Area, and the six surrounding municipalities, by sex, for the nineteen-year survey period from 1990-2008.

For Pompton Lakes, overall cancer incidence was borderline statistically significantly elevated for females (SIR=1.08; 95% CI=1.00, 1.17). With the addition of 2008 data and the new population estimates, the SIR for females for all cancer sites combined has decreased slightly from the previous years analysis from 1990-2007 (SIR=1.12; 95% CI=1.03, 1.22). Additionally, the colorectal cancer rate in males is no longer statistically significantly elevated.

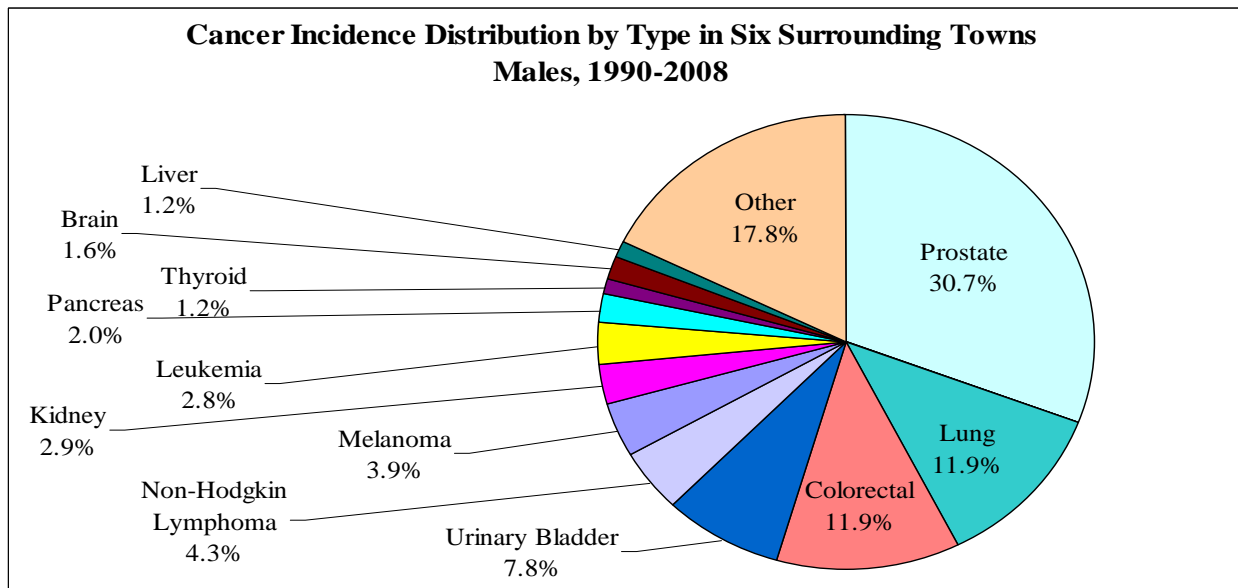
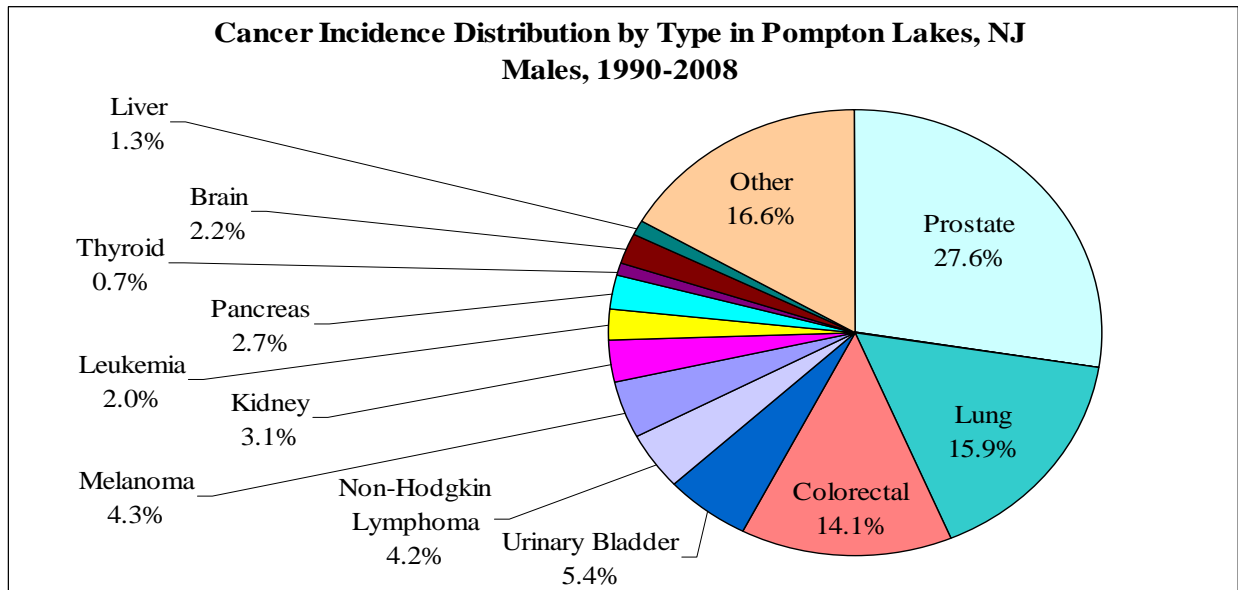
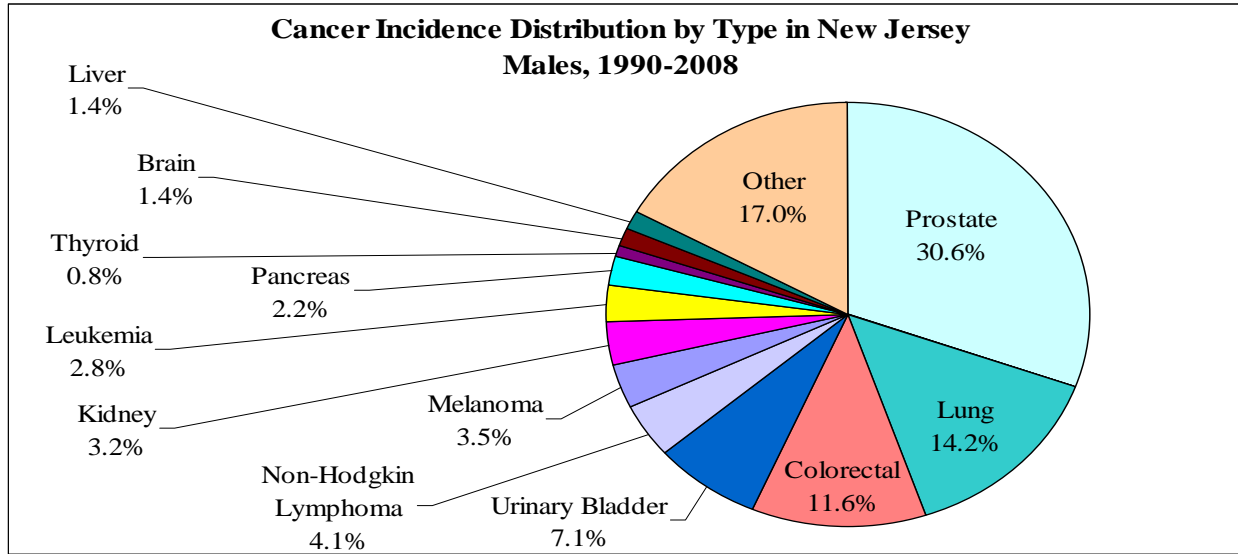
For the groundwater contamination area of Pompton Lakes, none of the cancer sites analyzed was found to be statistically significantly elevated in this analysis. Although both kidney cancer in females and non-Hodgkin lymphoma in males were elevated to a similar degree as reported in previous analyses, the rates are not significantly different in comparison to the State of New Jersey in the time period 1990-2008.

For the six surrounding municipalities, the incidence of all cancers combined among females was statistically significantly elevated (SIR=1.05; 95% CI=1.02, 1.07). Additionally, the analysis showed a statistically significant elevation for melanoma in females (SIR=1.21; 95% CI=1.04, 1.40), and thyroid cancer in males

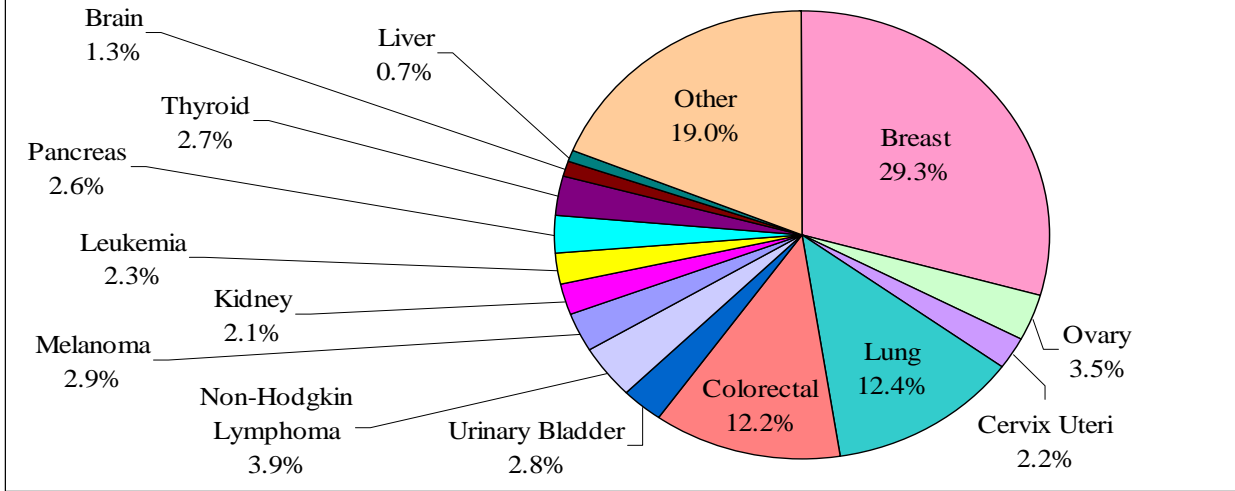
(SIR=1.56; 95% CI=1.22, 1.98). Lung cancer in males was found to be statistically significantly low (SIR=0.83; 95% CI=0.77, 0.90).

Benign brain cancer cases from 2004-2008 were reviewed for Pompton Lakes. For this five year period, there were fewer than five benign brain cancer cases diagnosed among both men and women combined. Based on New Jersey State rates for benign brain cancer for the same time period and the population of Pompton Lakes, the expected number of benign brain cancer cases in Pompton Lakes would be 4.6. There were no cases of benign brain cancer reported for the plume area for this five year period.

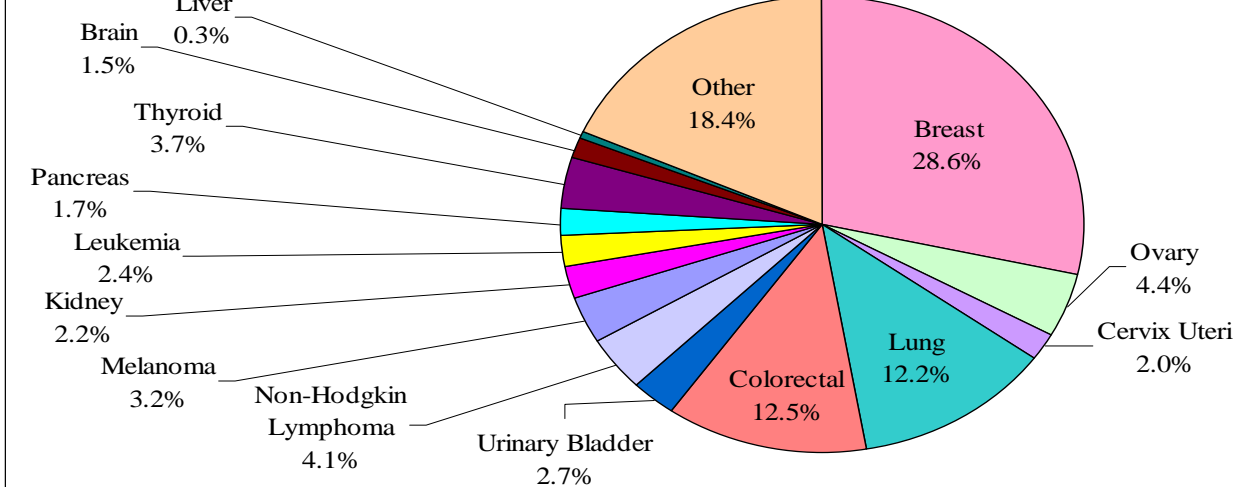
Figure 1. Distributions of Cancer Incidence by Type, Sex, and Survey Area



**Cancer Incidence Distribution by Type in New Jersey
Females, 1990-2008**



**Cancer Incidence Distribution by Type in Pompton Lakes, NJ
Females, 1990-2008**



**Cancer Incidence Distribution by Type in Six Surrounding Towns
Females, 1990-2008**

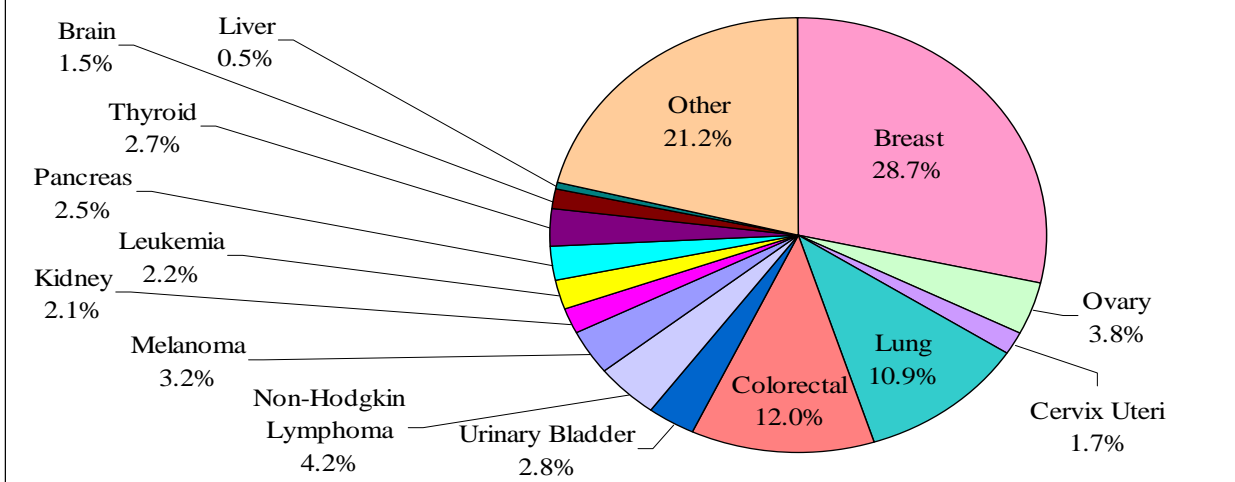


Table 1- SIR Analysis, by Cancer Type, Sex and Community, All Races Combined, 1990-2008

		Pompton Lakes ^					Ground Water Contamination Area					6 Surrounding Towns ^				
		Observed	Expected	SIR	95% CI		Observed	Expected	SIR	95% CI		Observed	Expected	SIR	95% CI	
					Lower	Upper				Lower	Upper				Lower	Upper
All Cancers	Male	554	554.6	1.00	0.92	1.09	75	90.2	0.83	0.65	1.04	5674	5,732.7	0.99	0.96	1.02
	Female	591	546.6	1.08*	1.00	1.17	94	83.1	1.13	0.91	1.38	5580	5,331.1	1.05*	1.02	1.07
Prostate	Male	153	172.0	0.89	0.75	1.04	20	27.3	0.73	0.45	1.13	1743	1,792.5	0.97	0.93	1.02
Breast	Female	169	163.1	1.04	0.89	1.20	19	24.41	0.78	0.47	1.22	1601	1,575.6	1.02	0.97	1.07
Lung	Male	88	78.0	1.13	0.90	1.39	11	12.67	0.87	0.43	1.55	676	812.2	0.83**	0.77	0.90
	Female	72	67.1	1.07	0.84	1.35	9	10.19	0.88	0.40	1.68	611	649.7	0.94	0.87	1.02
Colorectal	Male	78	64.7	1.21	0.95	1.50	11	11.03	1.00	0.50	1.79	677	676.9	1.00	0.93	1.08
	Female	74	67.0	1.10	0.87	1.39	14	10.60	1.32	0.72	2.22	669	676.9	0.99	0.91	1.07
Bladder	Male	30	39.4	0.76	0.51	1.09	<5	NR	0.44	0.09	1.28	442	414.1	1.07	0.97	1.17
	Female	16	15.2	1.05	0.60	1.70	<5	NR	1.68	0.45	4.30	158	152.4	1.04	0.88	1.21
NHL	Male	23	22.8	1.01	0.64	1.51	7	3.74	1.87	0.75	3.86	242	231.2	1.05	0.92	1.19
	Female	24	21.4	1.12	0.72	1.67	<5	NR	1.21	0.33	3.10	237	209.6	1.13	0.99	1.28
Melanoma	Male	24	19.5	1.23	0.79	1.83	7	3.1	2.24	0.90	4.61	224	198.4	1.13	0.99	1.29
	Female	19	15.7	1.21	0.73	1.89	5	2.4	2.11	0.68	4.91	181	149.9	1.21*	1.04	1.40
Leukemia	Male	11	15.0	0.74	0.37	1.32	<5	NR	0.80	0.09	2.88	161	152.3	1.06	0.90	1.23
	Female	14	12.2	1.15	0.63	1.93	0	1.90	0.00	-	-	125	120.0	1.04	0.87	1.24
Kidney	Male	17	17.4	0.97	0.57	1.56	<5	NR	0.73	0.08	2.63	162	179.1	0.90	0.77	1.06
	Female	13	11.4	1.14	0.61	1.95	5	1.74	2.88	0.93	6.72	116	110.6	1.05	0.87	1.26
Pancreas	Male	15	11.8	1.27	0.71	2.10	<5	NR	0.51	0.01	2.86	113	123.2	0.92	0.76	1.10
	Female	10	13.5	0.74	0.36	1.37	<5	NR	1.44	0.29	4.22	137	135.3	1.01	0.85	1.20
Thyroid	Male	<5	NR	0.87	0.23	2.22	0	0.7	0.00	-	-	70	44.7	1.56*	1.22	1.98
	Female	22	14.5	1.52	0.95	2.30	<5	NR	1.40	0.28	4.10	151	133.1	1.13	0.96	1.33
Brain	Male	12	7.9	1.52	0.78	2.65	<5	NR	1.63	0.18	5.88	89	77.8	1.14	0.92	1.41
	Female	9	6.9	1.30	0.59	2.47	0	1.05	0.00	-	-	81	65.5	1.24	0.98	1.54
Liver	Male	7	7.2	0.98	0.39	2.01	<5	NR	1.76	0.20	6.35	67	74.0	0.91	0.70	1.15
	Female	<5	NR	0.58	0.07	2.11	<5	NR	1.87	0.02	10.39	28	34.0	0.82	0.55	1.19

- Counts and observed suppressed when fewer than 5 cases to ensure confidentiality.

* Statistically significantly high, ** Statistically significantly low.

-- Liver includes Intrahepatic Bile Duct

-- Brain includes central nervous system

^ 2010 Census available