State of New Jersey
DEPARTMENT OF HEALTH AND SENIOR SERVICES
CANCER EPIDEMIOLOGY SERVICES
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CHRISTINE TODD WHITMAN
Governor

CHRISTINE GRANT, J.D., M.B.A.
Commissioner

www.state.nj.us/health

December 6, 1999

Dear East Riverton Resident:

In response to citizens' concerns about various cancers in their community, the Burlington County Health Department (BCHD) conducted a survey in 1998-1999 of cancer occurrences in each of the 360 residences in East Riverton. The Cancer Epidemiology Services of the New Jersey Department of Health and Senior Services (NJDHSS) assisted the BCHD by analyzing the responses. Since October 1978, the New Jersey State Cancer Registry has collected information on all cancers which are diagnosed among residents of N.J. We would like to share with you a summary of our findings.

Survey of Cancer Incidence in East Riverton Section of Cinnaminson

Based on analyses of the cancer survey data collected earlier this year, the overall pattern of cancer incidence in East Riverton is not different from New Jersey as a whole. The distribution of various cancer types is also similar to that of New Jersey.

After many mailings and house visits by BCHD staff, about three quarters of the residences responded to the survey. Of the 276 questionnaires that were returned, there were 109 cases of cancers reported among 863 individuals, spanning the years 1947 to 1999, and comprising 19 different types of cancer.

The NJDHSS used a combination of several statistical methods to evaluate the information. Since cancer comprises over 100 distinct diseases, and most of these occur with higher frequency among older people, interpretation of this type of information must take into account the age distribution of the population, the ages at which various cancers usually occur, and the particular types of cancers. The questionnaire responses did not provide enough information on smoking and occupation to enable these important factors in cancer risk to be taken into account.

First, the Cancer Registry data were used to compare the rates of cancers diagnosed among East Riverton residents to the rates for the entire State during the years for which the Registry currently has information (1979-1997). Then, using information back to 1947 from the East Riverton questionnaires in combination with the Registry, three sets of comparisons were conducted of the proportions of the various types of cancers in East Riverton to New Jersey as a whole.

As stated above, the results of the analyses indicated that cancer incidence rates and the proportional distribution of most cancers were similar when comparing East Riverton and the entire State. A few types of cancer, such as of the esophagus and bladder, appeared in some of the analyses to be higher than expected, and a few other types, such as leukemia and uterine cancer, appeared to be lower than expected. This is what we typically see when we do many separate analyses of this type. There is no evidence that any of the cancers are related to unusual factors which have been found in East Riverton.

Because of historical concerns about environmental contamination in this area, state and federal environmental agencies are continuing to monitor the potential for exposures to toxic substances associated with ground water contamination and are overseeing ongoing remediation efforts. It is very important that environmental standards and guidelines protect public health and that these standards be strictly enforced.

Thank you for your interest and assistance in this public health issue. Should you have any questions about the survey or environmental quality issues in your community, please feel free to reach out to the Burlington County Health Department at (609) 265-5548.

Sincerely yours,

Eddy A. Bresnitz

Eddy A. Bresnitz, MD, MPH
State Epidemiologist/Assistant Commissioner

Analysis of Burlington County Health Department's Cancer Survey of the East Riverton Section of Cinnaminson, NJ by the NJ Department of Health and Senior Services

Introduction

In 1986, this Department conducted an analysis of cancer data in the East Riverton section of Cinnaminson, in response to community concerns about the occurrence of cancer in their neighborhood, which concluded that there was no statistically significant excess of cancer. During the ensuing years, citizens continued to be concerned about cancer and about the environmental quality of their community.

In response to these concerns, the Burlington County Health Department (BCHD) distributed and collected questionnaires (**Appendix 1**) about cancer among East Riverton residents late in 1998. The BCHD requested technical assistance from Cancer Epidemiology Services of the New Jersey Department of Health and Senior Services (NJDHSS) in analyzing the questionnaire responses. The methods and results of those analyses and a discussion of the observations are presented below and in the attached tables.

About three quarters of the households responded to the survey. While a 25% non-response rate may affect the interpretation of the information, the response rate for this survey was better than the response rate generally found in similar neighborhood surveys.

Summary of Findings

The overall numbers and types of cancer which have occurred among residents of East Riverton are not unusual, based upon a comparison of the information in the questionnaires with data in the New Jersey State Cancer Registry. As invariably occurs when a large number of comparisons are made, some individual types of cancer occurred with greater frequency and some with lower frequency than expected based on statewide patterns.

Data in New Jersey State Cancer Registry

The New Jersey State Cancer Registry (NJSCR) collects information on all cancers diagnosed since October of 1978 among residents of New Jersey. The data in the Registry are now complete through 1996 and almost complete for the year 1997. All newly diagnosed cases of cancer in New Jersey are required by law to be reported to the Registry. The Registry was used to verify all reports of cancer diagnosed during those years and characterize New Jersey with regard to incidence rates of specific cancers as well as all cancers combined. Conversely, since the Registry contains no information on individuals diagnosed before October of 1978, it could not be used to confirm resident reports of such cases. Nor could the Registry provide incidence data for years prior to 1979.

Background for Survey: Cancer concerns and previous analyses

Citizens of the East Riverton section of Cinnaminson have historically expressed concern about various environmental issues in their neighborhood, including air emissions from industrial facilities, ground water quality, and the nearby landfill which is on the National Priority List under the US EPA Superfund program. In 1986, the NJ Department of Health conducted an analysis of cancer incidence using the data collected thus far by the New Jersey State Cancer Registry. A report issued at that time (**Appendix 2**) indicated that there was no statistical excess of cancer incidence. However, the observed number of lung cancers among men was higher than the expected number (five observed and slightly more than one expected).

Cancer comprises more than 100 different diseases, each with its unique set of risk factors, and many different causes. The concerns of the community focused primarily on total cancers, and the 1986 analysis found only lung cancer among males to be elevated. Therefore, the 1999 analyses conducted by the NJDHSS treated occurrence of total cancers and lung cancer as prior hypotheses. In addition, twenty other common types of cancer were included in the 1999 analysis, even though there were no prior reasons to suspect that living in East Riverton was causally related to any specific types of cancer.

Demographic Comparison of East Riverton and Questionnaire Respondents

For demographic information, the 1990 census data for census tract 7003.01 was used as an estimate of the population of East Riverton during the time period 1979-1997. This census tract corresponds precisely to the East Riverton section of Cinnaminson. **Table A** includes a summary of information from the U.S. Census about the population of the survey area in 1990 with respect to age, gender, and race distribution, and the corresponding data for the individuals represented by the survey who are currently living in East Riverton. The distributions are very similar.

The individuals represented by the survey inhabited residences in East Riverton from one to 77 years. Of the 1,039 individuals listed in the responses, representing 276 households, there were 863 over 18 years of age. Data on smoking and occupation were absent in the majority of the responses (see **Table B**).

Number and Types of Cancer Occurrences in the Questionnaire Responses

The questionnaire responses specified 108 cases of cancer diagnosed during the years spanning 1947 to 1999. Of these, 81 were diagnosed during the time the NJSCR has been collecting data. There were more than 19 different types of cancer listed on the questionnaires, including 29 cases for which the type of cancer was unknown.

Statistical Analyses of Cancer Incidence by NJDHSS

Two methods were used to analyze cancer incidence: **Standardized Incidence Ratios** and **Proportional Incidence Ratios**. Both methods compare local data from East Riverton to overall New Jersey data available through the New Jersey State Cancer Registry.

When many statistical tests are conducted, there is likely to be some "false positives" that is, "statistically significant differences" due to chance alone. Using the conventional level of "statistical significance", most towns in the United States would be found to have a "statistically high" and a "statistically low" rate for at least one type of cancer due to chance variation alone.

Results

1. Standardized Incidence Ratio Analyses Using Only NJSCR Data.

The NJDHSS assessed whether the total incidence rate of cancer in East Riverton was higher or lower than New Jersey as a whole during the twenty years that the NJSCR has collected data. This was done by conducting Standardized Incidence Ratios (SIRs). The Standard Incidence Ratios were calculated by dividing the **observed** number of cases of cancer in the East Riverton census tract by the number that would be **expected** based on incidence rates for New Jersey. These incidence rates are derived using the most recently published NJSCR data which are for the years 1979-1996. The expected numbers of cases were calculated by using the statewide cancer rates taking into account age and gender distribution of the population in East Riverton as specified by the U.S. census data. SIR analyses were conducted for the total East Riverton population. Because cancer rates vary among the genders and races, separate analyses were also conducted for four subgroups: African-American males, African-American females, white males, and white females.

Standardized Incidence Ratios (SIRs) are evaluated according to how much they differ from one (1.0) and by the **confidence interval** around the ratio. If the ratio = 1.0, the number of observed cases is equal to the number of expected cases. When the ratio is less than one, fewer cases have occurred than expected. When the ratio is greater than one, more cases have occurred than expected. When the confidence interval (C.I.) does not include 1.0, the ratio is said to be "statistically significant". A 95% confidence interval is conventionally used, but scientists sometimes use wider intervals, such as a 99% C.I., when they are testing numerous possibilities without specific hypotheses.

Standardized Incidence Ratios require that the entire population of interest be accurately defined. The SIR method could only be used for NJSCR data from 1979 to 1997, the time period for which there is virtually complete accounting of the population and the cancer incidence.

Table C shows the results of the SIR analysis of all the survey data. The table shows:

*the number of cases reported via the survey (the **observed** number),
*the number of cases **expected** based on the age and gender distribution of the East Riverton population and the comparable distribution of these cancers in all of the New Jersey population during the years of the Registry,
*the **ratio of the observed to the expected number,** and
*the 95% **confidence interval** around that ratio.

As can be seen from **Table C**, the SIR analysis indicated that for the years 1979-1997, the overall numbers of cancer in East Riverton was very close to what would be predicted by New Jersey incidence data as a whole; that is, 103 cancers were found and about 100 cancers were expected based on overall New Jersey patterns. The resulting ratio for overall cancer incidence was 1.04; that is, about 4% higher than expected based on the State average. The 95% confidence interval indicates that this SIR is within the bounds of normal fluctuation seen among communities due to chance alone.

As indicated in recent State reports, *Cancer Incidence in New Jersey 1992-1996* and *Cancer Incidence by County, New Jersey 1986-1996*, the highest cancer rates in the State occur among African-American males, followed by white males and white females; African-American females have the lowest overall cancer incidence rates. In **Table C**, the highest SIR in East Riverton is seen among white males (although the SIR is not statistically significant).

2. Three Analyses using Proportional Cancer Incidence Ratios

The next set of analyses conducted were Proportional Incidence Ratio (PIR) analyses. In this type of analysis, (sometimes called PCIR for Proportional Cancer Incidence Ratio), the **proportion of specific types among all cancers** in a particular community are compared with the corresponding proportion for the **same specific types** of cancer among the overall population (i.e., New Jersey as a whole). Proportional cancer incidence analyses are done to determine if there are unusual types of cancer in a community or if the distribution of various types of cancer are unusual. The ages of the cancer cases in the comparison group (New Jersey) and the group

being evaluated (East Riverton) are taken into account in the computations. PIRs are useful tools when researchers do not have a complete list of every individual in the community of interest, including the information on what dates and ages they each moved into or left a community, which is the situation for this survey.

It often happens that cancers are reported on surveys according to the part of the body to which cancer has spread (metastasized) from its original or "primary" site. The metastatic sites which are most often so reported are brain, bone, and liver. Conducting PIRs using survey data which cannot be corroborated (because they predate the NJ State Cancer Registry) would therefore tend to exaggerate the primary occurrence of these three types of cancer.

Since it was not possible to confirm or correct the survey reports with the NJSCR for the years 1947 through most of 1978, and for the currently incomplete years 1997 through 1999, NJDHSS did one analysis using only the types of cancer as reported on the surveys. The categories of cancer which were analyzed in this way are the most common types in the NJ and US population, together comprising over 90% of cancer in this country. (Had there been any less common cancers which appeared more than once in the survey, these would also have been included, but there were no such instances.)

Since there was an excess of lung cancer among males detected in the 1986 analysis by this Department as described above (see **Appendix 2**), the preexisting hypothesis was that lung cancer would be seen in excess of statewide proportions. In addition, NJDHSS analyzed separate PIRs for each of 20 other major categories of cancer. However, there were no specific data on any factors which would lead NJDHSS to suspect that there might be an increase in a particular type of cancer. Among the 108 listings of reportable cancers only 39 included smoking data and only 23 included occupational information. Such data are important because smoking and some occupational exposures are very strong and well known risk factors for lung cancer and some other cancers.

In these analyses, *in-situ* breast and cervical cancers were not included, since standard methods of analyzing national and state cancer data do not include such cases. Similarly, non-

melanoma skin cancers were excluded because these are not reportable and are not included in the comparable proportions for New Jersey.

Tables D to F show the results of the PIR analyses for 21 different types of cancer. In order to protect the confidentiality and privacy of individuals, and in accordance with Department policy, the tables showing the results of the PIR analyses show actual observed and actual expected numbers where there were **at least five cases.** If there was at least one but less than five cases, the table indicates "less than 5" observed and does not show the expected number. However, the ratios of observed-to-expected are shown in all instances.

Table D shows the results of the first PIR analysis that included all cases of cancer reported in the BCHD survey, including those cancers reported to have occurred prior to 1979. Lung cancer and every other type of cancer were within the bounds of the expected proportional cancer occurrence. Lung cancer and 15 other types of cancer occurred in lower proportions than expected and five cancers occurred in higher proportions than expected. None were statistically significant. There were several types of common cancers for which there were no cases in East Riverton listed on the survey forms, including oral or pharyngeal cancers, laryngeal cancer and leukemias even though more than one of each of these types of cancer was expected.

In the second PIR analysis, for the time period October 1978 through 1997, NJDHSS matched the individuals reported with cancer on the survey with the information in the NJSCR. Among the 81 cases noted on the survey during this period, 73 were confirmed by the Registry. The type of cancer reported was different in the Registry from the survey in five of these cases, and 17 of the cases for which the survey had unknown type were able to be assigned to the specific cancer category through the Registry. These 73 confirmed cases and eight cases which could not be confirmed by the Registry are included in **Table E.** The table shows that lung cancer and 11 other types of cancer occurred in lower proportions than expected and six in higher proportions. Except for esophageal cancer, all of the categories again occurred within the normal confidence intervals for the expected proportions. All three cases of esophageal cancer occurred among men who were reported to have been smokers. Smoking is a major risk factor for esophageal cancer. As in the previous table, there were several common cancer types for which

no cases were reported, including uterine cancers, oral or pharyngeal cancers, laryngeal cancer, and leukemias, for which approximately one or more of each was expected.

A final PIR analysis was performed of all individuals with cancer who, according to the NJSCR had lived in the East Riverton section of Cinnaminson Township at the time of diagnosis (see **Table F**). This analysis was independent of any information from the BCHD survey. There were 103 such cases during the period for which the Registry is now virtually complete (1979-1997). Included were 26 cases not reported through the BCHD survey. In **Table F** one can see that lung cancer and 13 other types of cancer occurred proportionally lower than expected, and six were proportionally higher. Bladder cancer was the only type of cancer for which the PIR appeared to be statistically significantly elevated (10 cases were observed and 4.6 were expected).

Although, as discussed above, statistical increases and decreases occur by chance alone when multiple analyses are conducted, NJDHSS subsequently conducted a thorough review of these bladder cancer cases. The details appear in **Appendix 3**. The results of this evaluation do not suggest that bladder cancer was likely to be elevated due to any particular characteristics of East Riverton.

As before, several common cancer types which would be expected in this population were found to be absent: oral or pharyngeal cancer, laryngeal cancer, and the leukemias. Substantially fewer than expected uterine cancers occurred (only one fifth as many as expected).

Conclusions

In summary, the overall number and type of cancers among residents of East Riverton are not unusual compared to statewide data. An excess of lung cancer which was detected in the 1986 analysis did not appear in this larger data set.

It is important to recognize that because of the fluctuations of disease frequency among communities, most "elevations" or "deficits" of specific or total cancers are due to random variation in time and in place, not specific causes related to a particular locality. NJDHSS and

many other public health agencies use statistical screening techniques to focus on those instances when the difference between the observed and expected number of specific types of cancer are pronounced and/or persistent. More detailed investigations are considered when statistically elevated rates persist for two or more consecutive time periods, when the likelihood of excess cancer is due to chance is quite small, and/or where there is a preexisting rationale, such as a documented completed exposure pathway in the community to high concentrations of carcinogens. None of these circumstances apply to East Riverton, based on the data which have been submitted to or analyzed by the NJDHSS.

The NJDHSS recommends that local health departments and concerned citizens and communities continue to learn about the major known causes of cancer, particularly those which can be prevented by individual and local efforts. To that end, the Cancer Epidemiology Services distributes material written by NJDHSS, the National Cancer Institute, and the American Cancer Society. NJDHSS also advocates that environmental standards be set so as to protect public health and that all such standards be strictly enforced.

The Consumer and Environmental Health Services of NJDHSS plans to update its Public Health Assessment for East Riverton early in 2000 under its Cooperative Agreement with the federal Agency for Toxic Substances and Disease Registry. The Cancer Epidemiology Services will also receive and evaluate the findings of that update.

Table A.
Demographic Characteristics of East Riverton section
Cinnaminson Township, Burlington County

	U.S. Census, 1990	Current Residents in Burlington County Health Dept. Survey
Gender		
Male	419 (45%)	308 (44%)
Female	514 (55%)	394 (56%)
Race		
Black	527 (56%)	374 (53%)
White	406 (43%)	276 (39%)
Other	6 (1%)	33 (5%)
Unknown	0	19 (3%)
Age Group		
0-19	245 (26%)	187 (27%)
20-44	345 (37%)	220 (31%)
45-64	204 (22%)	171 (24%)
65+	139 (15%)	124 (18%)
Total individuals	939	702

Table B.
Summary of Data from Household Survey
East Riverton section of Cinnaminson Township, Burlington County

Survey data	Number	Remarks
Number of household surveys received by DHSS	276	represents about three quarters of all households
Number of individuals listed	1,039	includes duplicates for multiple addresses, multiple primaries, and prior occupants
Number of individuals who are current residents	702	
Number of individuals over 18 years old	863	as of 12/98 where dates of birth known
Number of cancer cases among all individuals listed	109	number of individuals is less than 109 due to multiple primaries. See below for distribution of cancer sites.
Number of cancer cases reportable to the NJSCR	108	Non-melanoma skin cancer and cervical cancer in-situ are not reportable
Over 18 and including smoking data	39	
Over 18 and including occupational data	23	"retired" is not usable as occupational data
Number of above cases confirmed in NJSCR	73	
Range of length of residence in East Riverton	1-77 years	10 with unknown years of residence
Range of year of diagnosis	1947-1999	5 with unknown year of diagnosis.

Distribution of cancer sites from Survey: Bladder=1, Brain=4, Breast=14, Cervix=2, Colon=9, Endometrium=1, Esophagus=2, Kidney=1, Liver=1, Lung=10, Lymphomas=4, Skin and Melanoma=2, Multiple Myeloma=1, Ovarian=3, Pancreas=2, Prostate=16, Stomach=3, Thyroid=1, Uterine=3, Unknown Cancer Site=29.

Table C.
Standardized Incidence Ratios (SIRs) for Total Cancer*

All data from New Jersey State Cancer Registry for East Riverton, 1979-1997

	Observed Cases	Expected Cases	SIR (Ratio of Observed- to-Expected)	95% Confidence Interval
All groups combined**	**103**	**99.2**	**1.04**	**0.85-1.26**
Black Males	39	37.0	1.05	0.75-1.44
Black Females	26	31.4	0.83	0.54-1.21
White Males	24	16.0	1.50	0.96-2.24
White Females	14	16.0	0.88	0.48-1.47

*Expected rates derived from 1979-1996 statewide rates for total invasive cancers.
**As can be seen from Table A, the total population according to the 1990 U.S. Census also includes some individuals of other races, and these are included in calculating the Expected number of cases.

Table D.

Proportional Incidence Ratios based on All Cancers Reported in Survey
East Riverton section of Cinnaminson Township, Burlington County

Cancers reported through Burlington County Department of Health Neighborhood Survey
Years of Diagnosis: 1947-1999. Total number of reportable cancers: 108

Type of Cancer	Number reported on survey	Expected number (based upon NJ distribution 1979-1996, age-adjusted)	PIR (Ratio of Observed to Expected)	95% Confidence Interval
1. Oral and Pharyngeal	0	2.9	0	0-1.3*
2. Esophagus	<5	--	1.7	0.4-6.3
3. Stomach	<5	--	1.3	0.5-3.7
4. Colorectal	9	14.4	0.6	0.5-1.5
5. Liver	<5	--	1.3	0.2-8.1
6. Pancreas	<5	--	0.8	0.2-3.1
7. Larynx	0	1.4	0	0-2.6*
8. Lung	10	15.6	0.6	0.4-1.1
9. Skin Melanoma	<5	--	0.3	0.1-1.9
10. Breast**	14	18.2	0.8	0.5-1.2
11. Cervix**	<5	--	0.5	0.2-1.3
12. Uterus, Corpus	<5	--	0.6	0.3-1.5
13. Ovary	<5	--	0.6	0.2-1.8
14. Prostate	16	20.4	0.8	0.5-1.2
15. Bladder	<5	--	0.2	0.04-1.6
16. Kidney	<5	--	0.4	0.1-2.6
17. Thyroid	<5	--	0.7	0.1-4.5
18. Brain	<5	--	2.4	1.0-6.0
19. Lymphomas	<5	--	2.1	0.8-5.2
20. Multiple Myeloma	<5	--	0.9	0.1-5.9
21. Leukemias	0	2.3	0	0-1.6*

Balance of the 108 cases were of unknown type. For confidentiality, no exact numbers less than 5 are shown. In this table, counts of cancers are not modified via comparison with the New Jersey State Cancer Registry

*Confidence Interval for PIRs of zero calculated by method for SIRs.

**If not specified in survey, breast and cervical cancers were counted as invasive. The expected numbers do not include in-situ cancers of the breast and cervix.

Table E

Proportional Incidence Ratios for 1979-1997 Cancers Reported in the Survey and corrected via NJSCR

East Riverton section of Cinnaminson Township, Burlington County

Cancers Reported through Burlington County Department of Health Neighborhood Survey
Years of Diagnosis: 1979-1997. Total number reported: 81

Type of Cancer	Number reported on survey	Expected number (based upon NJ distribution 1979-1996, age-adjusted)	PIR (Ratio of observed to expected)	95% Confidence Interval
1. Oral and Pharyngeal	0	1.6	0	0-2.3*
2. Esophagus	<5	--	3.3	1.1-9.5
3. Stomach	<5	--	1.7	0.6-4.7
4. Colorectal	9	10.9	0.8	0.5-1.6
5. Liver	<5	--	1.8	0.3-12.2
6. Pancreas	<5	--	0.5	0.1-3.3
7. Larynx	0	1.1	0	0-3.3*
8. Lung	10	12.0	0.8	0.5-1.4
9. Skin Melanoma	<5	--	0.5	0.1-2.6
10. Breast**	8	13.3	0.6	0.3-1.1
11. Cervix**	<5	--	0.4	0.1-2.1
12. Uterus, Corpus	0	4.9	0	0-0.8*
13. Ovary	<5	--	1.1	0.4-2.7
14. Prostate	16	16.0	1.0	0.7-1.6
15. Bladder	<5	--	0.9	0.3-2.6
16. Kidney	<5	--	1.1	0.3-3.7
17. Thyroid	<5	--	1.0	0.2-6.3
18. Brain	<5	--	1.8	0.5-6.3
19. Lymphomas	<5	--	1.0	0.3-3.5
20. Multiple Myeloma	0	0.8	0	0-4.9*
21. Leukemias	0	1.7	0	0-2.2*

Balance of the 81 cases were of unknown type. Cases which were not confirmed through the NJSCR were counted as the type reported. Cases which were confirmed through the NJSCR are listed according to the type of cancer indicated on the Registry, if different from the survey report. For confidentiality, no exact numbers of cases less than 5 are shown.

* Confidence Intervals for PIRs of zero were calculated using SIR method.

**Breast and cervical cancers confirmed to be in-situ cases are not counted in order to be consistent with the standard set of comparison data.

Table F.

Proportional Incidence Ratios for all cancers reported to the NJSCR

East Riverton section of Cinnaminson Township, Burlington County

(Includes cancers not reported on the neighborhood survey)

Years of Diagnosis: 1979-1997. Total number of cases: 103

Type of Cancer	Number reported on survey	Expected number (based upon NJ distribution 1979-1996, age-adjusted)	PIR (Ratio of observed to expected)	95% Confidence Interval
1. Oral and Pharyngeal	0	1.6	0	0-2.3*
2. Esophagus	<5	1.2	2.5	0.8-7.3
3. Stomach	<5	--	1.2	0.4-3.4
4. Colorectal	15	15.9	0.9	0.9-1.0
5. Liver	<5	--	2.7	0.7-10.4
6. Pancreas	<5	--	0.7	0.2-2.7
7. Larynx	0	1.4	0	0-2.6*
8. Lung	**9**	**16.4**	**0.5**	**0.3-1.0**
9. Skin Melanoma	<5	--	0.9	0.3-3.0
10. Breast**	11	14.9	0.7	0.4-1.2
11. Cervix**	0	2.2	0	0-1.67*
12. Uterus, Corpus	<5	--	0.2	0.02-1.0
13. Ovary	<5	--	0.9	0.4-2.2
14. Prostate	23	24.5	0.9	0.7-1.3
15. Bladder	10	4.6	2.2	1.2-3.7
16. Kidney	<5	--	0.8	0.2-3.2
17. Thyroid	<5	--	1.3	0.2-8.2
18. Brain	<5	--	2.1	0.9-5.1
19. Lymphomas	<5	--	1.0	0.3-3.5
20. Multiple Myeloma	<5	--	0.8	0.1-5.6
21. Leukemias	0	2.6	0	0-1.4*

Balance of the 103 cases are of unknown or other type. For confidentiality, no exact numbers of cases less than 5 are shown.

*Confidence Intervals of PIRs of zero calculated by SIR method.

**In situ cancers of the breast and cervix are not included in order to be consistent with the standard set of comparison data.

APPENDIX I

BURLINGTON COUNTY HEALTH DEPARTMENT

DECEMBER, 1998

COMMUNITY HEALTH EVALUATION SURVEY

I have agreed to take part in this study and understand that my participation is voluntary, my response will be kept completely confidential, and the information in this study will be summarized to evaluate the health in this neighborhood.

(Please Print)

NAME:_____ PHONE NUMBER:_____

ADDRESS:_____ BLOCK #:_____ LOT #:_____

PERSON COMPLETING THIS FORM:_____ DATE MOVED IN:_____

INSTRUCTIONS:
Please indicate the name, date of birth, sex, race, and other information requested for each current member of your house. If any former member of your household has moved away or died, please provide information regarding their status, separately, below. In the Race column, please indicate "W" White, "B" Black, "A" Asian, "O" other for members of your household. In the smoking column, indicate with "S" smoker, "N" never smoked or "P" past smoker for members of household.

CURRENT OCCUPANTS: NAME	DATE OF BIRTH	SEX	RACE	USUAL OCCUPATION	SMOKING STATUS	CANCER YES OR NO	TYPE OF CANCER	DATE OF DIAGNOSIS

(If additional persons, please provide same information for each named person, on back of this form).

FORMER OCCUPANTS OF YOUR HOUSEHOLD: NAME	DATE OF BIRTH	SEX	RACE	YEARS LIVED THERE	LIVING YES OR NO	IF DECEASED, CAUSE OF DEATH/YEAR

(If additional persons, please provide same information for each named person, on back of this form).

APPENDIX 2

State of New Jersey

DEPARTMENT OF HEALTH
JOHN FITCH PLAZA
CN 360, TRENTON, N.J. 08625

J. RICHARD GOLDSTEIN, M.D.
COMMISSIONER

April 10, 1986

Mr. Walter Trommelen, M.C.
Public Health Coordinator
Burlington Co. Health Dept.
Woodlane Road
Mt. Holly, N.J. 08060

Dear Mr. Trommelen:

As we discussed today, the New Jersey Department of Health will not be able to be represented at the public meeting scheduled for April 14 in Cinnaminson due to prior commitments by several staff members. I have completed additional analysis of the survey data which you have provided and I have also included additional explanation of our analysis techniques.

In performing our analysis, we considered the only hypothesis which was offered by the residents. We were asked to help investigate whether there is an excess of cancer incidence in the East Riverton section of Cinnaminson. The data which we were given do not support the hypothesis that there is an increase in cancer incidence in the East Riverton section of Cinnaminson.

The additional analyses which were performed include the comparison of the observed and expected number of the most common cancer types: lung, colon, breast, and prostate. Rates for leukemia and lymphoma were also examined because of reports that these diseases have been induced by chemical contamination in other parts of the country. The results of these additional analyses indicate that there was no statistically significant difference from the expected number of cancer cases over the nineteen year average residence period. Of the 12 analyses which were performed, only the number of male lung cancer cases is significantly greater than the expected number.

The observed number of cancers was compared to the expected number. The latter is the number one would expect to occur under the presumption that incidence rates in the State of New Jersey in 1982 would prevail in the population surveyed. The year 1982 was chosen from the four years of available incidence data for New Jersey, 1979 - 1982, since it has the most representative cancer rates. The one individual who reported skin cancer was excluded from the analysis because there are no data available to allow us to calculate the number of basal cell carcinomas of the skin which one would expect in this population. These skin cancers are not collected by the State Registry.

TABLE 2

Comparison of Observed and Expected
Cancers 1979 - 1985
East Riverton Section of Cinnaminson

Sex - Type	Observed	Expected	SIR 1	95% CI 2 for SIR
Male - All Sites	25	27	0.9	0.6 - 1.4
Female - All Sites	11	22	0.5	0.2 - 0.9
Male - Colon	5	2	2.2	0.7 - 5.1
Male - Lung	5	1	3.5	1.1 - 8.1
Female - Breast	3	6	0.5	0.1 - 1.5
Male - Prostate	4	5	0.9	0.2 - 2.2
Female - Colon	1	3	0.4	0.0 - 2.2
Female - Lung	0	2	0.0	-
Male - Lymphoma	2	0.8	2.6	0.3 - 9.3
Female - Lymphoma	1	0.7	1.4	0.0 - 7.8
Male - Leukemia	0	0.5	0.0	-
Female - Leukemia	0	0.3	0.0	-

1 SIR - Standardized Incidence Ratio of Observed to Expected number of Cancers (Age Standardized).

2 Approximately 5 percent of the SIR fall outside these limits. If 1.00 is included within this Confidence Interval, there is not a significant departure of observed cancer incidence from State incidence rates.

The time of observation was conservatively set at 19 years which represents the average duration of residance. A conservative approach is chosen to maximize chances of finding significant differences. Table 2 shows our findings after the additional analyses were included.

When multiple statistical tests are conducted, the probability of finding a departure from the expected number of cases due to chance increases dramatically with the number of tests conducted. In the absence of a preexisting hypothesis about a specific type of cancer, one observation among many (as for male lung cancer) of a difference between expected and observed rates, can not be considered to suggest a causal association. In other words, the more tests which are performed with the same confidence limits, the greater the chance of finding a significant departure from the expected.

Lung cancer is primarily caused by smoking and occupational exposures. These individual risk factors are the most likely cause for the elevated number of male lung cancers in this community. If you have any further questions, please telephone me at (609)984-1863.

Sincerely,

Joseph E. Rizzo
Program Specialist
Environmental Health
Protection Program

Appendix 3

Review of NJSCR Cases of Bladder Cancer for East Riverton

The NJDHSS staff conducted a thorough review of the ten bladder cancer cases found in the NJSCR and living in East Riverton at time of diagnosis. Cancer of the urinary bladder is the fifth most common type of cancer in the U.S.

Characteristics of the cases:

Residential history: unknown for the majority (not in survey)

Time of occurrence: 1980 through 1993 (no pattern)

Residence at diagnosis: scattered throughout East Riverton

Age at occurrence: sixties through eighties (median: 74): not unusual for bladder cancer

Vital status: most now deceased.

Relation to survey data: most detected only through the Registry, not the survey.

Smoking Data: None for nine of the cases (not collected by NJSCR).

Occupational data: Data available on six cases from the Registry or survey did not suggest a consistent occupation or industry.

Considerations regarding the degree of excess cancer:

An observed-to-expected ratio in excess of 1.0, with a 95% confidence interval which does not include 1.0, occurs for at least one type of cancer in the vast majority of towns or neighborhoods by chance alone due to random variation in disease over time and place.

Under the most ideal conditions, researchers considering an interview study would require over seventy (70) participating case families in order to detect a factor which produced a doubling of risk.

Chemicals and other risk factors reported in the literature as contributing to bladder cancer*:

Smoking tobacco and other forms of tobacco use

Industrial exposure to dyestuffs including: aromatic amines such as benzidine, 2-naphthylamine

Industrial exposures in rubber and leather industries

Certain medications for cancer or pain

Parasitic and other infections

Urban residence

Genetic susceptibility

***References:**

National Cancer Institute: Cancer Rates and Risks

American Cancer Society: Facts and Figures 1999

Schottenfeld and Fraumeni: Cancer Epidemiology and Prevention

Conclusion:

Given the lack of consistent pattern for these cases and the likelihood for at least one observed-to-expected ratio to be statistically significant due to chance alone, NJDHSS does not believe that any further analyses of these cases are needed. NJDHSS has no documentation of contamination in East Riverton of any known bladder carcinogen, based on the Health Assessment conducted in 1991 by the Consumer and Environmental Health Services of this Department. However, if any past exposures to bladder carcinogens among residents of East Riverton are discovered in the future, it might be useful to examine these bladder cancer occurrences with respect to such exposures.