



State of New Jersey

DEPARTMENT OF HEALTH

JOHN FITCH PLAZA
CN 360, TRENTON, N.J. 08625

August 18, 1986

MEMORANDUM

TO: Dr. Merry L. Morris, Acting Assistant Director
Hazardous Site Mitigation Science

THROUGH: Dr. Terry Shehata, Chief ^{TS}
Environmental Disease Prevention Service

FROM: Michael K. Berry, Research Scientist MKB
Environmental Disease Prevention Service

SUBJECT: Cancer risk evaluation in the vicinity of the Florence Land
Recontouring Landfill

This is an analysis completed by Environmental Disease Prevention Service staff of reports of cancer among residents of Florence, Mansfield, and Springfield Townships, Burlington County. Our purpose was to evaluate whether the number of reported cases constitute an unusual occurrence.

A total of 218 cases of cancer from the three townships combined have been reported to the New Jersey Cancer Registry from 1979 through 1983. The breakdown of total cancer per township is: Florence Township, 155; Mansfield Township, 40; and Springfield Township, 23. Florence Township was further subdivided into Census Tracts with the landfill Census Tract, 7013.03, evaluated separately. A total of 21 cancers were reported from the Census Tract containing the landfill. A description of these cancers is presented in Tables 1 A through E.

Analysis of the cancer incidence within the specific study areas was completed using Standardized Incidence Ratios (SIR). The SIR is calculated by dividing the observed number of cases by the expected number. The expected number of cases are determined on the presumption that incidence rates for the whole 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 through 1982, since it is the most complete and has the most representative cancer rates.) Evaluation of the SIR is by how much it deviates from unity. When the SIR is less than one, we conclude that we have observed fewer cases than we expected. Should the SIR be greater than one, then we have observed more cases than we expected. The 95% confidence interval is used to evaluate the probability that the SIR may be greater than 1.0 due to chance alone. If the confidence interval includes 1.0 then the SIR is not considered to be significantly different from 1.0, using conventional definitions of "statistical significance".

Tables 2 A through E show our findings for each of the study area breakdowns evaluated. The observed number of total cases was not found to be significantly different from the expected number of cases for any of the population aggregates.

However, it should be pointed out that since the landfill's operation began as recently as 1973 and the DOH cancer investigation covers the years 1979 through 1983, the likelihood of finding an increase in cancer potentially attributable to the landfill would be small given the long latency involved with most cancers. Because of this, leukemia was evaluated separately since it is known to have an environmental etiological component and it is a fairly rapid onset cancer. A total of nine cases of leukemia were diagnosed within the three township area over the five year period, seven in Florence Township, one in Mansfield Township and one in Springfield Township.

Table 3 presents the leukemia SIR findings for the three townships combined. Although the SIRs for both sexes are over 1.0, neither of the ratios are statistically significant since the confidence interval for each includes 1.0. No childhood leukemia cases were reported in this population for the period of investigation. The average age of diagnosis was 78 years of age with an age range of 58 to 85 years. Leukemia was not evaluated on a smaller geographical area since none of the cases occurred within a three mile radius of the landfill.

It must be noted that this investigation is not definitive, it does not provide a final answer to the questions raised concerning adverse health endpoints in the community that may be potentially attributable to this landfill. Other potential adverse health outcomes, such as birth defects or reproductive health, have not been investigated. Additionally, cancer incidence was evaluated starting from a period only six years after the landfill began operation, thus not permitting an adequate time interval for the expression of cancers with much longer latencies.

Again, we have been asked to look at just one potential health outcome, cancer, while no explicit exposure pathway appears likely to be affecting the population. A proper environmental health evaluation can only be conducted when exposure pathways, determined by environmental exposure assessments, can be defined, differentiating exposure levels within the community.

If I can be of further assistance, please write, or call me at (609) 984-1863.

cc: Beth Muhler, DEP
Ann Decicco, DEP
Jeff Folmer, DEP
Mary Pat Robbie, Burlington County
Walter Trommelen, Burlington County HD

TABLE 1 -A

Florence, Mansfield and Springfield Townships
Burlington County

Description of Reported Cancer Cases

Site	Male	Female	Total
Buccal Cavity	2	1	3
Esophagus	4	-	4
Stomach	4	1	5
Colon	23	13	36
Rectal/anus	8	7	15
Small intestine	-	1	1
Pancreas	2	3	5
Larynx	1	-	1
Lung/trachea/bronchus	28	11	39
Leukemia	4	5	9
Soft tissue	2	1	3
Skin *	14	8	22
Breast	-	22	22
Cervix uteri	-	9	9
Corpus uteri	-	9	9
Ovary	-	5	5
Other Female Genital	-	1	1
Prostate	20	-	20
Bladder	10	1	11
Kidney	1	3	4
Brain	1	3	4
Lymph Nodes	2	2	4
Gallbladder	1	3	4
Unknown primary	1	3	4
	<u>114</u>	<u>104</u>	<u>218</u>

* Skin cancer is not included in totals

TABLE 2 - A

Comparison of the Observed and Expected
All Cancers 1979-1983

Florence, Mansfield and Springfield Townships
Burlington County

Sex - Type	Observed	Expected	SIR ¹	95% CI ² for SIR
Male - All Sites	114	155.6	0.7	0.6 - 0.9
Female - All Sites	104	157.4	0.7	0.5 - 0.8

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

² 95% Confidence Interval. There is only 5% likelihood that the SIR is actually outside of this interval. If the confidence interval includes 1.0, then the SIR is not considered to be different from 1.0 using conventional definitions of "statistical significance".

TABLE 1 -B

Florence Township
Burlington County

Description of Reported Cancer Cases

Site	Male	Female	Total
Buccal cavity	2	1	3
Esophagus	3	-	3
Stomach	3	1	4
Colon	16	11	27
Rectal/anus	7	6	13
Lung/trachea/bronchus	21	7	28
Leukemia	3	4	7
Soft tissue	2	-	2
Skin *	7	6	13
Breast	-	14	14
Cervix uteri	-	5	5
Corpus uteri	-	6	6
Ovary	-	2	2
Pancreas	2	3	5
Gallbladder	1	3	4
Prostate	15	-	15
Bladder	8	-	8
Kidney	-	3	3
Brain	-	2	2
Lymph nodes	1	1	2
Unknown primary	-	2	2
	<hr/> 84	<hr/> 71	<hr/> 155

* Skin cancer is not included in totals

TABLE 2 - B

Comparison of the Observed and Expected
All Cancers 1979-1983

Florence Township
Burlington County

Sex - Type	Observed	Expected	SIR ¹	95% CI ² for SIR
Male - All Sites	84	101.1	0.8	0.7 - 1.0
Female - All Sites	71	106.4	0.7	0.5 - 0.8

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

² 95% Confidence Interval. There is only 5% likelihood that the SIR is actually outside of this interval. If the confidence interval includes 1.0, then the SIR is not considered to be different from 1.0 using conventional definitions of "statistical significance".

TABLE 1-C

Mansfield Township
Burlington County

Description of Reported Cancer Cases

Site	Male	Female	Total
Esophagus	1	-	1
Stomach	1	-	1
Colon	3	2	5
Rectal/anus	-	1	1
Small intestine	-	1	1
Larynx	1	-	1
Lung/trachea/bronchus	5	3	8
Leukemia	1	-	1
Soft tissue	-	1	1
Skin *	5	2	7
Breast	-	4	4
Cervix uteri	-	3	3
Corpus uteri	-	3	3
Ovary	-	3	3
Prostate	3	-	3
Bladder	1	1	2
Brain	-	1	1
Unknown primary	-	1	1
	<u>16</u>	<u>24</u>	<u>40</u>

* Skin cancer is not included in totals

TABLE 2 - C

Comparison of the Observed and Expected
All Cancers 1979-1983

Mansfield Township
Burlington County

Sex - Type	Observed	Expected	SIR ¹	95% CI ² for SIR
Male - All Sites	16	28.9	0.6	0.3 - 0.9
Female - All Sites	24	26.8	0.9	0.6 - 1.3

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

² 95% Confidence Interval. There is only 5% likelihood that the SIR is actually outside of this interval. If the confidence interval includes 1.0, then the SIR is not considered to be different from 1.0 using conventional definitions of "statistical significance".

TABLE 1 - D

Springfield Township
Burlington County

Description of Reported Cancer Cases

Site	Male	Female	Total
Colon	4	-	4
Rectal/anus	1	-	1
Lung/trachea/bronchus	2	1	3
Leukemia	-	1	1
Skin *	2	-	2
Breast	-	4	4
Cervix uteri	-	1	1
Other female genital	-	1	1
Prostate	2	-	2
Bladder	1	-	1
Kidney	1	-	1
Brain	1	-	1
Lymph nodes	1	1	2
Unknown primary	1	-	1
	<u>14</u>	<u>9</u>	<u>23</u>

* Skin cancer is not included in totals

- TABLE 2 - D

Comparison of the Observed and Expected
All Cancers 1979-1983

Springfield Township
Burlington County

Sex - Type	Observed	Expected	SIR ¹	95% CI ² for SIR
Male - All Sites	14	25.7	0.5	0.3 - 0.9
Female - All Sites	9	24.3	0.4	0.2 - 0.7

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

² 95% Confidence Interval. There is only 5% likelihood that the SIR is actually outside of this interval. If the confidence interval includes 1.0, then the SIR is not considered to be different from 1.0 using conventional definitions of "statistical significance".

TABLE 1 -E

Florence Township, Census Tract 7013.03
 (Census Tract immediately surrounding landfill)
 Burlington County

Description of Reported Cancer Cases

Site	Male	Female	Total
Buccal cavity	1	-	1
Esophagus	1	-	1
Stomach	2	-	2
Colon	2	2	4
Lung/trachea/bronchus	1	2	3
Soft tissue	1	-	1
Skin *	1	-	1
Breast	-	3	3
Cervix uteri	-	1	1
Ovary	-	1	1
Prostate	1	-	1
Kidney	-	1	1
Brain	-	1	1
Gallbladder	-	1	1
	<u>9</u>	<u>12</u>	<u>21</u>

* Skin cancer is not included in totals

TABLE 2- E

Comparison of the Observed and Expected
All Cancers 1979-1983

Florence Township, Census Tract 7013.03
(Census Tract immediately surrounding landfill)
Burlington County

Sex - Type	Observed	Expected	SIR ¹	95% CI ² for SIR
Male - All Sites	9	24.4	0.4	0.2 - 0.7
Female - All Sites	12	24.0	0.5	0.3 - 0.9

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

² 95% Confidence Interval. There is only 5% likelihood that the SIR is actually outside of this interval. If the confidence interval includes 1.0, then the SIR is not considered to be different from 1.0 using conventional definitions of "statistical significance".

TABLE 3

Comparison of the Observed and Expected
Leukemia 1979-1983

Florence, Mansfield and Springfield Townships
Burlington County

Sex - Type	Observed	Expected	SIR ¹	95% CI ² for SIR
Male - Leukemia	4	3.1	1.3	0.7 - 5.2
Female - Leukemia	5	2.2	2.2	0.3 - 3.3

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

² 95% Confidence Interval. There is only 5% likelihood that the SIR is actually outside of this interval. If the confidence interval includes 1.0, then the SIR is not considered to be different from 1.0 using conventional definitions of "statistical significance".