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Ms Holly Kennedy  
c/o J W August  
10 News  
P O Box 85347  
San Diego, California 92186

Dear Ms. Kennedy:

This letter is written in response to your recent concerns about risk for cancers related to benzene in the area of Poway, California. We have looked at the latest available incidence data for leukemia and lymphoma, from the California Cancer Registry. I am pleased to say that, as of this writing we see no evidence that the risk for leukemia or lymphoma in this area is any different than in San Diego County as a whole.

On 12 July 2006 we received e-mail from you requesting assessments on leukemia and other cancers related to benzene, as well as, "lupus, thyroid, and lymph-node problems," in an area of Poway. Three maps were attached to the e-mail, all annotated with a point near Dehia street. You requested assessments within a five-mile radius of the point you marked on the maps you sent to us. In our opinion, leukemia and lymphoma may be related to exposure to benzene, so our assessments are for those conditions, including subtypes. We are not aware of demonstrated links between benzene and cancer types other than leukemia and lymphoma. We have no information on lupus or other health conditions, apart from cancers.

Our methods for these assessments are mandated by the California Department of Health Services, and are consistent with well known and accepted methods of descriptive epidemiology (e.g., Esteve et al, 1994). The main statistical measure is the Standardized Incidence Ratio, which compares, statistically, the number of cases actually seen in an area of interest during a certain time to the average number of cases expected for that area in that time period. That average number depends on the age and sex of the population in the area and the occurrence of cancers in the surrounding County as a whole.

As you may know, the risk for different cancers changes with age, and is often different between men and women. So it is important to allow for the ages and gender of the people in an area when considering cancer types in that area. The Standardized Incidence Ratio is statistically significant only if the observed numbers of cases exceeds the average number expected by more than natural variability.

Cancer incidence data are from the *San Diego / Imperial Organization for Cancer Control*, which is a part of the California Cancer Registry, and is housed in the Epidemiology Division, University of California, Irvine. Incidence data reflect the database as of January 2006, with current census-tract information. To reduce 'noise' in the data, the California Department of Health Services suggests that assessments be done for five-year periods of time. We considered the five-year period 1999-2003. At this writing data for calendar year 2003 is the most recent considered complete by the California Department of Health Services. We included all race/ethnic groups in these assessments. (Countywide statistics through 2003 may be seen on the web, at <http://www.epi.uci.edu/media/docs/cspoc/AnnualReport/SD/sandiego.htm>). Population figures are from the US Census of 2000.

As you know, the cancer data base contains, to the extent possible, the census tract of the patient's residence at diagnosis. We defined the area of interest (catchment area) by census tract. We approximated the point you marked on the maps you sent as 14500 Dehia street. Using ARC-GIS software, we identified 27 census tracts lying wholly or in part within a five mile-radius of 14500 Dehia Street. (At this time we have no way to consider only part of a census tract.) The 27 tracts are: 009504, 016901, 017006, 017007, 017009, 017010, 017014, 017015, 017018, 017019, 017020, 017021, 017026, 017034, 017038, 017039, 017040, 017041, 017042, 017044, 017045, 017046, 017047, 017048, 017049, 017050, and 020801. The enclosed map shows the catchment area. The recent US Census for 2000 gives us an estimate of how many people live in this collection of census tracts, by age and gender.

The assessment results for males and females are presented in Tables 1 and 2, respectively. Each row in the table corresponds to a cancer type or sub type. Results are given for Leukemia (all types pooled together and AML alone), Lymphoma (all types, Hodgkin's Lymphoma, and non-Hodgkin's Lymphoma), and the pool of Leukemia and Lymphoma. The second column of the tables shows the number of incident cases on record in the catchment for 1999-2003 (as of 1/06). The third column shows the average number of incident cases expected for a group with the age and sex makeup of the catchment population for the period 1999-2003. The fourth column of the table shows the

Standardized Incidence Ratio, which is simply the cases seen (col 2) divided by the average number expected (col 3). Column five shows whether or not the Standardized Incidence Ratio is statistically significant, that is, if the number of cases actually seen is statistically incompatible with the average number of cases expected. Columns 6 and 7 give the lower and upper limits of the number of cases we would expect to see in the catchment, if the risks in the catchment are the same as those in the County as a whole.

As the tables show, for no condition in either sex is the observed number of cases in 1999-2003 statistically incompatible with the average number of cases expected to be seen in that time period. Thus, these data give no reason to suspect that the risk for any of these cancer types in the catchment area between 1999 and 2003 was different than the risks in the County as a whole. In every instance, the number of cases seen falls comfortably within the range of plausible numbers of cases.

These assessments are done pooling all race/ethnic groups. According to the Census information, about 75 percent of residents of the catchment area are non-Hispanic White. Insofar as non-Hispanic Whites are at greater risk for Leukemia and Lymphoma than at least some other racial/ethnic groups, we have underestimated the average numbers of cases expected to be seen. The consequences of underestimating those numbers is to bias the assessments toward statistical significance. Despite this bias, none of the assessments are statistically significant.

Cancer registries are dynamic entities, where new or corrected information can change the count or character of cases at any time. However, in our experience, such changes are small, and are extremely unlikely to affect the results of assessments of the period 1999-2003. While the present data do not support the idea of increased risks for Leukemia or Lymphoma for residents of these 27 census tracts, we would be happy to update the assessments when more recent data are available.

While re-assuring from a public-health perspective, these assessments cannot shed light upon the causes of cancers in individual patients. We always recommend that anyone concerned with cancer risk consult their personal physician. The physician is well situated to help assess an individual's risk for cancers, and to help devise ways to reduce those risks. Additionally, the California Department of Health Services has a web site on cancer prevention, at <http://www.dhs.ca.gov/ps/cdic/cpns/>.

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I hope you find this information useful. Please provide us a copy of any materials you produce for general distribution using this information, as we are required to document uses of registry data. Any such material should include the disclaimer on the tables. If you have questions or comments about these materials, then please feel free to contact our Medical Epidemiologist, Dr Jason Zell (e-mail [jzell@uci.edu](mailto:jzell@uci.edu), telephone: 949-824-0188) or our Senior Statistician, Dr Taylor (e-mail: [thtaylor@uci.edu](mailto:thtaylor@uci.edu), telephone: 949-824-6903)

Sincerely,



Hoda Anton-Culver, PhD  
Chief

References

Esteve J, Benhamou E, Raymond L. *Statistical methods in cancer research, volume iv: descriptive epidemiology*. New York: Oxford University Press; 1994. (IARC No 128)

cc: Nancy Bowen MD MPH, County Health Officer  
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William E Wright, PhD: Chief, Cancer Surveillance Section,  
California Department of Health Services

Epidemiology Division, University of California, Irvine  
 SAN DIEGO / IMPERIAL ORGANIZATION FOR CANCER CONTROL

Table 1

Number of Cases Observed<sup>1</sup>, Average Number of Cases Expected<sup>2</sup>,  
 Standardized Incidence Ratio<sup>3</sup>, and Range of Plausible Number of Cases<sup>4</sup> of  
 Lymphoma and Leukemia in the Vicinity of Poway<sup>5</sup>, 1999-2003, Males

Cancer Type <sup>1</sup>	Cases Seen <sup>1</sup>	Cases Expected on Average <sup>2</sup>	SIR <sup>3</sup>	Statistically Significant <sup>6</sup>	Number of Plausible Cases <sup>4</sup>	
					lower limit	upper limit
Leukemia						
All Types	54	54.16	1.00	no	37	77
AML	16	17.90	0.89	no	8	32
Lymphoma						
All Types	76	82.33	0.92	no	60	109
Hodgkin's	6	9.48	0.63	no	3	21
non-Hodgkin's	70	72.85	0.96	no	52	98
Leukemia and Lymphoma	130	136.5	0.95	no	108	170

1 Cancer incidence data are as of 1/06, with updated geographic information.

Cancer types are per the National Cancer Institute SEER-Site Recode ICD-O-3 (1/27/2003).

2 Average number of cases expected in a five-year period, given US Census (2000) population estimates and sex- and cancer type-specific incidence rates in San Diego, 1999-2003, all race/ethnicities

3 Standardized Incidence Ratio estimates relative risk

4 bounds of the 99% confidence limits about the average cases expected [exact, Poisson methods].

5 Geographic area is defined as census tracts within a five-mile radius of 14500 Dehia Street, namely:

009504 016901 017006 017007 017009 017010 017014 017015 017018 017019 017020 017021  
 017026 017034 017038 017039 017040 017041 017042 017044 017045 017046 017047 017048  
 017049 017050 020801

6 Indicates if the lower bound of the 99% confidence interval about the SIR is larger than unity [exact, Poisson methods]

*The collection of cancer incidence data used in this study was supported by the California Department of Health Services as part of the statewide cancer reporting program mandated by California Health and Safety Code Section 103885; the National Cancer Institute's Surveillance, Epidemiology and End Results Program under contract N02-PC-15105 awarded to the Public Health Institute; and the Centers for Disease Control and Prevention's National Program of Cancer Registries, under agreement #U55/CCR921930-02 awarded to the Public Health Institute. The ideas and opinions expressed herein are those of the author(s) and endorsement by the State of California, Department of Health Services, the National Cancer Institute, and the Centers for Disease Control and Prevention or their contractors and subcontractors is not intended nor should be inferred.*

Epidemiology Division, University of California, Irvine  
 SAN DIEGO / IMPERIAL ORGANIZATION FOR CANCER CONTROL

Table 2

Number of Cases Observed<sup>1</sup>, Average Number of Cases Expected<sup>2</sup>,  
 Standardized Incidence Ratio<sup>3</sup>, and Range of Plausible Number of Cases<sup>4</sup> of  
 Lymphoma and Leukemia in the Vicinity of Poway<sup>5</sup>, 1999-2003, Females

Cancer Type <sup>1</sup>	Cases Seen <sup>1</sup>	Cases Expected on Average <sup>2</sup>	SIR <sup>3</sup>	Statistically Significant <sup>6</sup>	Number of Plausible Cases <sup>4</sup>	
					lower limit	upper limit
Leukemia						
All Types	34	35.98	0.95	no	22	55
AML	11	12.26	0.90	no	5	25
Lymphoma						
All Types	56	63.51	0.88	no	44	88
Hodgkin's	6	7.54	0.80	no	2	18
non-Hodgkin's	50	55.97	0.89	no	38	79
Leukemia and Lymphoma	90	99.48	0.90	no	75	129

1 Cancer incidence data are as of 1/06, with updated geographic information.

Cancer types are per the National Cancer Institute SEER-Site Recode ICD-O-3 (1/27/2003).

2 Average number of cases expected in a five-year period, given US Census (2000) population estimates and sex- and cancer type-specific incidence rates in San Diego, 1999-2003, all race/ethnicities

3 Standardized Incidence Ratio estimates relative risk

4 bounds of the 99% confidence limits about the average cases expected [exact, Poisson methods].

5 Geographic area is defined as census tracts within a five-mile radius of 14500 Dehia Street, namely:

009504 016901 017006 017007 017009 017010 017014 017015 017018 017019 017020 017021  
 017026 017034 017038 017039 017040 017041 017042 017044 017045 017046 017047 017048  
 017049 017050 020801

6 Indicates if the lower bound of the 99% confidence interval about the SIR is larger than unity [exact, Poisson methods]

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