

# Questions and Concerns about the IDPH Cancer Incidence Assessment in Willowbrook, IL, 1995-2015

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The Illinois Department of Public Health (IDPH) published this document on March 29, 2019, that reported on diagnosed cancers in the general area of Sterigenics. The data reported are based on actual cancers of various types as opposed cancer risks based on calculated models as having been presented by EPA, ATSDR, and NATA. On the surface, it might seem that the IDPH report, which concludes that some cancers were elevated in the populations living near the Sterigenics facility, provides a limited basis to assess health issues associated with the EtO emissions from Sterigenics but that is not the case. At best, IDPH provides a lower limit to what the real health effects may be.

The concerns about this report are:

- The transient nature of people.
- The use of ZIP code information as the basis for the population assessment.
- The definition of Study Area.
- The casual comment about other sources.
- The higher levels for breast cancer in DuPage County.
- Aggregating highest cancer incidents beyond expected rates from both Study Areas.

**The Transient Nature of People.** The study has trouble accounting for the transient nature of people. The U.S. Census reports that in 2016, 11.2 percent of the population moved. If that's a stable number, it indicates that during the study period, the population turned over 2.24 times. This means that every year people with undiagnosed cancer moved elsewhere and people that did not live within the same contamination area moved in with an impact on the cancers diagnosed. This second group would have had fewer years of exposure to EtO. IDPH reports that "This choice of time frame also allows for the typical cancer latency period which would be 4 to 10 years for lymphohematopoietic and 10 to 15 years for solid tumors." Thus, there is a group of residents who have been exposed to EtO from Sterigenics whose cancers may have yet to develop.

Then there are the people who moved out of the area after some years of exposure to Sterigenics emissions. Did these people develop cancers after they moved? If so, were they reported?

Unfortunately, the cancer database registries in 37 states do not exchange any information. This means a person may have lived next to Sterigenics for many years, but, if they moved to one of those states, their cancer diagnosis would become lost. Even for the 13 states (plus Mayo Clinic) that do exchange diagnostic information, the information may not be complete. IDPH wrote, "Out-of-state diagnoses among residents of the two study areas accounted for less than one percent (0.5%) of the total number of cases reported." Also, people that moved intrastate might be missed. For example, a person that lived in the Sterigenics zone of contamination and then moved to Glen Ellen or Naperville before diagnosis, may not have been included.

**The use of Zip Code information.** IDPH states that they used zip code information to determine the Study Areas. Zip codes are inadequate tools for defining populations, and they

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require considerable work to reconcile them to census tracts. One possibility for substantial error that is unaddressed by the Study is zip code 60521. This zip code was split in July 2001 when Willowbrook and Burr Ridge were removed from 60521 and assigned to 60527. This means that for years prior to 2001, the population base for diagnosed cancers included people in areas far removed from Sterigenics and its emission cloud **unless zip code played no role** and allocation by census tract was utilized. A statement clarifying this concern is sought.

IDPH commented that “\*State referent includes Lake, McHenry, Kane, DuPage, and Will counties.” That would appear to mean that the “State” used as a comparative base for the study is not the entire State of Illinois but rather the counties. This needs to be clarified.

**The definition of Study Area** could be recast to provide more information about cancer rates at a specific range of distances from the source. The following image depicts how the study areas could be recast into 3 study areas to provide that result. The current definition of study areas prevents that from occurring and this should be a trivial matter to address as no additional census tracts are needed. Further concerns (see map) Red is Study Area 1, yellow are those additional Tracts that add to Study Area 1 that form Study Area 2. It visually shows the Tracts that were omitted from the study and tracts that stretch the boundary limits. For example, Tract 45803 (lower left) the most distant point is about 33k feet away from Sterigenics (6.25 miles) and it can be reasoned the population's exposure to EtO was significantly less than the population just above in Tracts 45807 and 45802 whose population is 9, 865 (in 2010) were excluded yet closer than other included census tracts. That results in a dilution of expected to observed cancers recorded. Perhaps there are reasons for this inclusion/exclusion of tracts, but at the very least I would like some explanation from IDPH on the boundary issues and the impact on the results should be made.

**The casual comment about other sources.** The study wrote as fact “The Willowbrook community is close to interstate highways, and motor vehicle fuel exhaust is a known source of EtO.” Please provide a reference to the source of information that supports this claim. At the very least this comment should be prefaced with the degree of uncertainty that exists concerning other ethylene oxide sources.

The higher levels for breast cancer in DuPage County. The study claims “This change could be plausibly explained by the fact that DuPage County, the county reference group in this study, has consistently displayed higher levels of breast cancer compared to other counties in the state (IDPH-ISCR 2018)”. Making this claim without outlining efforts to identify the reasons and to seek solutions is alarming. Given that claim and the devastating consequences of breast cancer, why would any woman consider moving to DuPage County? What steps is IDPH taking today to identify why DuPage County women suffer at higher breast cancer rates than the rest of the state. **This should be a state priority.**

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## **Scatter Charts**

Included are six scatter charts depicting the data culled from the IDPH report. The first four charts model the IDPH study combining boys and girls for each Study Area and Referent. Beyond the IDPH tables there are two additional charts. How relevant or useful they are is beyond my knowledge and are offered more as a question than a statement of fact. The background is the Study Areas usefulness have some issues as previously presented, I wondered if a broader view might be provided by selecting the highest cancer rate for each type of cancer from the two study areas broken out by referents, These last two charts depict that result.

## **Conclusion**

The above concerns need to be addressed. Taken all together they indicate a possibility of significant underreporting of the cancers associated with Sterigenics' emissions. If it is not possible to quantify the possibly underreported cancers, these issues should be at least noted as qualifiers in the study.

## **Reference**

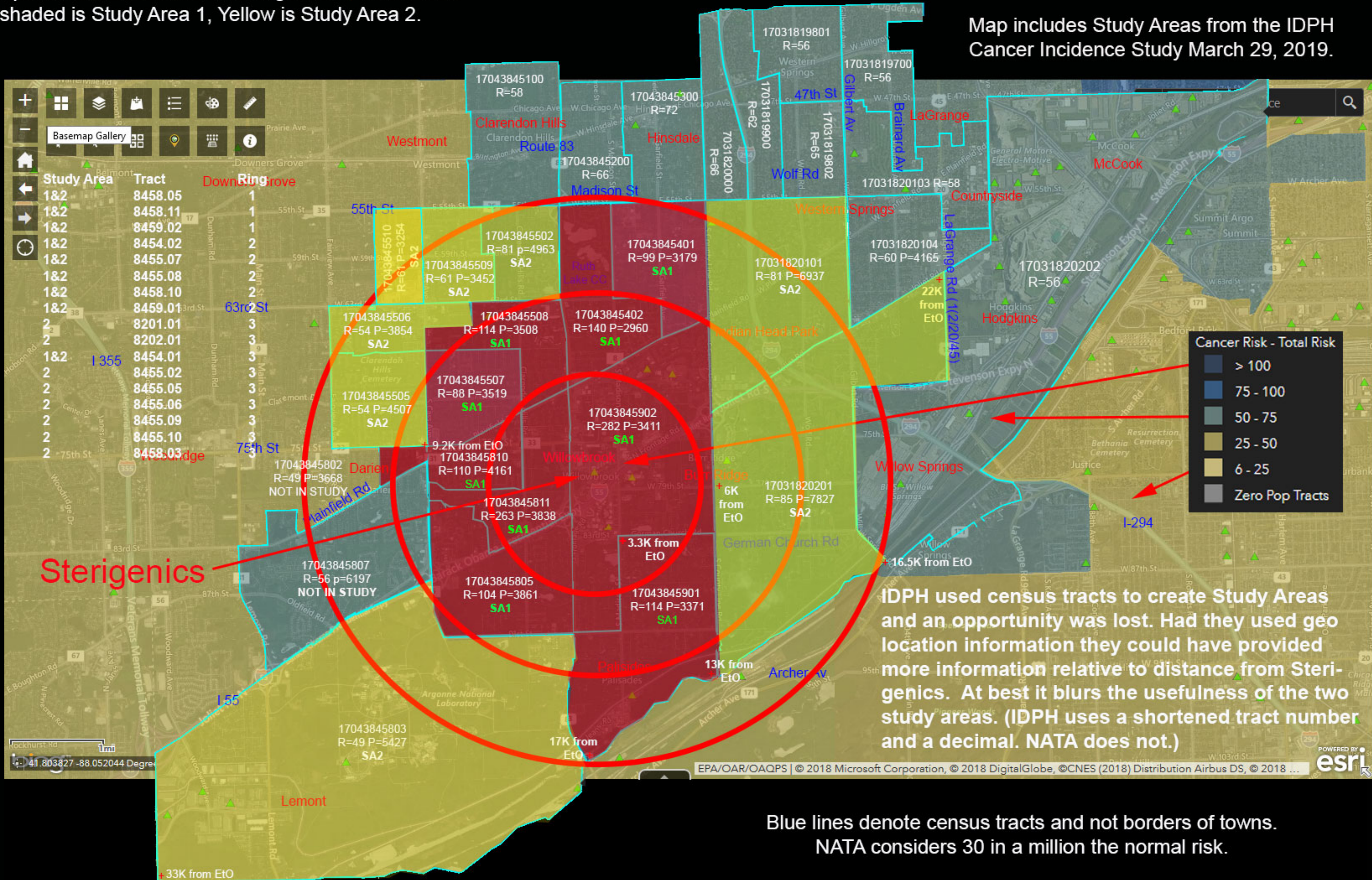
<https://www.census.gov/newsroom/press-releases/2016/cb16-189.html>



Census Tract: 170NNNNNNNN (From NATA Map)  
 Total Cancer Risk: R=NNN (From NATA Map).  
 Example: Census Tract 1703182021 has a total cancer risk of 85 in a million. Population:P=NNNN.  
 Aproximate distance from Sterigenics: + X.XK. Red shaded is Study Area 1, Yellow is Study Area 2.

National Air Toxic Assessment (NATA) calculates cancer risks for different age groups knowing children are as much as 10X more at risk from ethylene oxide than other groups. NATA does not provide specific groups risks rather they blend all groups establishing an overall risk. Data available on NATA is from 2014 and is the latest available as of 4-14-2019.

Map includes Study Areas from the IDPH Cancer Incidence Study March 29, 2019.



IDPH used census tracts to create Study Areas and an opportunity was lost. Had they used geo location information they could have provided more information relative to distance from Sterigenics. At best it blurs the usefulness of the two study areas. (IDPH uses a shortened tract number and a decimal. NATA does not.)

Blue lines denote census tracts and not borders of towns.  
 NATA considers 30 in a million the normal risk.



Cancer Incidence Assessment near Sterigenics in Willowbrook, IL, 1995-2015  
(March 29, 2019)

Disease	County - Study Area 1 - Female	State - Study Area 1 - Female	County - Study Area 2 - Female	State - Study Area 2 - Female	Highest - All Study Areas - Female ①	Highest - State - All Study Areas - Female ①	Disease	County - Study Area 1 - Male	State - Study Area 1 - Male	County - Study Area 2 - Male	State - Study Area 2 - Male	Highest - All Study Areas - Male ①	Highest - State - All Study Areas - Male ①
	Bladder	139%	132%	116%	111%	139%		132%	Bladder	98%	97%	98%	97%
Bone	33%	33%	43%	50%	43%	50%	Bone	175%	175%	138%	138%	175%	175%
Breast	105%	110%	103%	107%	105%	110%	Colorectal	92%	89%	102%	99%	102%	99%
Cervix	85%	77%	90%	80%	90%	80%	Esophageal	103%	100%	103%	101%	103%	101%
Colorectal	101%	99%	104%	101%	104%	101%	Hodgkin's	58%	58%	76%	76%	76%	73%
Esophageal	142%	155%	88%	100%	142%	155%	Kidney	117%	110%	109%	103%	117%	110%
Hodgkin's	190%	190%	130%	130%	190%	190%	Leukemia	103%	96%	98%	92%	103%	96%
Kidney	94%	91%	90%	86%	94%	91%	Liver	90%	90%	113%	111%	113%	111%
Leukemia	69%	70%	85%	86%	85%	86%	Lung	93%	88%	91%	87%	93%	88%
Liver	123%	123%	83%	89%	123%	123%	Lymphocytic Leukemia	106%	106%	105%	97%	106%	106%
Lung	97%	89%	94%	86%	97%	89%	Melanoma	110%	106%	113%	109%	113%	109%
Lymphocytic Leukemia	79%	83%	77%	82%	79%	83%	Myeloma	97%	97%	105%	105%	105%	105%
Melanoma	97%	90%	89%	83%	97%	90%	Nervous	88%	94%	90%	95%	90%	95%
Myeloma	92%	88%	109%	105%	109%	105%	Non-Hodgkin's	108%	108%	108%	108%	108%	108%
Nervous	104%	104%	97%	97%	104%	104%	Oral	103%	100%	93%	90%	103%	100%
Non-Hodgkin's	107%	107%	109%	109%	109%	109%	Other	111%	108%	109%	106%	111%	108%
Oral	94%	94%	100%	100%	100%	100%	Pancreas	80%	80%	93%	93%	93%	93%
Other	106%	106%	101%	102%	106%	106%	Prostate	108%	109%	106%	107%	108%	109%
Ovary	125%	129%	106%	109%	125%	129%	Stomach	80%	80%	107%	109%	107%	109%
Pancreas	131%	128%	120%	118%	131%	128%	Testis	132%	132%	105%	107%	132%	132%
Stomach	92%	92%	111%	111%	111%	111%							
Uterus	98%	101%	102%	105%	102%	105%							

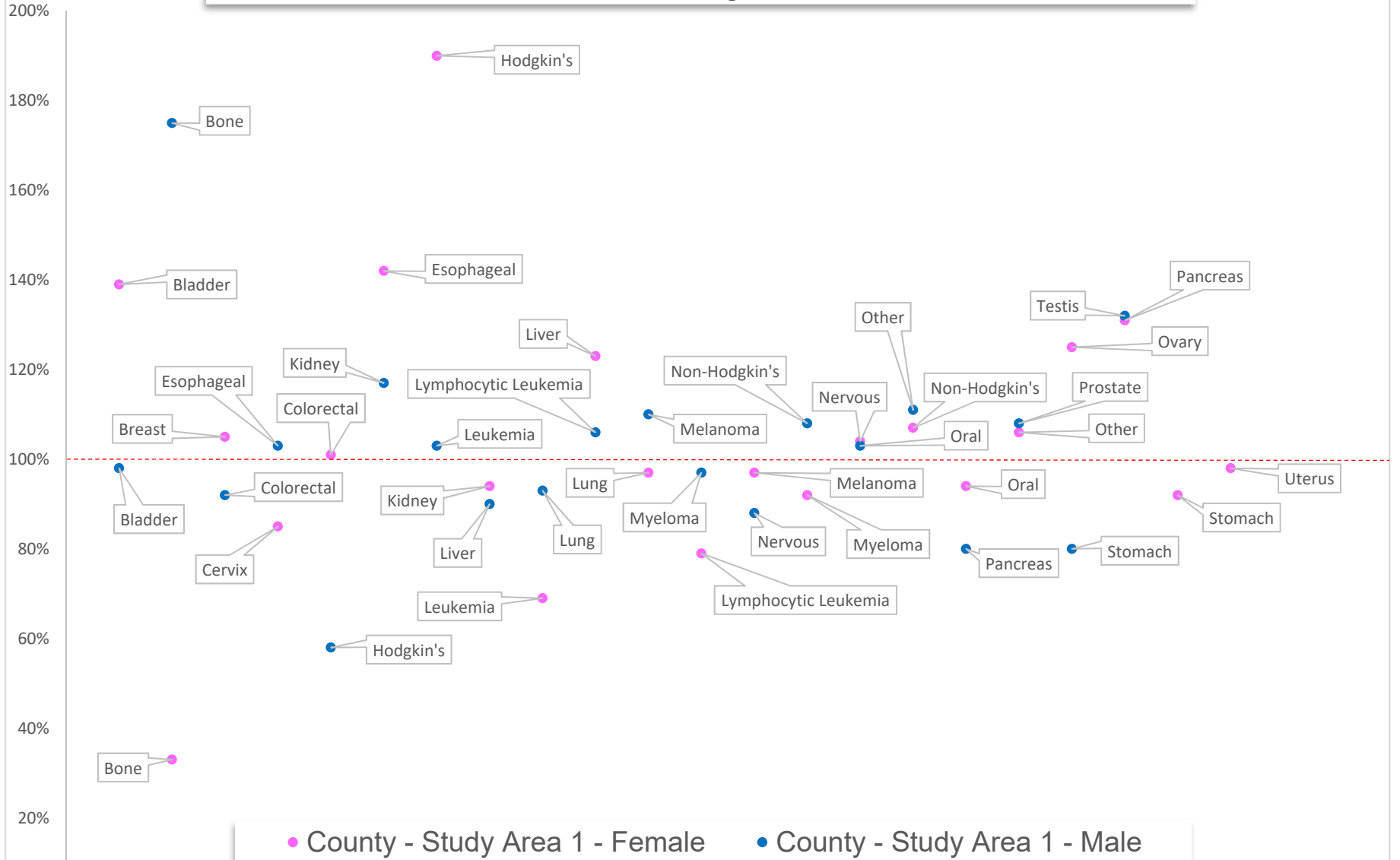
The accompanying charts are broken out by County, State, Study Area 1 (15 sq. mi. nearest Sterigenics) and Study Area 2 (40. sq. mi. that includes Study Area 1) and each chart depict cancers for Male (male) and Female (female). Girl data points are pink, boy data points are blue. In cases, where boy and girl cancer data points intersect, the color is arbitrary based on the whim of Excel. See data series legend at the bottom of each chart for each charts comparative sample.

① Data is pulled from IDPH Cancer Incidence tables. Within each referent's Study Area 1 & 2 the percentage between observed and expected is evaluated and the highest reported value within each cancer type is selected. The basis for making this association is the result of the census boundary concerns including the omission of two census tracts nearby Sterigenics.

Caution interpreting those results is urged.

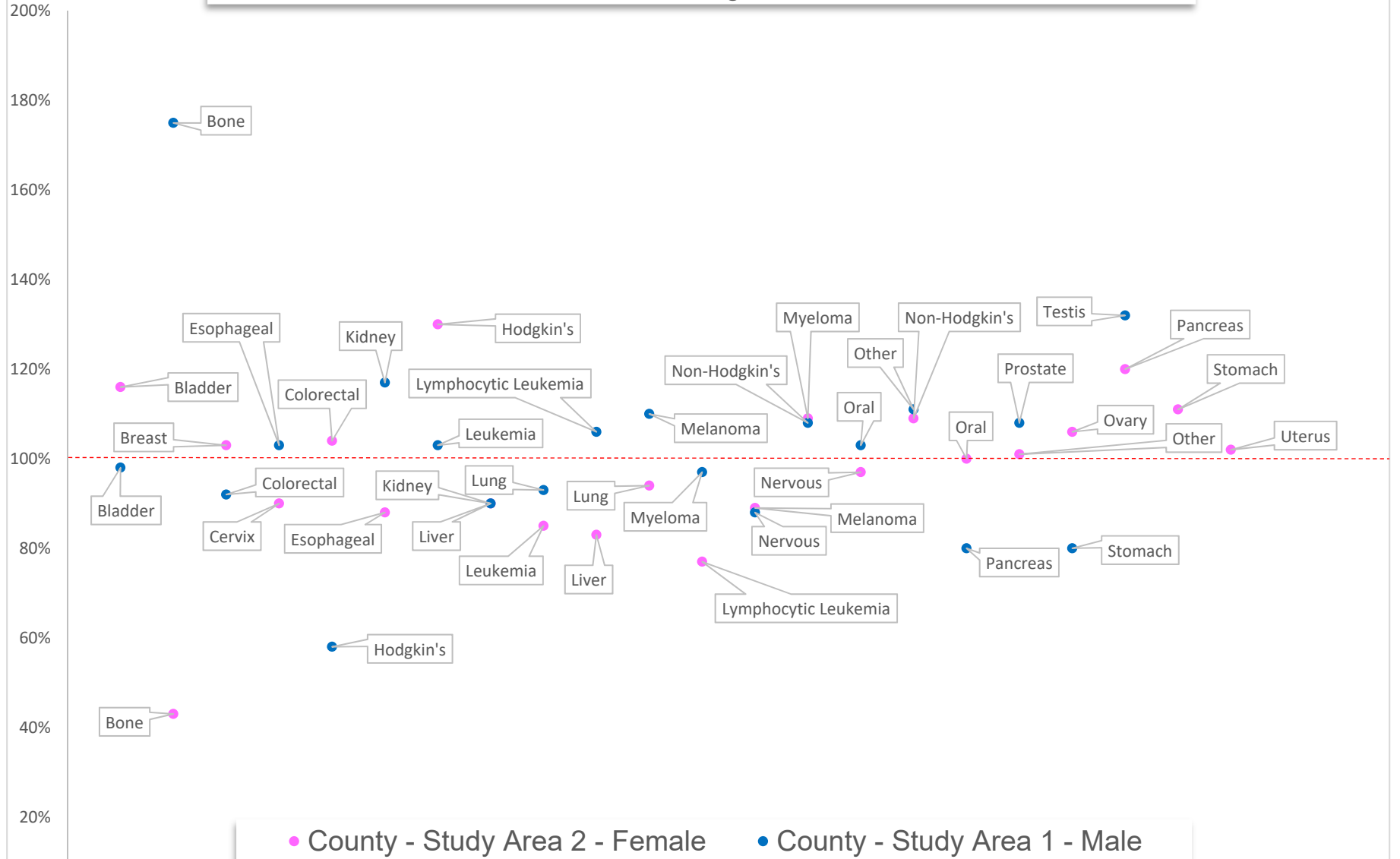
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# Cancer Incidence Assessment near Sterigenics in Willowbrook, IL, 1995-2015



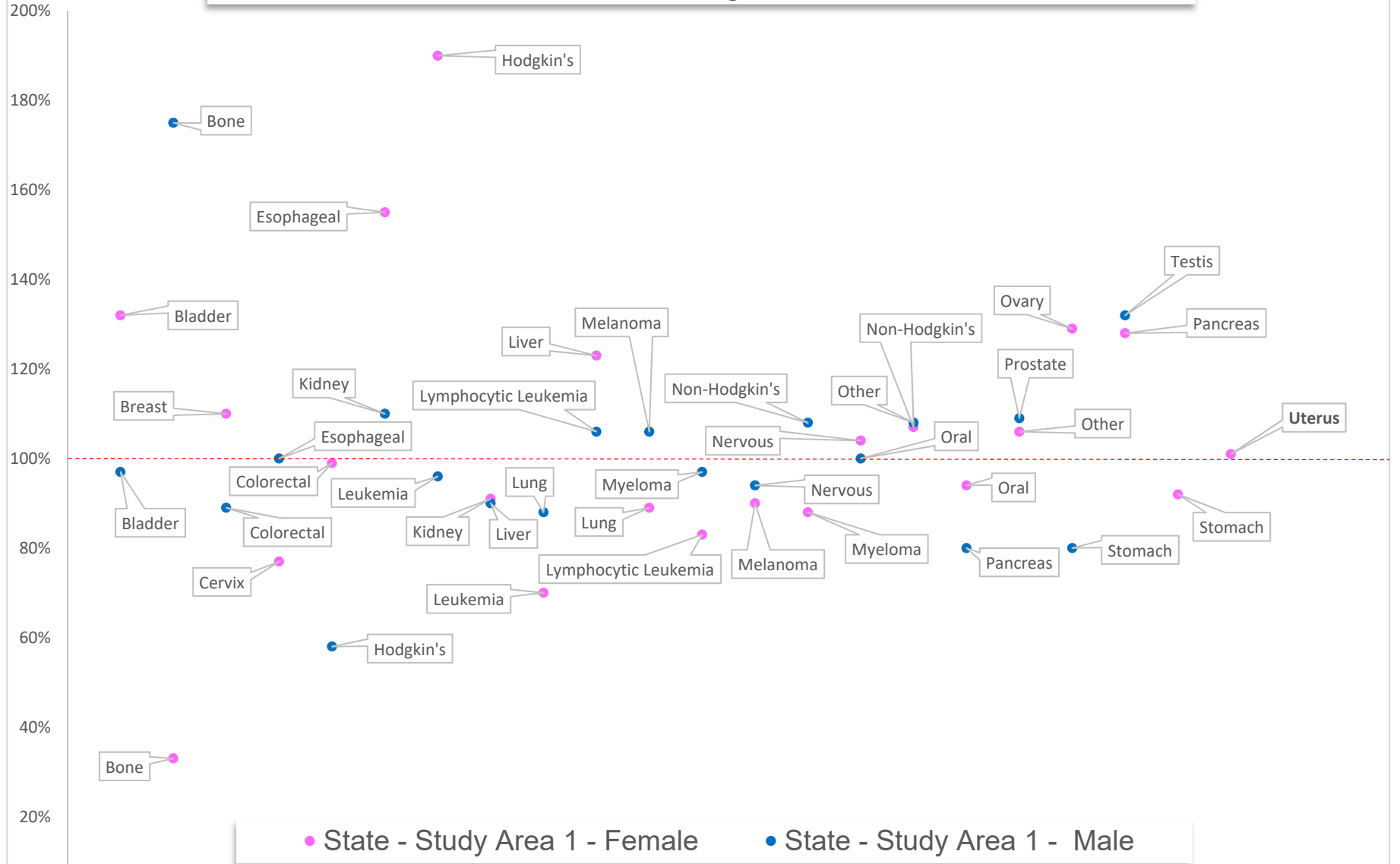
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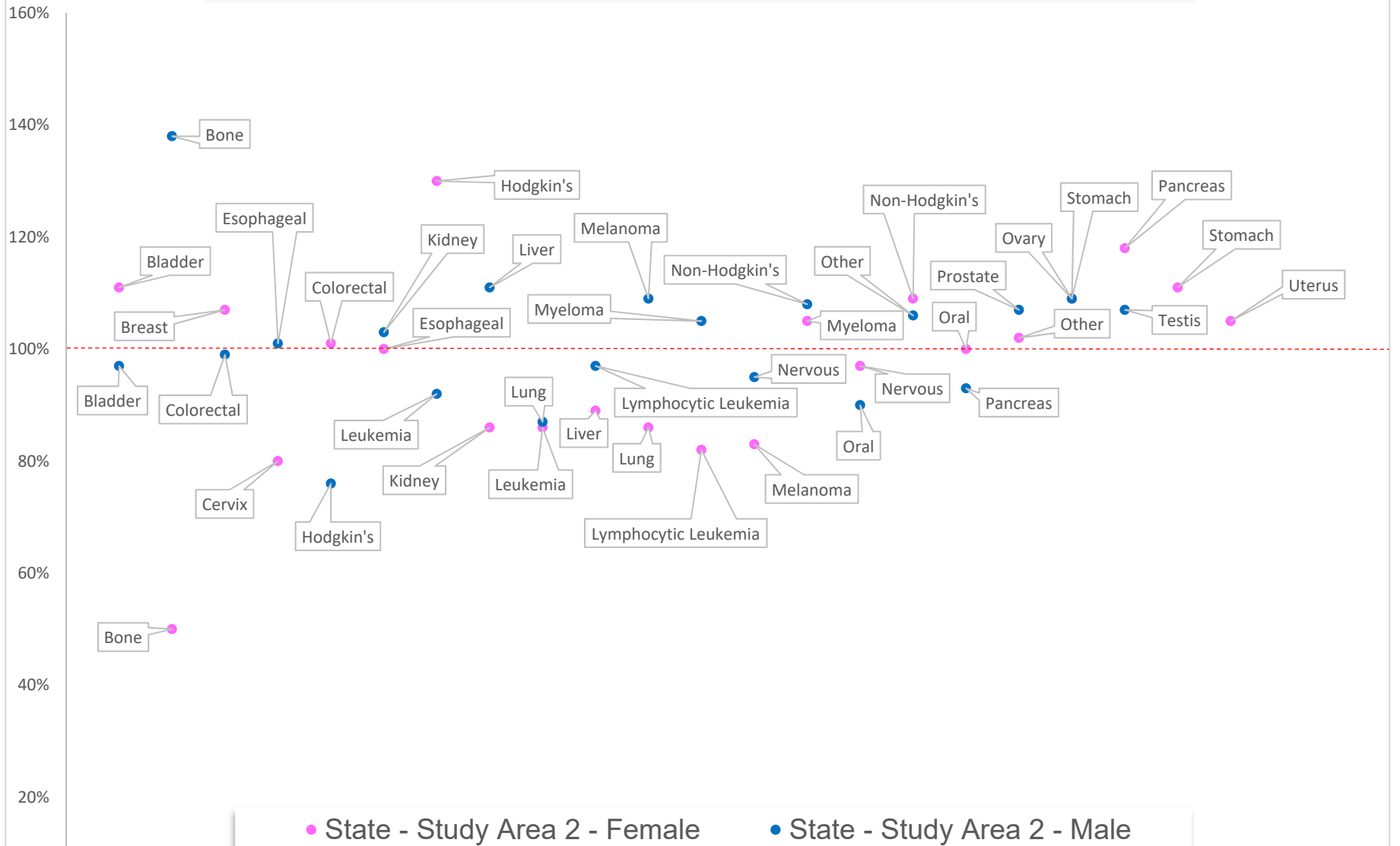
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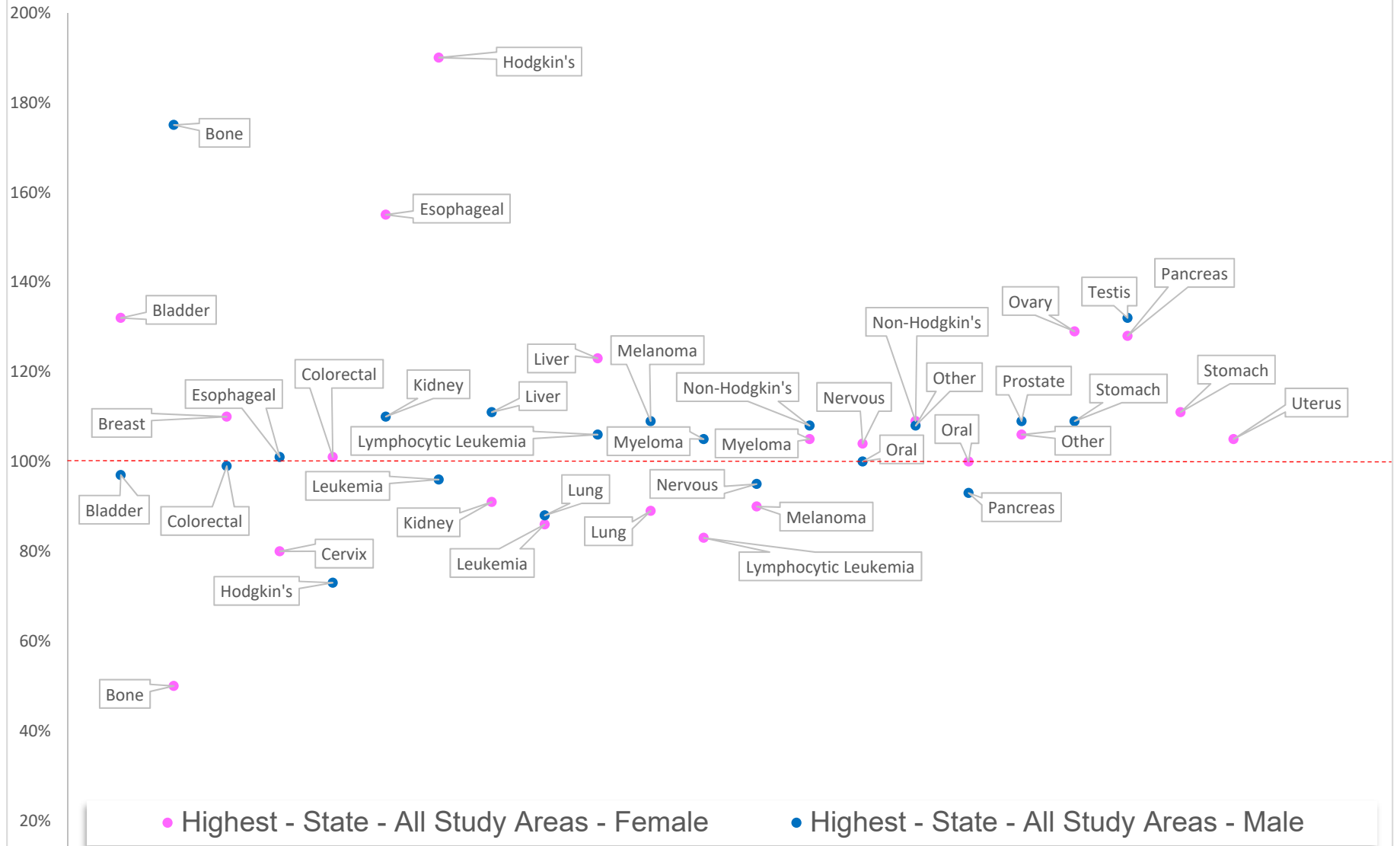


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IDPH Cancer Incidence Assessment near Sterigenics in Willowbrook, IL Data Range:  
1995-2015 Report Date: March 29, 2019

Bonus Data ①

County - Female

Study Area 1 (SA1) - 15 sq. mi. nearest Sterigenics					Study Area 2 (SA2) - 40 sq. mi expanding on SA1.					Highest % > Expected from Study Area 1 and 2 Highest between Study Area 1 and 2				
Disease	QA	Observed	Expected	% > Exp	Disease	QA	Observed	Expected	% > Exp	Disease	QA	Observed	Expected	% > Exp
Hodgkin's	X	19	10	190%	Hodgkin's	X	30	23	130%	Hodgkin's		19	10	190%
Esophageal	X	17	12	142%	Pancreas	X	151	126	120%	Esophageal		17	12	142%
Bladder	X	78	56	139%	Bladder	X	140	121	116%	Bladder		78	56	139%
Pancreas	X	77	59	131%	Stomach	X	61	55	111%	Pancreas		77	59	131%
Ovary	X	84	67	125%	Myeloma	X	58	53	109%	Ovary		84	67	125%
Liver	X	16	13	123%	Non-Hodgkin's	X	208	191	109%	Liver		16	13	123%
Non-Hodgkin's	X	95	89	107%	Ovary	X	152	143	106%	Stomach		61	55	111%
Other	X	282	266	106%	Colorectal	X	483	463	104%	Myeloma		58	53	109%
Breast	X	747	711	105%	Breast	X	1548	1508	103%	Non-Hodgkin's		208	191	109%
Nervous	X	28	27	104%	Uterus	X	322	315	102%	Other		282	266	106%
Colorectal	X	218	215	101%	Other	X	582	574	101%	Breast		747	711	105%
Uterus	X	147	150	98%	Oral	X	68	68	100%	Colorectal		483	463	104%
Lung	X	262	270	97%	Nervous	X	57	59	97%	Nervous		28	27	104%
Melanoma	X	57	59	97%	Lung	X	541	575	94%	Uterus		322	315	102%
Kidney	X	48	51	94%	Kidney	X	98	109	90%	Oral		68	68	100%
Oral	C	30	32	94%	Cervix	X	52	58	90%	Lung		262	270	97%
Myeloma	X	23	25	92%	Melanoma	X	114	128	89%	Melanoma		57	59	97%
Stomach	X	23	25	92%	Esophageal	X	23	26	88%	Kidney		48	51	94%
Cervix	X	23	27	85%	Leukemia	X	101	119	85%	Cervix		52	58	90%
Lymphocytic Leukemia	X	19	24	79%	Liver	X	24	29	83%	Leukemia		101	119	85%
Leukemia	X	38	55	69%	Lymphocytic Leukemia	X	40	52	77%	Lymphocytic Leukemia		19	24	79%
Bone	X	1	3	33%	Bone	X	3	7	43%	Bone		3	7	43%

County - Male

Study Area 1 (SA1) - 15 sq. mi. nearest Sterigenics				Study Area 2 (SA2) - 40 sq. mi expanding on SA1.				Highest % > Expected from Study Area 1 and 2 Study Area 1 (SA2) and Study Area 2 40 sq. mi						
Disease	QA	Observed	Expected	% > Exp	Disease	QA	Observed	Expected	% > Exp	Disease	QA	Observed	Expected	% > Exp
Bone	X	7	4	175%	Bone	X	11	8	138%	Bone		7	4	175%
Testis	X	25	19	132%	Melanoma	X	195	172	113%	Testis		25	19	132%
Kidney	X	98	84	117%	Liver	X	71	63	113%	Kidney		98	84	117%
Other	X	230	207	111%	Kidney	X	189	173	109%	Melanoma		195	172	113%
Melanoma	X	91	83	110%	Other	X	467	430	109%	Liver		71	63	113%
Non-Hodgkin's	X	108	100	108%	Non-Hodgkin's	X	222	206	108%	Other		230	207	111%
Prostate	X	680	630	108%	Stomach	X	89	83	107%	Prostate		680	630	108%
Lymphocytic Leukemia	X	34	32	106%	Prostate	X	1367	1287	106%	Non-Hodgkin's		222	206	108%
Oral	X	65	63	103%	Myeloma	X	62	59	105%	Stomach		89	83	107%
Leukemia	X	68	66	103%	Testis	X	44	42	105%	Lymphocytic Leukemia		34	32	106%
Esophageal	X	36	35	103%	Lymphocytic Leukemia	X	69	66	105%	Myeloma		62	59	105%
Bladder	X	162	166	98%	Esophageal	C	74	72	103%	Oral		65	63	103%
Myeloma	X	28	29	97%	Colorectal	X	464	457	102%	Leukemia		68	66	103%
Lung	X	273	294	93%	Bladder	X	335	342	98%	Esophageal		36	35	103%
Colorectal	X	203	221	92%	Leukemia	X	135	138	98%	Colorectal		464	457	102%
Liver	X	28	31	90%	Pancreas	X	115	123	93%	Bladder		162	166	98%
Nervous	X	29	33	88%	Oral	X	120	129	93%	Pancreas		115	123	93%
Pancreas	X	48	60	80%	Lung	X	551	603	91%	Lung		273	294	93%
Stomach	X	32	40	80%	Nervous	X	62	69	90%	Nervous		62	69	90%
Hodgkin's	X	7	12	58%	Hodgkin's	X	19	25	76%	Hodgkin's		19	25	76%

Sources: IDPH Summary: <https://goo.gl/6QhtSM> IDPH Study: <https://goo.gl/WelV3c> IDPH FAQ: <https://goo.gl/R6Xr6q>

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IDPH Cancer Incidence Assessment near Sterigenics in Willowbrook, IL  
Data Range: 1995-2015 Report Date: March 29, 2019

Bonus Data ①

State - Female

Highest % > Expected from Study Area 1 and 2  
Study Area 1 (SA2) and Study Area 2 40 sq. mi

Study Area 1 (SA1) - 15 sq. mi. nearest Sterigenics					Study Area 2 (SA2) - 40 sq. mi expanding on SA1.					Study Area 1 (SA2) and Study Area 2 40 sq. mi				
Disease	QA	Observed	Expected	% > Exp	Disease	QA	Observed	Expected	% > Exp	Disease	QA	Observed	Expected	% > Exp
Hodgkin's	X	19	10	190%	Hodgkin's	X	30	23	130%	Hodgkin's	X	19	10	190%
Esophageal	X	17	11	155%	Pancreas	X	151	128	118%	Esophageal	X	17	11	155%
Bladder	X	78	59	132%	Bladder	X	140	126	111%	Bladder	X	78	59	132%
Ovary	X	84	65	129%	Stomach	X	61	55	111%	Ovary	X	84	65	129%
Pancreas	X	77	60	128%	Ovary	C	152	139	109%	Pancreas	X	77	60	128%
Liver	X	16	13	123%	Non-Hodgkin's	X	208	191	109%	Liver	X	16	13	123%
Breast	X	747	681	110%	Breast	X	1548	1445	107%	Stomach	X	61	55	111%
Non-Hodgkin's	X	95	89	107%	Myeloma	X	58	55	105%	Breast	X	747	681	110%
Other	X	282	265	106%	Uterus	X	322	306	105%	Non-Hodgkin's	X	208	191	109%
Nervous	X	28	27	104%	Other	X	582	571	102%	Other	X	282	265	106%
Uterus	X	147	145	101%	Colorectal	X	483	476	101%	Myeloma	X	58	55	105%
Colorectal	X	218	221	99%	Esophageal	X	23	23	100%	Uterus	X	322	306	105%
Oral	C	30	32	94%	Oral	X	68	68	100%	Nervous	X	28	27	104%
Stomach	X	23	25	92%	Nervous	X	57	59	97%	Colorectal	X	483	476	101%
Kidney	X	48	53	91%	Liver	X	24	27	89%	Oral	C	68	68	100%
Melanoma	X	57	63	90%	Leukemia	X	101	117	86%	Kidney	X	48	53	91%
Lung	X	262	295	89%	Lung	X	541	628	86%	Melanoma	X	57	63	90%
Myeloma	X	23	26	88%	Kidney	X	98	114	86%	Lung	X	262	295	89%
Lymphocytic Leukemia	X	19	23	83%	Melanoma	X	114	137	83%	Leukemia	X	101	117	86%
Cervix	X	23	30	77%	Lymphocytic Leukemia	X	40	49	82%	Lymphocytic Leukemia	X	19	23	83%
Leukemia	X	38	54	70%	Cervix	X	52	65	80%	Cervix	X	52	65	80%
Bone	X	1	3	33%	Bone	X	3	6	50%	Bone	X	3	6	50%

State - Male

Highest % > Expected from Study Area 1 and 2  
Study Area 1 (SA2) and Study Area 2 40 sq. mi

Study Area 1 (SA1) - 15 sq. mi. nearest Sterigenics					Study Area 2 (SA2) - 40 sq. mi expanding on SA1.					Study Area 1 (SA2) and Study Area 2 40 sq. mi				
Disease	QA	Observed	Expected	% > Exp	Disease	QA	Observed	Expected	% > Exp	Disease	QA	Observed	Expected	% > Exp
Bone	X	7	4	175%	Bone	X	11	8	138%	Bone	X	7	4	175%
Testis	X	25	19	132%	Liver	X	71	64	111%	Testis	X	25	19	132%
Kidney	X	98	89	110%	Melanoma	X	195	179	109%	Liver	X	71	64	111%
Prostate	X	680	623	109%	Stomach	X	89	82	109%	Kidney	X	98	89	110%
Non-Hodgkin's	X	108	100	108%	Non-Hodgkin's	X	222	205	108%	Prostate	X	680	623	109%
Other	X	230	213	108%	Testis	X	44	41	107%	Melanoma	X	195	179	109%
Lymphocytic Leukemia	X	34	32	106%	Prostate	X	1367	1274	107%	Stomach	X	89	82	109%
Melanoma	X	91	86	106%	Other	X	467	441	106%	Non-Hodgkin's	X	108	100	108%
Esophageal	X	36	36	100%	Myeloma	X	62	59	105%	Other	X	230	213	108%
Oral	X	65	65	100%	Kidney	X	189	183	103%	Lymphocytic Leukemia	X	34	32	106%
Bladder	X	162	167	97%	Esophageal	X	75	74	101%	Myeloma	X	62	59	105%
Myeloma	X	28	29	97%	Colorectal	X	464	470	99%	Esophageal	X	75	74	101%
Leukemia	X	68	71	96%	Lymphocytic Leukemia	X	69	71	97%	Oral	X	65	65	100%
Nervous	X	29	31	94%	Bladder	X	335	345	97%	Colorectal	X	464	470	99%
Liver	X	28	31	90%	Nervous	X	62	65	95%	Bladder	X	162	167	97%
Colorectal	X	203	228	89%	Pancreas	X	115	124	93%	Leukemia	X	68	71	96%
Lung	X	273	309	88%	Leukemia	X	135	147	92%	Nervous	X	62	65	95%
Pancreas	X	48	60	80%	Oral	X	120	133	90%	Pancreas	X	115	124	93%
Stomach	X	32	40	80%	Lung	X	551	634	87%	Lung	X	273	309	88%
Hodgkin's	X	7	12	58%	Hodgkin's	X	19	25	76%	Hodgkin's	X	19	26	73%

Sources: IDPH Summary: <https://goo.gl/6QhtSM> IDPH Study: <https://goo.gl/WelV3c> IDPH FAQ: <https://goo.gl/R6Xr6q>

① Data is pulled from IDPH Cancer Incidence tables. Within each referent's Study Area 1 & 2 the percentage between observed and expected is evaluated and the highest reported value within each cancer type is selected. The basis for making this association is the result of the census boundary concerns including the omission of two census tracts nearby Sterigenics. Caution interpreting those results is urged.

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