Division of Public Health
Curtis State Office Building
1000 SW Jackson St., Suite 300
Topeka, KS 66612-1368

Kansas Department of Health and Environment

Phone: 785-296-1086
www.kdheks.gov

Janet Stanek, Secretary

Laura Kelly, Governor

December 4, 2024

[redacted]

Dear [redacted],

This letter summarizes the results of an investigation conducted by the Kansas Department of Health and Environment (KDHE) in response to your concerns regarding the number of Forest Hills residents diagnosed with cancer over the past seven years or so.

Executive Summary

- This investigation found that the cancers you reported were not of the same type or etiologically similar to one another.
- This investigation did not find that the cancers you reported were as expected given what is known in the scientific literature about cancers potentially associated with exposure to tetrachloroethylene (PCE), trichloroethylene (TCE), and other Volatile Organic Compounds (VOCs).
- This investigation found that no one cancer type occurred at a significantly higher percentage in the area of interest than the other reported cancers.
- This investigation found that there is no statistically significant difference in the cancer incidence rates for the area of interest compared to Sedgwick County, Region 5, and the state of Kansas.
- This investigation found that the number of observed cancer cases in the population of interest is considered equal to the expected number of cancer cases.

Background

On June 24, 2024, the Bureau of Epidemiology and Public Health Informatics (BEPHI) at KDHE received an email from you requesting a health study for the Forest Hills neighborhood in Wichita, Kansas. You were concerned about an "unusual number of cancers in the area." This request followed email conversations you had with Mary Daily of the KDHE Bureau of Environmental Remediation on the subject. On June 27, 2024, a virtual meeting was set up between you and KDHE Epidemiology staff to fill out the initial intake form. You invited [redacted] to that meeting as he was known to be familiar with the cancer cases among the neighbors. From this meeting, KDHE staff collected a list of cancer cases that you were aware of including cases of brain, lung, throat, leukemia, and uterine cancers. You indicated that you suspected that exposure to trichloroethylene (TCE) and tetrachloroethylene (PCE) from nearby aircraft manufacturing

and flight operations at the Textron Aviation Inc. (formerly known as the Hawker Beechcraft Corporation (HBC)) facility was responsible for the increase in cancer cases in the area. At the end of the meeting, staff discussed with you the following:

- High incidence of cancer: Cancer is not one disease, but a collection of related diseases with many different causes that can occur almost anywhere in the body. Cancer is common in Kansas and the United States and cases may cluster naturally; approximately 40.5% of men and women will be diagnosed with cancer at some point during their lifetimes (based on 2017–2019 data). Still, KDHE takes all reports of possible cancer clusters seriously and attempts to investigate all reports.
- Time lag between exposure and cancer development: Most cancers take between 3 and 40 years to develop.
- Epidemiological significance of cancer in children: Childhood cancers are relatively rare, compared to adult cancer.[1] However, it is the leading cause of death by disease after infancy among children in the United States.[2] The rarity of childhood cancers allows researchers to study specific exposures more closely, such as exposures to tobacco smoke, arsenic in drinking water, formaldehyde in furniture, radon gas in homes and ionizing radiation.[3]
- Brief description of KDHE's protocol for cancer cluster investigations:
  The KDHE has adopted the 2022 definition of a cancer cluster published by the Centers for Disease Control and Prevention (CDC), Agency for Toxic Substances and Disease Registry (ATSDR) as "a greater than expected number of the same or etiologically related cancer cases that occurs within a group of people in a geographic area over a defined period of time."[4]
  This definition can be further understood as follows:
    - A greater than expected number: When the number of observed cases is greater than typically observed in a similar setting.
    - Of the same or etiologically related cancer cases: Cases are of the same type, are within a family of tumors (e.g., Ewing's family of tumors), or have a known or suggested link to the same specific environmental or chemical exposures. It is possible to consider multiple cancer types when such a known exposure (e.g., radiation or a specific chemical) is linked to more than one cancer type or when more than one contaminant or exposure type has been identified.
    - Within a group of people: The population in which the cancer cases are occurring is defined by its demographic factors (e.g., race, ethnicity, age, and sex).
    - In a geographic area: The geographic area may be based upon pre-existing geopolitical boundaries (e.g., census tract, county, or ZIP code/ZIP code tabulation area). It may be defined according to the nature and extent of potential exposures that may cross multiple or partial boundaries. For example, air pollution from a hazardous waste incinerator which may cross multiple counties or census tracts. These geographic boundaries are used to determine the number of cancer cases as they relate to the total population in this predefined area.
    - Over a period of time: The time frame used to establish the beginning and end dates for analysis. The time period chosen for analysis will affect both the total cases observed and the calculation of the expected incidence of cancer in the population.
- Cancer risk factors: Certain factors increase the likelihood of developing cancer including, age, tobacco use, alcohol abuse, obesity, diet, sun exposure, exposure to cancer-causing substances, radiation, hormonal factors, immunosuppression, infectious agents, and genetics.[5] When considering an individual's risk for developing cancer, these and many other risk factors should be taken into consideration.

Initial Investigation: Health Data

The first step in KDHE's investigation was to evaluate your report of a potential cluster of cancer cases, specifically brain, lung, throat, leukemia, and uterine cancers, against the CDC/ATSDR definition of a cancer cluster. This evaluation found that the cancers you reported were not of the same type or etiologically similar to one another. However, given that there may be the potential for exposure to several chemicals including tetrachloroethylene (PCE), trichloroethylene (TCE), and other Volatile Organic Compounds (VOCs), as well as their degradation compounds in the Forest Hills area, we further evaluated the reported cancers against cancers known in the scientific literature to be potentially associated with exposure to these chemicals; namely kidney and renal pelvis, liver and biliary tree, urinary bladder (including in situ), myeloma, and lymphomas (Hodgkin and non-Hodgkin)[6,7]. Again, our evaluation did not find that the cancers you reported were as expected given what is known in the scientific literature.

The next step in KDHE's investigation process consisted of a review of available data from the Kansas Cancer Registry to compare the observed cancers in the population of interest to what might be expected if the population of interest had the same cancer experience as larger comparison populations. In the Forest Hills investigation, KDHE compared cancer data from ZIP Codes 67206 and 67207 to cancer data from Sedgwick County, Region 5, and the State of Kansas. The comparisons covered the period spanning from 2011 to 2020 and included the total number of all cancers and the specific cancers you reported: lung, throat, brain, leukemia, and uterine cancers. The following is a summary of the findings.

- Definitions
    - Incident cases/Incidence – The number of new cancer cases over a time period.
    - Incidence rate – The number of cancer cases per 100,00 persons for a period of interest. The rates were adjusted for the 2000 US population age groups.
    - Cancer case – Incident cancer cases were defined following the World Health Organization (WHO) Classification of Tumours of Haematopoietic and Lymphoid Tissues, National Cancer Institute (NCI) Surveillance Epidemiology and End Results (SEER) site recode from ICD-O-3/WHO 2008 value (Table 1).

Table 1: SEER Site Recode of the types of cancers to be studied in the area of interest.

Type of cancer	**SEER Site Recode**
Lung and Bronchus	22030
Leukemia	35011,35012,35013,35021,35022,35023,35031,35041,35043
Brain and Other Nervous System (ONS)	31010,31040
Oral Cavity and Pharynx	20010,20020,20030,20040,20050,20060,20070,20080,20090,20100
Larynx	22020
Uterus	27020,27030
Liver and Biliary Tree	21071,21072
Kidney and Renal Pelvis	29020
Urinary Bladder (including in-situ)	29010
Myeloma	34000
Lymphomas (Hodgkin and Non-Hodgkin)	33041,33042,33011,33012

All Cancers	20010,20020,20030,20040,20050,20060,20070,20080,20090,20100, 21010,21020,21030,21041,21042,21043,21044,21045,21046,21047, 21048,21049,21051,21052,21060,21071,21072,21080,21090,21100, 21110,21120,21130,22010,22020,22030,22050,22060,23000,24000, 25010,25020,26000,27010,27020,27030,27040,27050,27060,27070, 28010,28020,28030,28040,29010,29020,29030,29040,30000,31010, 31040,32010,32020,33011,33012,33041,33042,34000,35011,35012, 35013,35021,35031,35022,35023,35041,35043,36010,36020,37000

- The area of interest – ZIP Codes 67206 and 67207.
- Region 5 – This region includes Sedgwick, Reno, Harvey, and McPherson counties.
- Age adjustment – A statistical technique designed to eliminate differences in observed rates that result from age differences in population composition.
- 95% Confidence Interval – There is a 95% confidence that the reported value falls within the range indicated.
- Standardized Incidence Ratio (SIR) – The ratio of the number of observed cancer cases in a population to the number of cases that would be expected based on a larger reference population. An SIR of 1 indicates that the observed number of cancer cases in the population of interest is equal to the expected number of cancer cases in the comparison population. An SIR less than 1 indicates that the number of observed cancer cases is less than the number of expected cancer cases. An SIR greater than 1 indicates that the number of observed cancer cases is greater than the number of expected cancer cases. For each SIR, a 95% confidence interval is calculated. If the confidence interval associated with an SIR includes 1, the SIR is not considered statistically different than 1; meaning the number of observed cancer cases in the population of interest is considered equal to the expected number of cancer cases.

- Results of the Evaluation
  - Table 2 summarizes the total number of cases of the specific cancers diagnosed in the state of Kansas and in the area of interest, as well as the percentage they represent. This shows that no one cancer type occurred at a significantly higher percentage in the area of interest than the others. Also, the population of the area of interest represents approximately 1.6% of the total Kansas population which is similar to the percentage of cases in the area of interest.

  - Tables 3 through 14 show the incidence rates for each specific cancer and for all cancers in the area of interest compared to Sedgwick County, Region 5, and the state of Kansas. Except for Lung and Bronchus cancer, since the calculated 95% confidence intervals for the incidence rate of each specific cancer and all cancers overlap in all regions, the conclusion is that there is no statistically significant difference in the cancer incidence rates for the area of interest compared to Sedgwick County, Region 5, and the state of Kansas. For Lung and Bronchus cancer, because the calculated 95% confidence interval does not overlap, the area of interest has a lower incidence rate of Lung and Bronchus cancer compared to Sedgwick County, Region 5, and the state of Kansas.

Table 2: Number of new cancer cases diagnosed in the area of interest, 2011-2020.

Sites	Number of cases identified in the area of interest	Number of cases in Kansas	Percentage of cases in area of interest
Lung and Bronchus	225	19,060	1.2%
Leukemia	59	4,996	1.2%
Brain and Other Nervous System (ONS)	26	2,075	1.3%
Oral Cavity and Pharynx	55	4,014	1.4%
Larynx	14	1,049	1.3%
Uterus	66	4,593	1.4%
Liver and Biliary Tree	42	2,380	1.8%
Kidney and Renal Pelvis	97	6,191	1.6%
Urinary Bladder (including in-situ)	113	7,268	1.6%
Myeloma	33	2,222	1.5%
Lymphomas (Hodgkin and Non-Hodgkin)	125	7,154	1.7%
Total of All Types of Cancer	2,263	152,856	1.5%

Table 3: Incidence rates for Lung and Bronchus cancer, 2011-2020

Geographical Area	Total number of cases	Age-adjusted rate (per 100,000 population)	95% Confidence Interval (per 100,000 population)
Area of interest	225	41.5	35.0 – 48.0
Sedgwick County	3,189	54.4	52.3 – 56.3
Region 5	4,066	52.8	50.9 – 54.8
Kansas	19,060	53.5	52.6 – 54.5

* Data source: Kansas Cancer Registry

* Rates are age-adjusted to the 2000 US standard population with 18 age groups

Table 4: Incidence rates for Leukemia, 2011-2020			
Geographical Area	**Total number of cases**	**Age-adjusted rate (per 100,000 population)**	**95% Confidence Interval (per 100,000 population)**
Area of interest	59	11.8	8.5 – 15.2
Sedgwick County	770	14.0	13.0 – 15.1
Region 5	1,018	14.3	13.3 – 15.3
Kansas	4,996	15.0	14.5 – 15.5

* Data source: Kansas Cancer Registry

* Rates are age-adjusted to the 2000 US standard population with 18 age groups

Table 5: Incidence rates for Brain and Other Nervous System (ONS) cancer, 2011-2020			
Geographical Area	**Total number of cases**	**Age-adjusted rate (per 100,000 population)**	**95% Confidence Interval (per 100,000 population)**
Area of interest	26	5.3	3.1 – 7.5
Sedgwick County	358	6.5	5.8 – 7.2
Region 5	446	6.4	5.7 – 7.0
Kansas	2,075	6.5	6.2 – 6.8

* Data source: Kansas Cancer Registry

* Rates are age-adjusted to the 2000 US standard population with 18 age groups

Table 6: Incidence rates for Oral Cavity and Pharynx cancer, 2011-2020			
Geographical Area	**Total number of cases**	**Age-adjusted rate (per 100,000 population)**	**95% Confidence Interval (per 100,000 population)**
Area of interest	55	10.3	7.1 – 13.5
Sedgwick County	660	11.2	11.2 – 12.2
Region 5	873	11.5	10.6 – 12.4
Kansas	4,014	11.6	11.1 – 12.0

* Data source: Kansas Cancer Registry

* Rates are age-adjusted to the 2000 US standard population with 18 age groups

Table 7: Incidence rates for Larynx cancer, 2011-2020			
Geographical Area	**Total number of cases**	**Age-adjusted rate (per 100,000 population)**	**95% Confidence Interval (per 100,000 population)**
Area of interest	14	2.6	0.9 – 4.2
Sedgwick County	200	3.3	2.7 – 3.8
Region 5	238	3.0	2.5 – 3.5
Kansas	1,049	2.9	2.7 – 3.2

* Data source: Kansas Cancer Registry

* Rates are age-adjusted to the 2000 US standard population with 18 age groups

Table 8: Incidence rates for Uterus cancer, 2011-2020			
Geographical Area	**Total number of cases**	**Age-adjusted rate (per 100,000 population)**	**95% Confidence Interval (per 100,000 population)**
Area of interest	66	25.0	17.8 – 32.3
Sedgwick County	841	27.9	25.7 – 30.0
Region 5	1,070	27.4	25.4 – 29.4
Kansas	4,593	25.5	24.6 – 26.4

* Data source: Kansas Cancer Registry

* Rates are age-adjusted to the 2000 US standard population with 18 age groups

Table 9: Incidence rates for Liver and Biliary Tree cancer, 2011-2020			
Geographical Area	**Total number of cases**	**Age-adjusted rate (per 100,000 population)**	**95% Confidence Interval (per 100,000 population)**
Area of interest	42	7.9	5.1 – 10.7
Sedgwick County	495	8.0	7.1 – 8.8
Region 5	603	7.5	6.8 – 8.3
Kansas	2,380	6.5	6.2 – 6.8

* Data source: Kansas Cancer Registry

* Rates are age-adjusted to the 2000 US standard population with 18 age groups

Table 10: Incidence rates for Kidney and Renal Pelvis cancer, 2011-2020			
Geographical Area	**Total number of cases**	**Age-adjusted rate (per 100,000 population)**	**95% Confidence Interval (per 100,000 population)**
Area of interest	97	19.2	14.9 – 23.4
Sedgwick County	1,031	18.4	17.1 – 19.6
Region 5	1,331	18.4	17.3 – 19.5
Kansas	6,191	18.3	17.8 – 18.9

* Data source: Kansas Cancer Registry

* Rates are age-adjusted to the 2000 US standard population with 18 age groups

Table 11: Incidence rates for Urinary Bladder cancer (including in-situ), 2011-2020			
Geographical Area	**Total number of cases**	**Age-adjusted rate (per 100,000 population)**	**95% Confidence Interval (per 100,000 population)**
Area of interest	113	21.5	16.8 – 26.1
Sedgwick County	1,184	20.4	19.1 – 21.7
Region 5	1,606	21.0	19.8 – 22.2
Kansas	7,268	20.6	20.0 – 21.1

* Data source: Kansas Cancer Registry

* Rates are age-adjusted to the 2000 US standard population with 18 age groups

Table 12: Incidence rates for Myeloma, 2011-2020			
Geographical Area	**Total number of cases**	**Age-adjusted rate (per 100,000 population)**	**95% Confidence Interval (per 100,000 population)**
Area of interest	33	6.4	3.9 – 8.9
Sedgwick County	353	6.1	5.4 – 6.8
Region 5	456	6.0	5.3 – 6.6
Kansas	2,222	6.4	6.1 – 6.7

* Data source: Kansas Cancer Registry

* Rates are age-adjusted to the 2000 US standard population with 18 age groups

Table 13: Incidence rates for Lymphomas (Hodgkin and Non-Hodgkin), 2011-2020			
Geographical Area	**Total number of cases**	**Age-adjusted rate (per 100,000 population)**	**95% Confidence Interval (per 100,000 population)**
Area of interest	125	25.3	20.4 – 30.1
Sedgwick County	1,171	21.1	19.8 – 22.4
Region 5	1,534	21.4	20.2 – 22.6
Kansas	7,154	21.3	20.7 – 21.9

* Data source: Kansas Cancer Registry

* Rates are age-adjusted to the 2000 US standard population with 18 age groups

Table 14: Incidence rates for All Cancer, 2011-2020			
Geographical Area	**Total number of cases**	**Age-adjusted rate (per 100,000 population)**	**95% Confidence Interval (per 100,000 population)**
Area of interest	2,263	438.8	418.2 – 459.5
Sedgwick County	25,674	449.4	443.3 – 455.5
Region 5	33,320	449.5	443.9 – 455.0
Kansas	152,856	446.4	443.8 – 449.1

* Data source: Kansas Cancer Registry

* Rates are age-adjusted to the 2000 US standard population with 18 age groups

- Finally, the standardized incidence ratio (SIR) for each specific cancer was calculated (Table 15). Except for Lung and Bronchus cancer, each of the calculated 95% Confidence Intervals contained the value of 1, which indicates that the results are not statistically significant from the null value of 1; meaning the number of observed cancer cases in the population of interest is considered equal to the expected number of cancer cases. For Lung and Bronchus cancer, the observed number of cases in the population is considered statistically significantly lower than expected.

Table 15. Standardized Incidence Ratios for the area of interest, 2011-2020				
Sites	**Observed number of cases ***	**Expected number of cases †**	**Standardized Incidence Ratio**	**95% Confidence Interval**
Lung and Bronchus	225	288.4	0.8	0.7 – 0.9
Leukemia	59	76.1	0.8	0.6 – 1.0
Brain and Other Nervous System (ONS)	26	31.8	0.8	0.5 – 1.2
Oral Cavity and Pharynx	55	59.6	0.9	0.7 – 1.2
Larynx	14	15.8	0.9	0.5 – 1.5
Uterus	66	69.4	1.0	0.7 – 1.2
Liver and Biliary Tree	42	35.3	1.2	0.9 – 1.6
Kidney and Renal Pelvis	97	93.2	1.0	0.8 – 1.3
Urinary Bladder (including in-situ)	113	109.8	1.0	0.8 – 1.2
Myeloma	33	33.6	1.0	0.7 – 1.4
Lymphomas (Hodgkin and Non-Hodgkin)	125	108.8	1.1	1.0 – 1.4
All Types of Cancer	2263	2308.3	1.0	0.9 – 1.0

* Observed number of cases in a 10-year period. Data source: Kansas Cancer Registry

† Expected number of cases in a 10-year period. Calculated bases on age-specific cancer incidence rates from the Kansas Cancer Registry

Conclusion

Based on the cancer data analysis, KDHE did not find evidence of higher incidence rates of cancer occurring in the Forest Hills subdivision and the surrounding areas. Given this finding, further investigation is not warranted.

Cancer is a common illness and risk increases with age so cases among older persons are less likely to be part of a true cluster. Also, when determining whether living in a certain geographical area, like a neighborhood, is a risk factor, the length of time living in the neighborhood must be substantial to implicate a cancer-causing hazard in the environment.

There are certain circumstances that indicate a potential common source or cause of cancer among people. A suspected cancer cluster is more likely to be a true cluster, rather than a coincidence, if there 1) are many cases of one type of cancer, rather than several different types, or 2) is a rare type of cancer, rather than common types, or 3) is an increased number of cases of a certain type of cancer in an age group that is usually not affected by that type of cancer. Had KDHE staff observed one or more of these scenarios, further investigation might have been warranted.

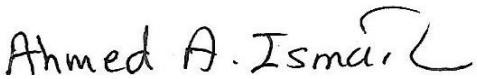
KDHE shares your concern for the health of the Forest Hills community and recognizes that every case of cancer is significant for the person affected and their families. That is why KDHE is extensively involved in efforts to reduce the occurrence of cancer in Kansas and improve care for those in whom it does occur. Staff from our Bureau of Health Promotion can provide resources to members in your community who want information on how they can reduce the risk of cancer. If you have any questions about this report, please contact the Bureau of Epidemiology and Public Health

Informatics at 1-877-427-7317. For more information about cancer prevention, please contact the Bureau of Health Promotion at 785-296-1207.

Sincerely,

Farah S. Ahmed, MPH, PhD
Environmental Health Officer and State Epidemiologist
Kansas Department of Health and Environment

Henri Menager, MD, MPH
Environmental Health Senior Epidemiologist
Kansas Department of Health and Environment



Ahmed Ismail, MB BCh, PhD
Cancer Control and Prevention Senior Epidemiologist
Kansas Department of Health and Environment

Resources

https://www.cancer.gov/about-cancer/understanding

https://www.cancer.gov/about-cancer/understanding/statistics

https://www.cdc.gov/cancer-environment/about/

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