



**TEXAS**  
Health and Human  
Services

**Texas Department of State  
Health Services**

**Assessment of the Occurrence of Cancer**  
*East Harris County, Texas*  
**2013-2021**  
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Prepared by the  
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## **Table of Contents**

<b>Executive Summary</b> .....	<b>1</b>
<b>Background</b> .....	<b>2</b>
<b>Methods</b> .....	<b>2</b>
Data Sources .....	3
Statistical Analysis .....	4
<b>Results</b> .....	<b>4</b>
Table 1.....	5
Table 2.....	6
<b>Discussion</b> .....	<b>6</b>
<b>Summary of Results</b> .....	<b>7</b>
<b>Additional Information</b> .....	<b>7</b>
<b>Figure 1.</b> .....	<b>9</b>
<b>Appendix A</b> .....	<b>9</b>

## **Executive Summary**

At the request of Texas Health and Environment Alliance (THEA), the Environmental Surveillance and Toxicology Branch (ESTB) within the Texas Department of State Health Services (DSHS) examined the occurrence of cancers in an area of East Harris County, Texas, consisting of 65 census tracts.

DSHS followed the Centers for Disease Control and Prevention's (CDC) Agency for Toxic Substances and Disease Registry (ATSDR) 2022 guidelines and agency protocol to investigate the occurrence of 22 types of all-age cancers and three childhood cancers in a geographic area selected in collaboration with THEA. In accordance with these guidelines, the purpose of this assessment was to determine whether the observed number of cancer cases is statistically significantly greater than expected based on cancer rates in Texas. It was not intended to determine the cause of the observed cancers or identify possible associations with any risk factors.

DSHS staff analyzed Texas Cancer Registry (TCR) data available for a 9-year period spanning from 2013 through 2021. The United States Census data were used to estimate the population in the selected geographic area, which consisted of a combined 65-census tract area in East Harris County, Texas. To evaluate the occurrence of cancer in the area investigated, the number of observed cancer cases was compared to what would be expected for the area based on cancer rates in Texas. Standardized incidence ratios (SIRs) were calculated as the number of observed cases divided by the number of expected cases in the area of concern for the 9-year period (2013-2021). A 95 percent confidence interval (CI) was calculated for each SIR to determine statistical significance.

Based on cancer rates in Texas, all-ages (combined for adults and children age groups) cervix uteri, leukemia, lung and bronchus, and lymphoma cancers were statistically significantly greater than expected. The observed number of all-age bladder, bone and joint, brain and other nervous system, colon, hypopharynx, kidney, liver, myeloma, nasopharynx, oropharynx, ovary, pancreas, and rectum cancers as well as childhood central nervous system and miscellaneous intracranial and intraspinal neoplasm cancers, leukemia, myeloproliferative and myelodysplastic disease, and renal tumor was within the range of what is expected based on cancer rates in Texas.

However, results should be interpreted with caution, because some of the numbers of observed cancer cases were small. SIRs based on small numbers often yield wide confidence intervals, which reduces the reliability of SIR estimates.

## Background

At the request of THEA, DSHS examined the occurrence of cancer in a combined 65-census tract area in East Harris County, Texas. THEA made the request on behalf of local residents concerned about a possible excess of cancer cases occurring in the flood plain around the San Jacinto River, including the San Jacinto River Waste Pits Superfund site.

DSHS assessed the occurrence of cancer in the same census tract area of East Harris County in 2015. The 2015 assessment showed some cancers (including childhood glioma, childhood melanoma, and childhood retinoblastoma) in specific census tracts were statistically significant.

The current assessment evaluates the same area using more recent years of data and additional cancer types. The current assessment did not analyze cancer types for individual census tracts. This approach is consistent with the revised 2022 CDC guidance for assessment of unusual patterns of cancer.<sup>1</sup> Therefore, the results of the two reports are not comparable.

CDC and ATSDR define unusual patterns of cancer 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”.<sup>1</sup> DSHS followed the CDC and ATSDR 2022 Guidelines for Examining Unusual Patterns of Cancer and Environmental Concerns<sup>1</sup> and DSHS protocol<sup>2</sup> to investigate the occurrence of cancer in this community.

## Methods

Consistent with CDC/ ATSDR 2022 guidelines, DSHS collaborated with THEA to select the geographic area, time frame, and cancers to be included in this analysis. The following all-age (combined for adults and children age groups) cancer types were included in the analysis: bladder, bone and joint, brain and other nervous system, breast, cervix uteri, chronic lymphocytic leukemia, colon excluding rectum, hypopharynx, kidney, leukemia, liver, lung and bronchus, lymphoma, myeloma, nasopharynx, oropharynx, ovary, pancreas, prostate, rectum, skin excluding basal and squamous, and thyroid. The following childhood cancer types were also included in the analysis: central nervous system and miscellaneous intracranial and intraspinal neoplasms; leukemias, myeloproliferative and myelodysplastic diseases; lymphomas and reticuloendothelial neoplasms.

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<sup>1</sup> Centers for Disease Control and Prevention, *Guidelines for Examining Unusual Patterns of Cancer and Environmental Concerns*. 2022. Available from: [Guidelines for Examining Unusual Patterns of Cancer and Environmental Concerns \(cdc.gov\)](https://www.cdc.gov/cancer/2022-guidelines-for-examining-unusual-patterns-of-cancer-and-environmental-concerns/).

<sup>2</sup> Texas Department of State Health Services, *Protocol for Responding to Community Concerns for Unusual Patterns of Cancer*. Updated September 21, 2023. Available from: [DSHS Booklet \(texas.gov\)](https://www.dshs.texas.gov/cancer/2023-protocol-for-responding-to-community-concerns-for-unusual-patterns-of-cancer/).

THEA also requested DSHS analyze other childhood cancer types including Burkitt lymphoma, hepatic tumors, malignant melanoma, renal tumors, and retinoblastoma. However, because there were less than six cases per cancer type, these cancers were not included in the analysis per DSHS protocol<sup>2</sup>.

Complete TCR cancer data are available for 1995 to 2021. DSHS evaluated 9 years of available cancer data in accordance with the request from THEA. The geographic area investigated was selected to encompass the entire area of concern. The 65 census tracts comprising the area investigated are shown in Figure 1.

This document outlines the results from this analysis, and only addresses the question, “Is there a statistically significant excess of cancer in the area of investigation?”

### *Data Sources*

For each cancer type, the number of cases observed from 2013 through 2021 in the area included in the investigation was obtained from TCR (Incidence – Texas, 1995-2021, SEER\*Prep 8.4.3). TCR is responsible for collection, maintenance, and dissemination of high-quality Texas population-based cancer data, and meets national CDC timeliness and data quality standards, as well as North American Association of Central Cancer Registry certification standards. All-age (combined for adults and children age groups) cancers were defined according to Site Recode ICD-O-3/WHO 2008 Definitions<sup>3</sup> and childhood cancers were defined according to ICCC Recode ICD-O-3/WHO 2008 Definitions<sup>4</sup>. Statewide cancer rates for the same time period were also obtained from TCR.

Population estimates for 2013 through 2021 were calculated using linear interpolation based on population counts obtained from the United States Decennial Census<sup>5</sup> for the years 2010 and 2020. This method, outlined by the United States Census Bureau<sup>6</sup>, assumed population growth occurred in a linear manner.

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<sup>3</sup> National Cancer Institute, Surveillance, Epidemiology and End Results Program. Site Recode ICD-O-3/WHO 2008 Definition. Available online: <https://seer.cancer.gov/siterecode/index.html>.

<sup>4</sup> National Cancer Institute, Surveillance, Epidemiology and End Results Program. ICCC Recode ICD-O-3/WHO 2008 Definition. Available online: [ICCC Recode ICD-O-3/WHO 2008 Table - SEER Recodes \(cancer.gov\)](https://seer.cancer.gov/iccc-recode-icd-o-3/who-2008-table).

<sup>5</sup> United States Census Bureau. Advanced Search. 2024; Available from: [Census Bureau - Advanced Search](https://www.census.gov/advance-search).

<sup>6</sup> US Census Bureau. *Methodology for the Intercensal Population and Housing Unit Estimates: 2000 to 2010*. 2012; Available from: <https://www2.census.gov/programs-surveys/popest/technical-documentation/methodology/intercensal/2000-2010-intercensal-estimates-methodology.pdf>.

### *Statistical Analysis*

To determine if a statistically significant excess of cancer existed in the area investigated, the number of observed cancer cases was compared to what would be expected for the area based on cancer rates in Texas.

Characteristics such as race/ethnicity, sex, and age are closely related to cancer. To ensure differences between the numbers of observed and expected cancer cases are not simply due to differences in these demographic characteristics, the expected numbers of cancer cases were calculated by multiplying the age-, sex-, and race/ethnicity-specific cancer incidence rates of Texas residents (reference population) by the number of people in the corresponding demographic groups in the area of investigation.

Standardized incidence ratios (SIRs) were calculated to determine if an excess of cancer exists in the area. The SIR is the number of observed cases compared to (divided by) the number of expected cases for each cancer type. If the SIR is greater than 1.00, that indicates the observed number of cases of a specific cancer type is higher than expected. If the SIR is less than 1.00, that indicates that the observed number of cases of a specific cancer type is lower than expected.

Few, if any, communities will have exactly the same rate as the average state rate for a similar population; most will be higher or lower. Therefore, 95 percent confidence intervals (CI) were calculated for the SIRs to determine if the observed number of cases was statistically significantly different than expected. If a 95 percent CI (range) includes 1.00, no statistically significant excess (or reduction) of cancer is indicated. If a 95 percent CI does not contain 1.00, the SIR is outside the expected range and is statistically significant. When using a 95 percent CI, 5 percent of SIR values calculated is expected to be statistically significantly higher or lower than the state average due to random chance alone.

In all cases, when results are described as significant or not significant, DSHS is referring only to statistical significance, with the understanding that all cases of cancer are significant to the individual, the family, and friends of the individuals who are affected.

### **Results**

Table 1 presents the number of observed cases, the number of expected cases, the SIRs, and the corresponding 95 percent CIs for each all-age cancer type evaluated in the area of investigation.

The number of all-age:

- Cervix uteri, leukemia, lung and bronchus, and lymphoma cancers were statistically significantly greater than expected based on cancer rates in Texas.
- Breast, chronic lymphocytic leukemia, prostate, skin, and thyroid cancers were statistically significantly lower than expected based on cancer rates in Texas.
- Bladder, bone and joint, brain and other nervous system, colon, hypopharynx, kidney, liver, myeloma, nasopharynx, oropharynx, ovary, pancreas, and rectum cancers were within the range of what is expected based on cancer rates in Texas.

Table 1. Standardized Incidence Ratios (SIRs) and 95 percent Confidence Intervals (CIs) for Selected All-Age Cancers in East Harris County, Texas, 2013-2021.

<b>Cancer Type</b>	<b>Observed</b>	<b>Expected</b>	<b>SIR</b>	<b>95% CI</b>
Bladder	318	300.1	1.06	(0.95, 1.18)
Bones and Joints	25	27.0	0.93	(0.60, 1.37)
Brain and Other Nervous System	139	146.5	0.95	(0.80, 1.12)
Breast†	1395	1509.0	0.92	(0.88, 0.97)†
Cervix Uteri*	155	131.0	1.18	(1.00, 1.38)*
Chronic Lymphocytic Leukemia†	77	97.3	0.79	(0.62, 0.99)†
Colon excluding Rectum	647	626.5	1.03	(0.95, 1.12)
Hypopharynx	14	12.3	1.14	(0.62, 1.91)
Kidney	503	492.3	1.02	(0.93, 1.12)
Leukemia*	304	97.3	3.12	(2.78, 3.50)*
Liver	277	292.8	0.95	(0.84, 1.06)
Lung and Bronchus*	1218	1040.1	1.17	(1.11, 1.24)*
Lymphoma*	437	394.4	1.11	(1.01, 1.22)*
Myeloma	172	187.1	0.92	(0.79, 1.07)
Nasopharynx	13	11.8	1.10	(0.59, 1.88)
Oropharynx	23	19.3	1.19	(0.75, 1.79)
Ovary	145	136.0	1.07	(0.90, 1.25)
Pancreas	295	293.9	1.00	(0.89, 1.13)
Prostate†	1090	1187.8	0.92	(0.86, 0.97)†
Rectum	230	209.8	1.10	(0.96, 1.25)
Skin excluding Basal and Squamous†	207	280.7	0.74	(0.64, 0.85)†
Thyroid†	217	297.3	0.73	(0.64, 0.83)†

\*Indicates observed number of cancer cases is statistically significantly **higher** than expected.

†Indicated observed number of cancer cases is statistically significantly **lower** than expected.

Table 2 presents the number of observed cases, the number of expected cases, the SIRs, and the corresponding 95 percent CIs for each childhood cancer type evaluated in the area of investigation.

The number of childhood:

- Central nervous system and miscellaneous intracranial and intraspinal neoplasm cases and leukemia, myeloproliferative and myelodysplastic disease cases was within the range of what is expected based on cancer rates in Texas.
- Lymphomas and reticuloendothelial neoplasm cases was statistically significantly lower than expected based on cancer rates in Texas.

Table 2. Standardized Incidence Ratios (SIRs) and 95 percent Confidence Intervals (CIs) for Selected Childhood Cancers in East Harris County, Texas, 2013-2021.

<b>Cancer Type</b>	<b>Observed</b>	<b>Expected</b>	<b>SIR</b>	<b>95% CI</b>
Central nervous system and miscellaneous intracranial and intraspinal neoplasms	35	44.5	0.79	(0.55, 1.09)
Leukemias, myeloproliferative and myelodysplastic diseases	42	51.6	0.81	(0.59, 1.10)
Lymphomas and reticuloendothelial neoplasms†	13	24.8	0.52	(0.28, 0.90)†

\*Indicates observed number of cancer cases is statistically significantly **higher** than expected.

†Indicated observed number of cancer cases is statistically significantly **lower** than expected.

## Discussion

The primary purpose of this assessment is to determine whether the observed number of cases is statistically significantly greater than expected<sup>1</sup>. It cannot determine the cause of the observed cancers or identify possible associations with any risk factors.

This assessment has several inherent limitations, and results should be interpreted with these limitations in mind. Cancer is not a single disease, but rather many different diseases. Different types of cancers vary in etiologies (causes or origins) and may not share the same predisposing factors. Cancers may be associated with a variety of factors such as genetics, lifestyle, and socioeconomic status. Because cancer is common, cases might



appear to occur with alarming frequencies within a community even when the number of cases is within the expected rate for the population.

Additionally, cancer incidence data are based on residence at the time of diagnosis. As people move, it becomes more difficult to determine whether living in the area of investigation is associated with an excess of cancers, because residential history is not tracked. Latency (the time period elapsed between exposure and illness onset) adds to the complexity of this step in the investigation. For most adult cancers, a period of 10 to 40 years can elapse between the beginning of an exposure to a cancer-causing agent and the development of a clinically diagnosable case of cancer. It is possible that former residents who developed cancer no longer lived in the area at the time of diagnosis, and these cases would not be included in this assessment. It is also possible that new people have moved into the area and then were diagnosed with cancer; these cases are included in this assessment.

For this assessment, DSHS analyzed 25 cancer types within a combined 65-census tract area in East Harris County, Texas, as requested by THEA. However, results should be interpreted with caution, because some of the numbers of observed cancer cases were small. SIRs based on small numbers often yield wide confidence intervals, which reduces the reliability of SIR estimates.

### **Summary of Results**

Based on cancer rates in Texas, the observed number of all-age cervix uteri, leukemia, lung and bronchus, and lymphoma cancers was statistically significantly greater than expected in the geographic area of concern from 2013 through 2021. Other all-age and childhood cancer types were either statistically lower or within the range of what is expected.

The limitations mentioned above must be considered when interpreting these results.

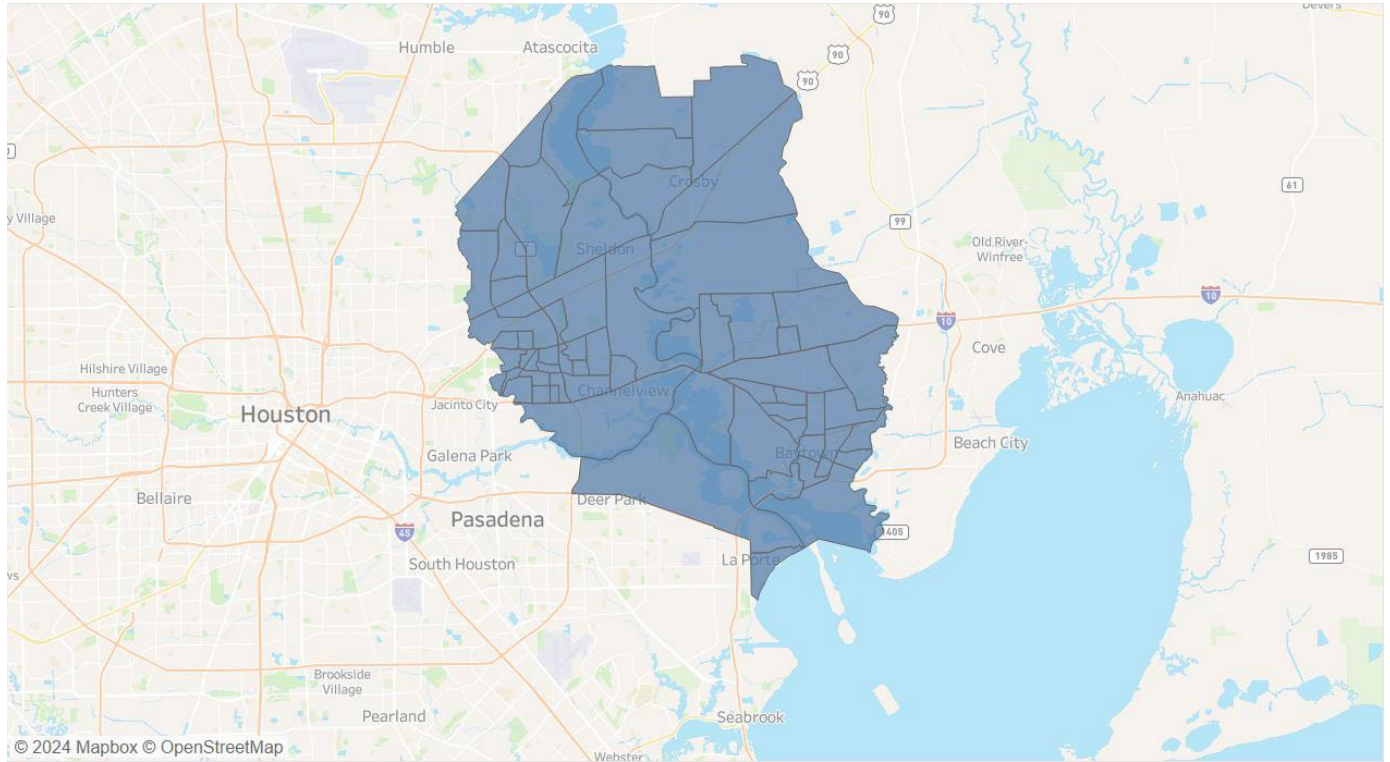
### **Additional Information**

For additional information about cancer clusters, visit the Centers for Disease Control and Prevention, "About Unusual Patterns of Cancer," web page at [About Unusual Patterns of Cancer | Unusual Cancer Patterns | CDC](#).

For additional information on cancer risk factors, visit the American Cancer Society, "Cancer Risk and Prevention" web page at <https://www.cancer.org/cancer/risk-prevention.html>

Questions or comments regarding this investigation may be directed to the Environmental Surveillance and Toxicology Branch, at 1-888-681-0927 (email: [epitox@dshs.texas.gov](mailto:epitox@dshs.texas.gov)).

**Figure 1.** Selected Census Tracts\* (Census 2020) for East Harris County, Texas.



\* A full list of selected census tracts can be found in Appendix A.

**Appendix A**

List of Selected Census Tracts (Census 2020) for East Harris County, Texas

2323.03	2323.04	2323.05	2323.06	2324.02
2324.03	2324.05	2324.06	2328.01	2328.02
2329.01	2329.02	2330.01	2330.02	2330.03
2331.01	2331.03	2331.04	2331.05	2332
2518	2519.02	2519.03	2519.04	2520.01
2520.02	2520.03	2521	2522.01	2522.02
2523.03	2523.04	2523.05	2523.06	2524
2525	2526.01	2526.02	2527	2528
2529.01	2529.02	2530	2531.01	2531.02
2532.01	2532.02	2533	2535.01	2535.02
2536.01	2536.02	2537	2538	2539
2540	2541	2542	2543	2544
2546	2547	2548	3436.01	3436.02