ST. LUCIE COUNTY CANCER ASSESSMENT

February 2019

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Executive Summary

This cancer assessment was completed to address community concerns received by the Florida Department of Health in St. Lucie County (DOH-St. Lucie). Concerned citizens, comprised initially of a local glioblastoma support group, questioned the number of glioblastoma cases occurring in the community. Specifically, concerned citizens questioned if there were higher rates of glioblastoma among individuals younger than 40 years of age and in the geographic areas of zip codes 34982, 34983, and 34952.

For this assessment, the number of observed cases for zip codes 34982 (primary area of concern) and zip codes 34952 and 34983 (secondary areas of concern), and the state age-specific rates from 1998 to 2017 for glioblastoma were gathered from the Florida Cancer Data System (FCDS), Florida's statewide cancer registry. A glioblastoma case was defined based on the International Classification of Oncology, 3rd edition (ICD-O-3) histology codes 9440, 9441, 9442, 9445, 9450, 9451 and Behavior 3.

Cancer can occur randomly among populations. The number of cancer cases may vary from year to year even if there is no change in the population or environment. Overall, cancer occurrence showed a pattern in which most cases occurred over the age of 60 and there were more cancers among males than females as expected.

For this assessment, two time periods (1998-2007 and 2008-2017) were examined. There were no statistically significant differences in the number of observed cases than expected cases for all three areas of concerns.

The Florida Department of Health takes health concerns brought forward by the community very seriously and will continue to take necessary and appropriate actions to ensure the health and safety of our residents. The Department will continue to monitor cancer incidence in the suspected areas of concern. Moreover, the Department will continue to work with local cancer stakeholders to provide education on cancer and what constitutes a suspected cancer cluster in addition to staying abreast of any new medical and scientific discoveries to better understand the occurrence of glioblastoma. Finally, the Department will recommend to the respective advisory boards that funding allocations from the Legislature through the Bankhead-Coley Program and the Live like Bella Program provide opportunities to fund local researchers to conduct studies to better understand the burden and potential risk factors for brain cancer sub-types, more specifically glioblastoma.

Purpose

This cancer assessment was completed to address community concerns received by the Florida Department of Health in St. Lucie County (DOH-St. Lucie). Concerned citizens, comprised initially of a local glioblastoma support group, questioned the number of glioblastoma cases occurring in the community. Specifically, concerned citizens questioned if there were higher rates of glioblastoma among individuals younger than 40 years of age and in the geographic areas of zip codes 34982 (primary area of concern), 34983, and 34952.

Background: Cancer and What Constitutes a Cancer Cluster

Although cancer is a serious and frightening diagnosis, it is a common disease. Current information shows that approximately one out of three Americans will develop cancer in their lifetime, and cancer will affect three out of four families. The risk of developing cancer increases with age, so as the population ages, more cases of cancer are expected in our communities.

The term *cancer* covers not one but many diseases that share the common feature of abnormal cell growth. It can occur in almost any part of the body. Each cancer type develops differently and has different risk factors. For example, the main risk factor for lung cancer is cigarette smoking, but for skin cancer it is sun exposure. The causes of some common cancers such as breast cancer are still unknown.

Many people believe that something in the environment causes most cancers, but behavior and lifestyle accounts for most of the known cancer risks. Factors such as smoking, poor diet, obesity, heavy alcohol use, sexual and reproductive history, and genetic factors can all contribute to developing cancer. It is estimated that less than 10% of cancers are caused by environmental exposures. In contrast, cigarette smoking alone causes about 30% of cancers. In addition, family history is important and contributes to some types of cancer.

Most cancers take a long time to develop. It is usually decades from the time someone is exposed to something that might cause cancer to the time that cancer is discovered. This is one of the reasons that cancer is more common in older adults. In addition, the few chemicals that are linked to cancer must have fairly long and/or concentrated exposures before they typically cause cancer.

A cancer cluster is defined as a greater than expected number of cancer cases that occurs within a group of people in a defined geographic area over a specified period of time. If a suspected cluster includes cancers of different types, it is probably not a “true” cancer cluster. For example, if someone reported that there were many people with cancer in their community, but the kinds of cancer included lung, breast, leukemia, and prostate which are cancers known to have different risk factors; this would not be considered a cancer cluster. A confirmed cancer cluster is a relatively rare occurrence and few documented clusters have been able to be linked to an environmental agent.

To be a cancer cluster, a group of cancer cases must meet the following criteria. Until all of these parameters are met, the group of cancer cases is often referred to as a **suspected cancer cluster**.

A greater than expected number:
A greater than expected number is when the observed number of cases is higher than one would typically observe in a similar setting (in a group with similar population, age, race, or gender). This may involve comparison with rates for comparable groups of people over a much larger geographic area (e.g., an entire state).

Of cancer cases:
All of the cases must involve the same type of cancer or types of cancer scientifically proven to have the same cause.

That occurs within a group of people:
The population in which the cancers are occurring is carefully defined by factors such as race/ethnicity, age, and gender, for purposes of calculating cancer rates.

In a geographic area:
Both the number of cancer cases included in the cluster and calculation of the expected number of cases can depend on how we define the geographic area where the cluster occurred. The boundaries must be defined carefully. It is possible to "create" or "obscure" a cluster by selection of a specific area.

Over a period of time:
The number of cases included in the cluster, and calculation of the expected number of cases, will depend on how we define the time period over which the cases occurred.

It is important to keep in mind that most investigations of suspected cancer clusters in a community or residential setting do not lead to the identification of an associated environmental contaminant given many factors, including the fact that cancer is not a single disease, but has many different forms with each form having its own etiology and risk factors. Furthermore, there is no national threshold or set number of cancer cases to determine or signal there is an elevated number of cancers occurring in a specific group of people or in a defined geographic area or over a specified time period.

Glioblastoma: Definition, Risk Factors, Symptoms, and Treatment

What is Glioblastoma?
Glioblastoma is a cancer of the glial, or supportive, tissue of the brain. Glioblastoma is the most common brain tumor accounting for approximately 54% of all gliomas and 16% of all primary brain tumors. Glioblastoma is also called "glioblastoma multiforme," "grade IV astrocytoma," and "GBM".

GBM is comprised of primary and secondary types, constituting distinct disease entities which evolve through different genetic pathways, affecting patients at different ages, and likely differing in prognosis and response to therapy.

- Primary de novo GBM accounts for more than 80% of GBM occurs in older patients (mean age = 64 years)
- Secondary GBM develops from lower grade astrocytoma or oligodendrogliomas, occurs in younger patients (mean age = 45 years)

What are the Risk Factors for Glioblastoma?

According to the World Health Organization, a risk factor is any attribute, characteristic, or exposure of an individual that increases the likelihood of developing a disease or injury. However, having a risk factor does not necessarily mean you will develop the disease. Many people who have one or more risk factors may never develop cancer whereas people with no known risk factor(s) may develop cancer. Risk factors for glioblastoma, as well as other types of brain tumors, are largely unknown. Scientists continue to conduct environmental, occupational, familial and genetic research to identify glioblastoma risk factors.

According to researchers at Moffitt Cancer Center, the following are possible risk factors for glioblastoma:

- Age: Being 50 years of age or older
- Gender: Males have a greater risk of glioblastoma compared to females.
- Genetic mutations: Change in genetic expression or chromosomal abnormalities on chromosome 10 or 17 may increase the risk of developing glioblastoma.
- Radiation exposure: Prior radiation exposure, especially a history of receiving radiation therapy to the head or neck as part of treatment to a previous cancer, may increase the risk of developing glioblastoma.

At this time what is known is that age remains the universal risk factor for all cancers in which increasing risk of developing any cancer increases starting at the age of 40.

What are the Symptoms for Glioblastoma?

The following symptoms could be caused by glioblastoma. A doctor should be consulted if any of these problems occur. Symptoms of brain tumors are usually due to increased pressure in the brain and include headaches, seizures, memory loss, impairment with speech and vision, and behavior changes.

What are the Treatments for Glioblastoma?

Standard treatments include surgery plus radiation or surgery plus radiation and chemotherapy. A variety of other treatments are currently under investigation in clinical trials.

Who Gets Glioblastoma?

An incidence rate is the rate at which new cancer cases occur in a population. In Florida, glioblastoma incidence rates have remained relatively constant over the last two decades. On average, nationwide and in Florida:

- Approximately, 3-4 cases per 100,000 population occur per year
- More cases occur among non-Hispanic White males
- More cases occur among individuals over 60 years of age

Reference

Tamimi AF, Juweid M. Epidemiology and Outcome of Glioblastoma. In: De Vleeschouwer S, editor. Glioblastoma [Internet]. Brisbane (AU): Codon Publications; 2017 Sep 27. Chapter 8. Available from: https://www.ncbi.nlm.nih.gov/books/NBK470003/ doi: 10.15586/codon.glioblastoma.2017.ch8

Environmental Health Assessment

In response to community concerns of any impact from the local nuclear plant facility and if their drinking water is safe, the Department's Bureau of Radiation Control and Bureau of Environmental Health have summarized below what has been tested and what is known for St. Lucie County.

Radiation

The Florida Department of Health, Bureau of Radiation Control conducts an environmental monitoring program in the vicinity of the St. Lucie Nuclear Power Plant site. The monitoring program meets the U.S. Nuclear Regulatory Commissions (NRC) requirements for a Radiological Environmental Monitoring Program (REMP) and the results are incorporated into the plant's Annual Radiological Environmental Operating Report submitted to the NRC. Copies of the annual reports can be obtained from the following web site:

https://www.nrc.gov/reactors/operating/ops-experience/tritium/plant-specific-reports/stl1-2.html

The monitoring program includes the following sample locations, types and frequency:

- Direct radiation gamma exposure rate at 33 locations by thermoluminescent dosimeters (TLDs). TLDs are collected and analyzed quarterly.
- Airborne radioiodine and particulate samplers are operated continuously at five locations. Samples are collected and analyzed weekly. Analysis include Iodine-131, gross beta and gamma isotopic measurements.
- Surface water samples are collected from two locations. Samples are collected weekly and monthly respectively. Analyses includes gamma isotopic and tritium measurements.
- Shoreline sediments are collected from two locations coinciding with the locations of surface water samples. Samples are collected and analyzed semi-annually. Sediment samples are analyzed by gamma isotopic measurements.
- Fish and invertebrate samples are collected from two locations. Samples are collected and analyzed semi-annually. Fish and invertebrate samples are analyzed by gamma isotopic measurements.
- Broad leaf vegetation samples are collected from three locations. Samples are collected and analyzed monthly. Broad leaf vegetation samples are analyzed by gamma isotopic measurements.

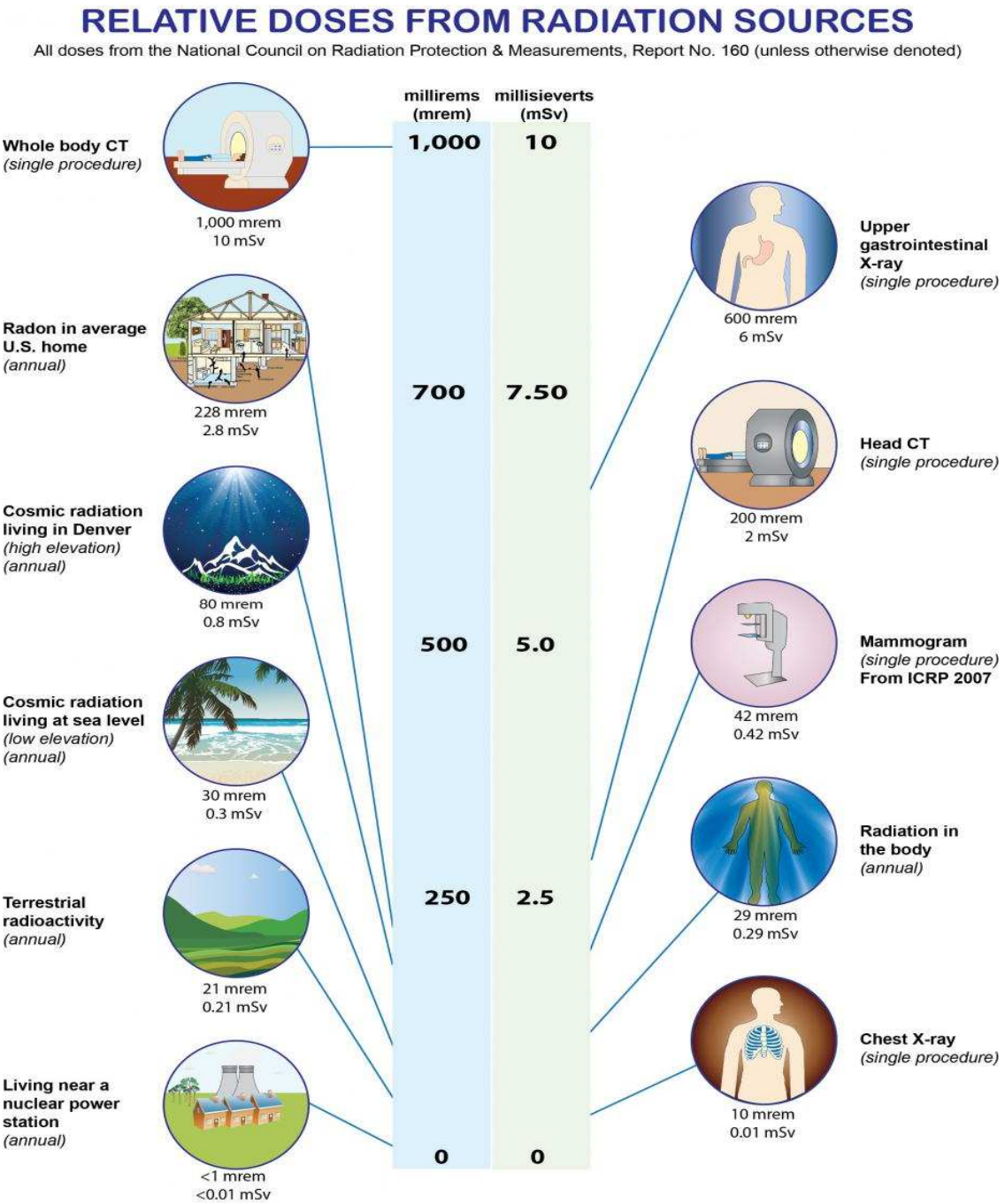
The Department collects additional supplemental samples that include citrus, garden crops, beach sand, shoreline sediment, surface and ground water, air samples and TLDs.

The data obtained through the St. Lucie Plant Radiological Environmental Monitoring Program verifies that the levels of radiation and concentrations of radioactive materials in the environmental samples, representing the highest potential pathways to members of the public, are not being increased. Measured exposure rates are consistent with exposure rates that were observed during the pre-operational surveillance program.

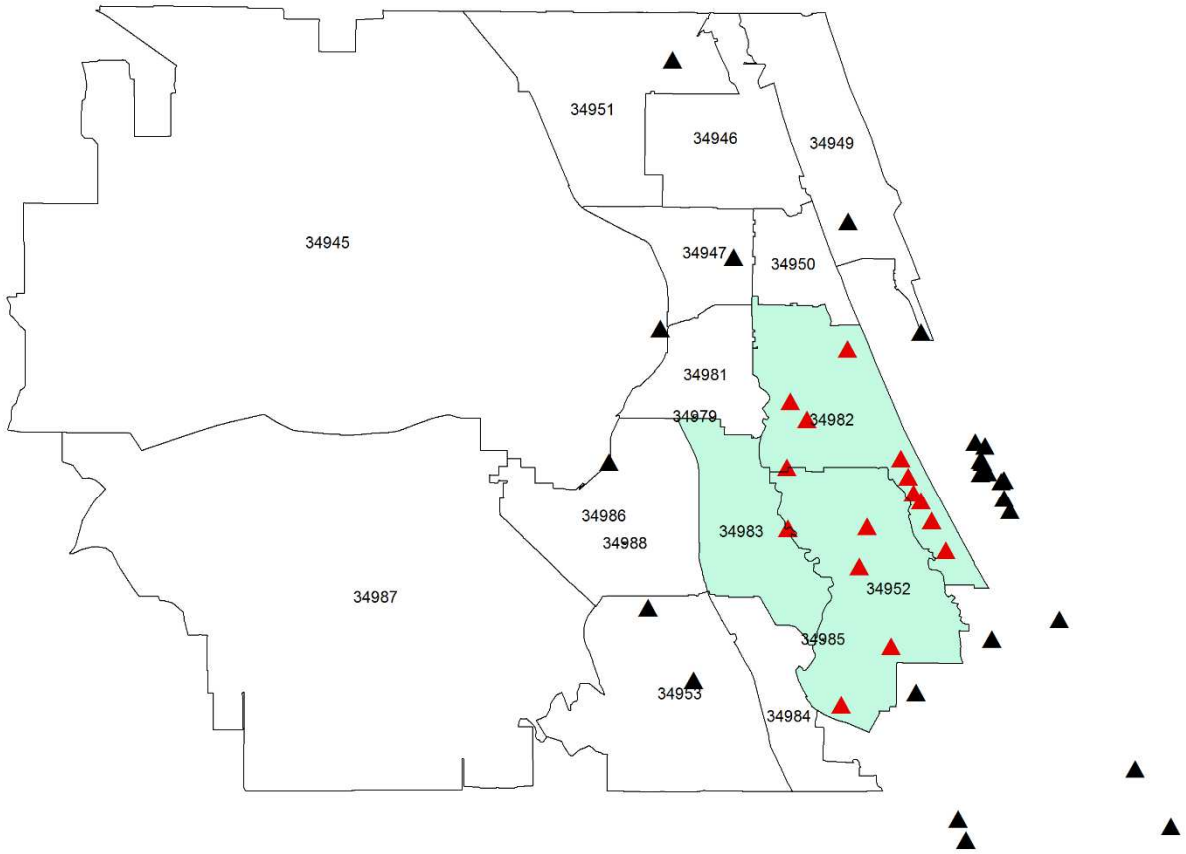
Owned and operated by the Florida Power and Light (FP&L), the St. Lucie Nuclear Power Plant's design safely keeps radiation inside the plant. Radiation releases from the plant measure less than 1 millirem per year.

Every year, a person in the U.S. is exposed to on average approximately 360 millirem from natural background radiation and man-made sources:

- About 82% of radiation exposure comes from natural sources.
- About 18% of radiation exposure comes from medical treatment (e.g., x-rays, nuclear medicine) and consumer products (e.g., watches, TVs, smoke detectors).
- Less than 1% (0.03%) of radiation exposure comes from nuclear power plant operations.



Radiological Environmental Monitoring Program (REMP) Sites, St. Lucie County



Water Quality & Testing

As ingestion is a possible route of exposure for chemical exposure, the Department has reviewed drinking water records from the utility companies and for the private well data that was available within the areas of interest in St. Lucie County. The Bureau of EH did not find areas of chemical concern based upon that review. Much of the county is served by public water supplies which are required to perform extensive chemical and biological testing every quarter. Any violations are required to come into compliance to drinking water standards. If a residence is served by a private well, water testing and upkeep of the water is the responsibility of the owner. The Florida Department of Health does have a program that can help a private owner determine whether their potable water is at risk. (http://www.floridahealth.gov/environmental-health/private-welltesting/index.html).

Methods

For this assessment, the number of observed cases for zip codes 34982 (primary area of concern) and zip codes 34952 and 34983 (secondary areas of concern), and the state age-specific rates from 1998 to 2017 for glioblastoma were gathered from the Florida Cancer Data System (FCDS), Florida's statewide cancer registry. A glioblastoma case was defined based on the International Classification of Oncology, 3rd edition (ICD-O-3) histology codes 9440, 9441, 9442, 9445, 9450, 9451 and Behavior 3.

The FCDS is legislatively mandated per Section 385.202 *Florida Statutes* to collect incidence data (i.e., the number of new cancers per year) on all cases diagnosed in the state of Florida. The FCDS has collected cancer incidence data from hospitals statewide since 1981 and from non-hospital sources (i.e., ambulatory surgical centers, radiation therapy centers, pathology laboratories, and private physician offices) since 1997. The main goal of the FCDS is to gather complete, accurate, and timely data to assist policy makers and researchers in developing policy and programs to reduce death and illness due to cancer by better understanding cancer trends and possible causes of cancer.

There are limitations to using the FCDS data to address community cancer concerns. Although the FCDS data can be provided by select geographical areas (based at the time of diagnosis), these data represent a retrospective account of the burden of cancer for the area of concern. The FCDS collects outcome data; like other state cancer registries, the FCDS does not collect environmental exposures, complete genetic data, nor residential history. The data submitted by hospital and non-hospital reporters to the FCDS describes "who", "what", "when", and "where" of the cancer case. However, the FCDS does not collect data as to "why" nor can analyses of FCDS data alone determine why the occurrence of cancer in a specific area or population is happening. Moreover, there is an inherent delay in collecting cancer incidence data. Reporting entities have up to six (6) months after the initial date of diagnosis to report the cancer case information to the Florida Department of Health. This six-month period permits the cancer case information to include the completed initial course of treatment. In addition, the FCDS must conduct external linkages with the Department's Bureau of Vital Statistics and the Agency for Health Care Administration to ensure the completeness and accuracy for the diagnosis year. Therefore, cancer data from the FCDS is not available for official release until two years after the close of the diagnosis year. However, for this assessment, the FCDS data acquisition staff worked with local hospitals in St. Lucie County and surrounding counties (Indian River, Martin, and Okeechobee) to ensure all cancers of the brain and central nervous system through 2017 were submitted and included in this review.

For this request, there were three areas of analysis: 34952, 34982, and 34983. For each zip code, the cancer count (i.e., the number of observed cases) among females and males for glioblastoma was obtained from the FCDS in addition to the state age-specific rate for glioblastoma. Population data for the three zip codes were obtained from the 2000 and 2010 U.S. Census respectively. An estimate of the total population for the time period from 1998 to 2007 for each zip code was calculated by multiplying the 2000 U.S. zip code tabulated area (ZCTA) population by 10. Likewise, an estimate of the total population for the time period from 2008 to 2017 for each zip code was calculated by multiplying the 2010 ZCTA population by 10.

The standardized incidence ratio (SIR) was calculated to determine if there was a greater than expected number of cases for glioblastoma for the three zip codes. The SIRs were calculated for each time period for each of the three zip codes. Ten-year time periods were used in this review to permit statistically sound analyses, ensuring that there was a sufficient population size for the area of concern to meet mathematical assumptions necessary to calculate appropriate statistics.

$$\text{Standardized Incidence Ratio (SIR)} = \frac{\text{Observed Incidence}}{\text{Expected Incidence}}$$

Observed cases are the number of cases found within the FCDS for the area of concern. Expected cases are calculated based on the age-sex population gathered from the 2000 and 2010 U.S. Census, respectively, for the suspected area of concern and the state age-sex specific rates obtained from the FCDS.

Statistical tests were performed to determine the likelihood of difference between observed and expected cases. Statistical testing was based on the 95% confidence interval of the SIR calculated. If the 95% confidence interval contained the value ‘1’, then the difference between “observed” and “expected” numbers was likely due to chance. If the 95% confidence interval did not contain the value ‘1’, then the difference in two numbers was unlikely due to random factors, and the numbers are “statistically significantly” different.

Results

Table 1. Standardized Incidence Ratio (SIR) for Glioblastoma among Females by ZIP, St. Lucie County, Florida, 1998-2007

ZIP	Observed Cases*	Expected Cases**	SIR (95% CI)+	Significant++
34952	8	8.3	1.0 (0.3, 1.6)	No
34982	4	4.6	0.9 (0.0, 1.7)	No
34983	7	4.9	1.4 (0.4, 2.5)	No

*Number of cancers found within the Florida Cancer Data System
**Number of expected cases are calculated using the state-specific rate for the respective cancer type and 2000 U.S. Census population for the respective ZIP/ZCTA
+Confidence Interval
++If the confidence interval includes the value '1', then not statistically significant

Table 2. Standardized Incidence Ratio (SIR) for Glioblastoma among Females by ZIP, St. Lucie County, Florida, 2008-2017

ZIP	Observed Cases*	Expected Cases**	SIR (95% CI)+	Significant++
34952	12	9.8	1.2 (0.5, 1.9)	No
34982	3	4.6	0.7 (0.0, 1.4)	No
34983	4	6.5	0.6 (0.0, 1.2)	No

*Number of cancers found within the Florida Cancer Data System
**Number of expected cases are calculated using the state-specific rate for the respective cancer type and 2010 U.S. Census population for the respective ZIP/ZCTA
+Confidence Interval
++If the confidence interval includes the value '1', then not statistically significant

Table 3. Standardized Incidence Ratio (SIR) for Glioblastoma among Males by ZIP, St. Lucie County, Florida, 1998-2007

ZIP	Observed Cases*	Expected Cases**	SIR (95% CI)+	Significant++
34952	17	10.4	1.6 (0.9, 2.4)	No
34982	7	5.9	1.2 (0.3, 2.1)	No
34983	4	6.7	0.6 (0.0, 1.2)	No

*Number of cancers found within the Florida Cancer Data System
**Number of expected cases are calculated using the state-specific rate for the respective cancer type and 2000 U.S. Census population for the respective ZIP/ZCTA
+Confidence Interval
++If the confidence interval includes the value '1', then not statistically significant

Table 4. Standardized Incidence Ratio (SIR) for Glioblastoma among Males by ZIP, St. Lucie County, Florida, 2008-2017

ZIP	Observed Cases*	Expected Cases**	SIR (95% CI)+	Significant++
34952	13	12.5	1.0 (0.5, 1.6)	No
34982	6	6.1	1.0 (0.2, 1.8)	No
34983	11	8.9	1.2 (0.5, 2.0)	No

***Number of cancers found within the Florida Cancer Data System

**Number of expected cases are calculated using the state-specific rate for the respective cancer type and 2010 U.S. Census population for the respective ZIP/ZCTA

+Confidence Interval

++If the confidence interval includes the value '1', then not statistically significant

Conclusions and Next Steps

Cancer can occur randomly among populations. The number of cancer cases may vary from year to year even if there is no change in the population or environment. Overall, the occurrence of glioblastoma in the areas of concern showed a pattern in which most cases occurred over the age of 60 and among males than females as expected.

For this assessment, two time periods (1998-2007 and 2008-2017) were examined. There were no statistically significant differences in the number of observed cases than expected cases for all three areas of concerns during the respective time period.

Furthermore, there are important contributing factors that are not included in an analysis of the standardized incidence ratio (SIR), such as the personal and family medical history of persons diagnosed with the respective cancer type and the length of time the person was living within that zip code. The SIR was adjusted for age and stratified by gender, but other factors that increase or decrease one's risk of developing cancer could not be addressed. The Department will continue to research and stay abreast of emerging public health applications and statistical methods to improve upon current methodologies in calculating area-based SIRs.

The data from the FCDS provides a background cancer rate of occurrence among the general population. Although FCDS data can be provided by select geographical area (based at the time of diagnosis), these data represent a retrospective account of the burden of cancer for the area(s) of concern. The FCDS collects outcome data; the FCDS does not collect environmental exposures, complete genetic information, nor residential history. The data submitted by health care providers to the FCDS describes "who", "what", "when", and "where" of the cancer case. However, the FCDS does not collect data to determine why a particular person has developed cancer. Nor can analyses of FCDS data alone determine why cancers are more or less common than expected in a specific area or population.

It is important to keep in mind that most investigations of suspected cancer clusters in a community or residential setting do not lead to the identification of an associated environmental contaminant given many factors, including the fact that cancer is not a single disease, but has many different forms with each form having its own etiology and risk factors.

The Department will continue to monitor cancer incidence in the suspected areas of concern. Moreover, the Department will continue to work with local cancer stakeholders to provide education on cancer and what constitutes a suspected cancer cluster in addition to staying abreast of any new medical and scientific discoveries to better understand the occurrence of glioblastoma. Finally, the Department will recommend to the respective advisory boards that funding allocations from the Legislature through the Bankhead-Coley Program and the Live like Bella Program provide opportunities to fund local researchers to conduct studies to better understand the burden and potential risk factors for brain cancer sub-types, more specifically glioblastoma.

Frequently Asked Questions

What is a cancer cluster?

A cancer cluster is defined as a greater-than-expected number of cancer cases that occurs within a group of people in a defined geographica area over a specified period of time. When people learn that several friends, family members, or neighbors have found out they have cancer, cancer clusters are often suspected. Cancer clusters are also sometimes suspected when people who work at the same place or have other factors in common get cancer.

What are the criteria for a group of cancer cases to be considered a cluster?

To be a cancer cluster, a group of cancer cases must meet the following criteria:

- Include a large number of cases of one type of cancer or types of cancer scientifically proven to have the same cause or etiology, rather than several different cancer types.
- The observed number of cases is higher than one would typically observe in a similar setting (e.g., in a group with a similar population, age, race, or gender).

Other important factors in evaluating reports of cancer clusters are:

- A rare type of cancer, rather than common types.
- An increased number of cases of a certain type of cancer in an age group that is not usually affected by that type of cancer.
- The type of cancer involved is a primary (original) cancer not a metastasized (spread from another organ) cancer.

How are suspected cancer clusters investigated?

Not all community concerns of excess cancer require investigation; oftentimes, community concerns can be resolved by providing general cancer educational information, facts and resources.

When needed, a local or state health department gathers information about the suspected cancer cluster. This commonly includes the types of cancer, number of cases, age, sex, race, address, and age at diagnosis of the individuals with cancer. The department reviews this available information and determines if analysis of cancer rates and other investigative steps are needed to better understand the situation.

If the department determines that analysis is needed, this involves confirming the number and types of cancers in the community and comparing this to what might be expected based on state or county rates of cancer. Specific analysis (such as investigating just childhood rates, or just among women in the case of breast cancer) may also be needed depending upon the type of concern. The department communicates and discusses the results of the analysis with the community.

Where do I go for additional information?

Centers for Disease Control and Prevention (CDC) Cancer Clusters

Agency for Toxic Substances and Disease Registry

National Cancer Institute (NCI) Cancer Clusters

What is FCDS (Florida Cancer Data System)?

The FCDS is Florida's statewide cancer surveillance system. The FCDS is legislatively mandated to collect incidence data on all cancers diagnosed in Florida per Section 385.202 *Florida Statute.* The FCDS has been collecting the number of new cancers diagnosed each year statewide since 1981. The FCDS is used to observe cancer trends and provide a research base for studies into the possible causes of cancer.

What kind of cancer cases must be reported to FCDS?

Florida statute requires all malignant cancers reportable with the following *exceptions* - In situ carcinoma of the cervix (CIS), intraepithelial neoplasia grade III of the cervix (CIN III) and intraepithelial neoplasia of the prostate (PIN III) are *not reportable.* Basal and squamous cell carcinoma of non-genital skin sites are *not reportable* regardless of extent of disease at the time of diagnosis or the date of first contact with the reporting facility. *Reportable* on or after diagnosis date of 01/01/2001 are Intraepithelial neoplasia Grade III of vulva (VIN III), vagina (VAIN III) and anus (AIN III) and Myelodysplastic Syndrome (MDS). All patients with an active, benign or borderline brain or central nervous system (CNS) tumor, diagnosed on or after 01/01/2004, whether being treated or not *are reportable.* All cancer cases diagnosed and/or treated in Florida since 1981 must be reported to the FCDS.

What kind of data is collected?

The FCDS requires that the data collected include information which indicates diagnosis, stage of disease, patient demographics, laboratory data, tissue diagnosis and methods of diagnosis or treatment for each cancer diagnosed or treated in Florida.

Who is required to report cancer cases to FCDS?

All facilities licensed under Chapter 395 and each freestanding radiation therapy center under Section 408.07; All ambulatory surgical centers as specified by Rule 64D-3.034; Any licensed practitioner in the state of Florida that practices medicine, osteopathic, chiropractic medicine, naturopathy or veterinary medicine are required to report under Chapter 381 or any laboratory licensed under Chapter 483 that diagnoses or suspects the existence of a cancer.

What types of water testing is available?

The Florida Department of Environmental Protection has the primary role of regulating public water systems in Florida. All public water systems are required to periodically test the water served to the public for contamination. The different types of contaminants are divided into groups. These include: Inorganic, Microbiological, Synthetic Organic, Volatile Organic and

Miscellaneous Contaminants and Radionuclides and Secondary Drinking Water Standards (see: https://floridadep.gov/water/source-drinking-water/content/standards-and-health-effects-drinking-water-contaminants).

If a residence is served by a private well, water testing and upkeep of the water well is the responsibility of the owner. The Florida Department of Health does have a program that can help a private owner determine whether their potable water is at risk. http://www.floridahealth.gov/environmental-health/private-well-testing/index.html

Is water quality info available online?

The United States Environmental Protection Agency has an online portal that can be used to find this type of information at: https://echo.epa.gov/?redirect=echo. The Florida Department of Health along with the Florida Department of Environmental Protection is working to streamline the way people can get information on their drinking water quality.

What is Radon and how do we check for it?

Radon comes from the breakdown of naturally occurring radium found in most soils. As a gas in the soil, it enters buildings through small openings in the foundation. Radon can damage your lungs and even cause cancer. Health effects from radon are more serious for those who smoke. Testing for radon is the only reliable way to find out if there are elevated levels in your home. It's easy and you can do the test yourself. Best of all, by using a coupon on this web site, (http://www.floridahealth.gov/environmental-health/radon/_documents/florida-radon-testkit-coupon.pdf) it's free. You can also get a radon test kit at your local hardware store for less than $15.00.

Why is radon more common in some areas vs. other areas?
Radon comes from certain types of geology in Florida. You can find more information on radon at: http://www.floridahealth.gov/environmental-health/radon/radon-faq.html

Should I have my water tested for radiation?
Basic testing for radiation is recommended annually. If you live in an area that is known for Naturally Occurring Radioactive Materials (NORM) in groundwater, then it is recommended that testing is also completed for gross alpha.

Appendices

Appendix A.1. Zip Code Tabulation Area 2000 U.S. Census Population

	34952		34982		34983	
Age Group	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
0-4	737	684	706	711	742	712
5-9	810	799	768	757	942	899
10-14	804	764	769	768	1142	979
15-19	722	720	705	666	930	850
20-24	544	594	635	590	562	524
25-29	628	655	681	667	639	651
30-34	725	798	690	699	762	805
35-39	908	1013	807	712	1058	1130
40-44	948	1023	820	804	1100	1202
45-49	854	856	736	760	972	1058
50-54	736	940	629	698	946	963
55-59	679	930	579	614	677	757
60-64	813	1010	519	622	556	660
65-69	1116	1271	552	660	607	650
70-74	1223	1381	601	713	594	686
75-79	1078	1435	486	673	547	597
80-84	770	979	315	450	341	386
85+	489	931	174	282	175	278

Appendix A.2. Zip Code Tabulation Area 2010 U.S. Census Population

	34952		34982		34983	
Age Group	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
0-4	883	801	815	840	1203	1105
5-9	891	866	848	799	1376	1186
10-14	929	839	775	748	1446	1375
15-19	924	879	847	753	1369	1331
20-24	911	963	738	698	1065	1044
25-29	967	985	742	735	1050	1096
30-34	910	894	685	692	1102	1140
35-39	869	905	708	688	1179	1317
40-44	994	1058	755	766	1305	1341
45-49	1177	1243	879	837	1470	1547
50-54	1165	1326	847	847	1416	1569
55-59	1182	1362	750	747	1180	1283
60-64	1267	1588	670	766	1185	1193
65-69	1239	1525	584	694	823	925
70-74	1236	1391	471	601	678	744
75-79	1083	1218	402	525	450	559
80-84	842	1021	336	372	338	441
85+	741	1211	211	373	245	404

Appendix B.1. Number of Male Cases by Age Group by Zip Code, 1998-2007

	ZIP 34952	ZIP 34982	ZIP 34983
Age Group			
0-4	0	0	0
5-9	0	0	0
10-14	0	0	0
15-19	0	1	0
20-24	0	0	0
25-29	0	0	0
30-34	0	0	0
35-39	0	0	1
40-44	1	1	0
45-49	0	0	0
50-54	0	0	0
55-59	1	0	0
60-64	3	1	0
65-69	2	1	0
70-74	4	0	0
75-79	3	3	3
80-84	0	0	0
85+	3	0	0
Total	17	7	4

Appendix B.2. Number of Male Cases by Age Group by Zip Code, 2008-2017

	ZIP 34952	ZIP 34982	ZIP 34983
Age Group			
0-4	0	0	0
5-9	0	0	0
10-14	0	0	0
15-19	0	0	0
20-24	0	0	0
25-29	0	1	0
30-34	1	0	0
35-39	0	0	0
40-44	0	0	1
45-49	1	0	0
50-54	0	1	2
55-59	0	2	0
60-64	2	1	5
65-69	3	0	2
70-74	3	1	0
75-79	3	0	1
80-84	0	0	0
85+	0	0	0
Total	13	6	11

Appendix C. 1996 St. Lucie County Cancer Cluster Investigation

Executive Summary
1996 St. Lucie County Cancer Cluster Investigation

In the period 1981 to 1996, 8 children are known to have been diagnosed with neuroblastoma (a type of cancer affecting the peripheral nervous system), and 20 central nervous system (CNS) cancers in St. Lucie County. This was statistically greater than the number of these cancers to be expected in a population the size of our county at that time. There were eight different forms of cancer, no two of which are known to have the same causative factor.

In 1996 the Florida Department of Health and the St. Lucie County Health Department embarked upon an extensive environmental and epidemiological investigation of this problem with the guidance and assistance of the Agency for Toxic Substance & Disease Registry (ATSDR) of the Centers for Disease Control, the American Cancer Society, and recognized experts in the field of pediatric oncology. The project had the full support and resources of Dr. James Howell, (then) Secretary of the Florida Department of Health, (then) United States' Representative Mark Foley, (then) State Senator Dr. William "Doc" Myers, (then) State Representative Ken Pruitt (then), and the locally based Suffer the Children Foundation.

A comprehensive literature review was begun immediately to determine what was already known of the sources of these cancers and to determine what information is currently available regarding any previous cancer and environmental research and testing done in St. Lucie County. A review of the children's medical records was done to confirm the diagnosis of cancer. Meanwhile, detailed information was gathered by the health department epidemiologist on the geographic location of the children during critical times for cancer development. In addition, lifestyle, medical history and parent health information was compiled by the epidemiologist. No common concerns were identified or common potential exposures were identified.

The environmental testing process began with the development of a wide range of chemicals and compounds, detailed sampling procedures, and precise testing methods to be done at each of the focus sites and matching control location; 44 sites in all. Samples were taken of soil, air, water, and dust and tested for over 561 different chemical and radiological compounds at a cost of $4,450 per site. Testing was done through the State of Florida Jacksonville Regional Laboratory. The laboratory standard was set that testing results would have absolutely no qualifiers (questionable results) which resulted in several re-samplings. Results were analyzed by the Florida Department of Health and the ATSDR. The Department of Health also offered to pay for an additional analysis of the information made by comparably credentialed individual or organization chosen by the Suffer the Children Foundation.

Public meetings were held to inform the community of progress, to welcome input, and to answer any questions. Parents and the community were included in every part of the investigation as advisors.

No environmental or epidemiologic (causal) links to cancer were found.

Additional Investigation Highlights

Bureau of Radiological Health investigators surveyed each site for radiation. The sampling and testing took over a year (1997-1998). Since there was no tolerance for questionable laboratory results, numerous re-samplings were conducted to assure unquestioned and accurate results. No chemical or radiological anomalies were found.

The Radiation and Public Health Project, known as the 'Tooth Fairy Project,' has been brought up many times in light of the fact that St Lucie County has a nuclear power plant. Florida Department of Health epidemiologists closely reviewed that report and found it to be seriously flawed scientifically. Similar conclusions were reached by the Nuclear Energy Institute (www.nei.org); Dade Moeller, Prof Emeritus, Harvard University; Dr. Francisco Tejada, Sylvester Comprehensive cancer Center of the University of Miami Hospital and Clinics; and Nuclear Regulatory Commission, response to Dr. Jerry Brown, January 15, 2002. In addition, claims that the plant contaminates the water supply with Strontium 90 does not address the fact that the plant is on a barrier island to the east of the mainland, and that St Lucie County's groundwater flows southeast, thus the plant is downstream.

Florida Department of Health Contact Information

This assessment report was completed by information gathered and/or maintained by the following state program offices:

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