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Governor Cuomo's Cancer Research Initiative

Centereach/Farmingville/Selden Cancer Incidence Investigation

November 2019

Today's Presentation

- Introduction & Background on the Initiative

- Approach

- Findings

- Limitations

- Conclusions

- Recommendations

- Acknowledgments

- Questions

Introduction & Background on the Initiative

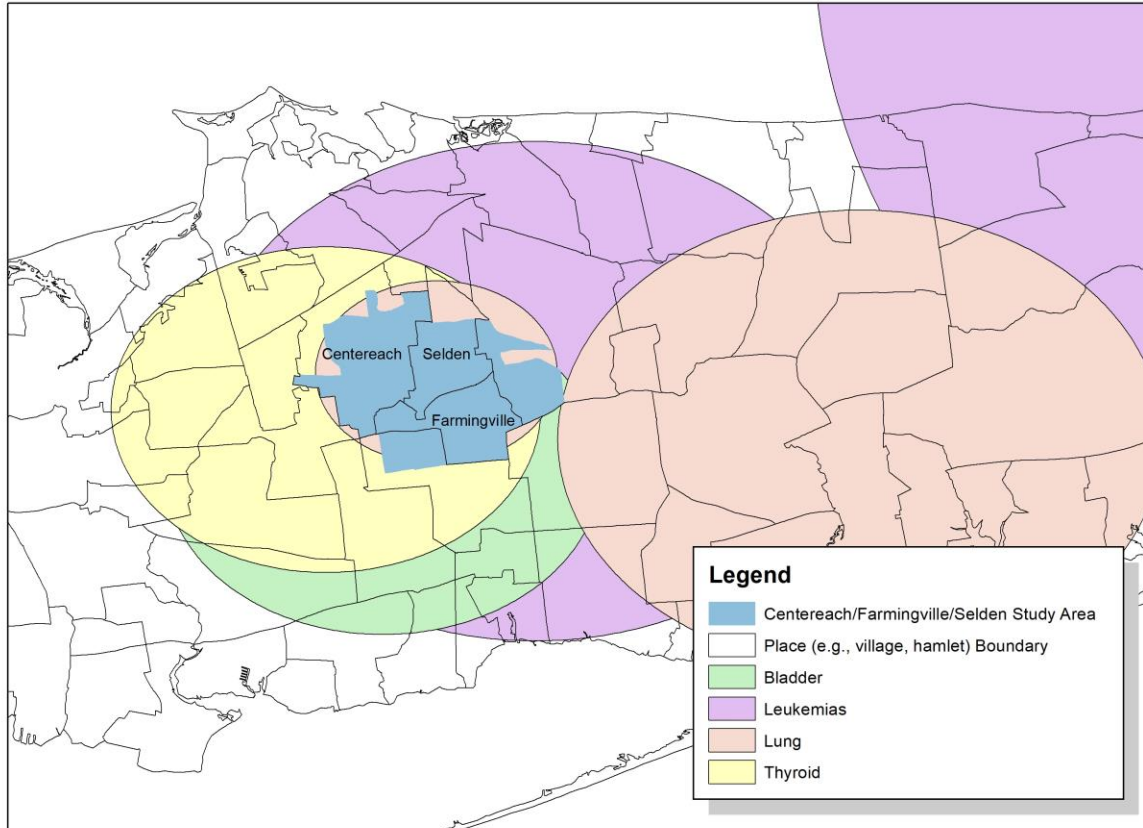# Purpose of the Governor's Cancer Research Initiative

- Learn more about the patterns of cancer in New York

- Identify any reasons for these patterns

- Enhance prevention and screening efforts

- Support access to appropriate high-quality health care services

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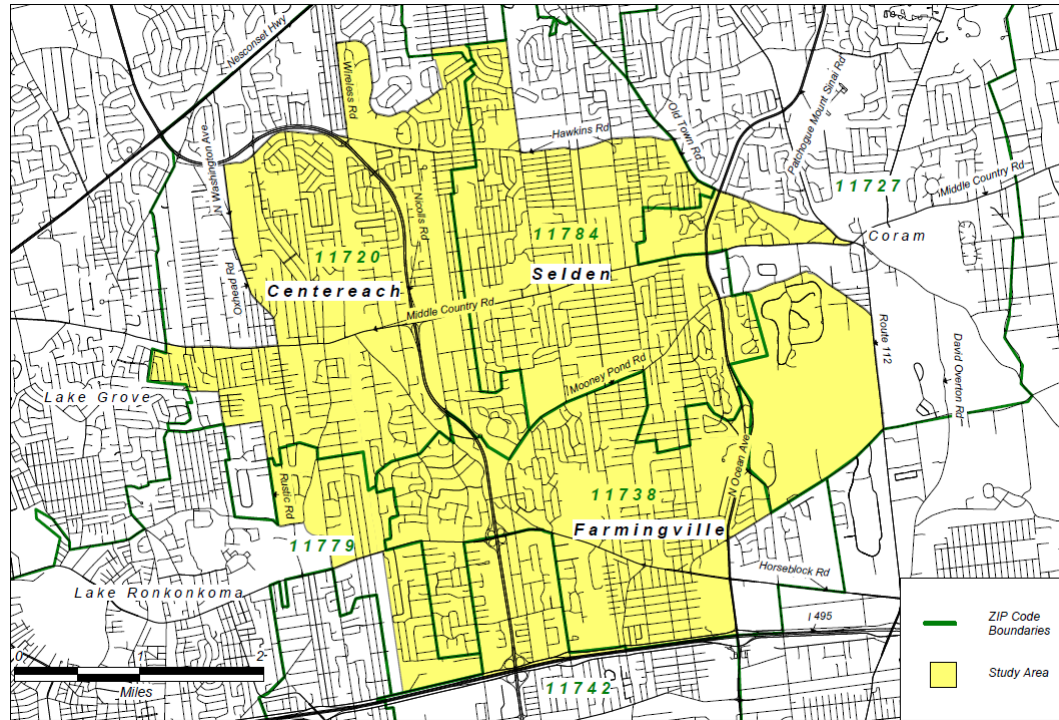
Selection of Four Study Areas

- **Warren County**: highest overall cancer rate in NYS, 2011-2015

- **Staten Island**: highest overall cancer rate among 5 NYC boroughs, 2011-2015

- **East Buffalo/West Cheektowaga**: where six high clusters overlap (colorectal, esophagus, kidney, lung, oral, prostate)

- **Centereach, Farmingville, Selden**: where four high clusters overlap (bladder, leukemia, lung, thyroid)

Study Area Locations

Warren County

East Buffalo/West Cheektowaga

Centereach-Farmingville-Selden

Staten Island

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Centereach/Farmingville/Selden study area

Legend

- Centereach/Farmingville/Selden Study Area
- Place (e.g., village, hamlet) Boundary
- Bladder
- Leukemias
- Lung
- Thyroid

Centereach/Farmingville/Selden study area

Timeline and Milestones

October 2017: initiative announced in Warren County and Staten Island

October – June 2018: other two study areas identified; cancer maps updated

July 2018: regional meetings held with elected officials, stakeholders and public

November 2018: study update posted on DOH website and emailed to attendees of July meetings

July 2018 – August 2019: data analyzed and reports drafted

October - November 2019: reports released; regional webinars and meetings to share study findings

Approach

Approach

- Literature review on the risk factors for elevated cancers

- Evaluation of:

  - Trends and patterns for elevated cancers in study area compared to other areas of NYS

  - Environmental factors that were unusual in study area compared to other areas of NYS

  - Behavioral, healthcare and occupational factors that were unusual in study area compared to other areas of NYS

- For most factors, no information was available on whether the people with cancer actually had or were exposed to this factor

- Study cannot draw definitive conclusions about what caused the elevations in cancer but may suggest factors that contributed to elevations

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Source of cancer data

The **New York State Cancer Registry** was the primary source of information on cancer occurrence.

- Reporting to the Cancer Registry is mandated by NYS law.

- Hospitals, physicians, laboratories, other healthcare facilities provide information.

- Over 100,000 new cases are reported annually.

- Information collected includes information on the cancer (anatomic site, stage, cell type), demographic information on the patient (age, gender, race/ethnicity, residence) and date and cause of death (if any).

- The Registry has received Gold-level certification since 1998, and was recently added to the NCI's SEER program.

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Data sources for environmental review

- Data on **outdoor air quality** were obtained from the US EPA's Air Quality System database, which contains results of monitoring for air pollutants, and their National-scale Air Toxics Assessment program, which estimates levels of specific toxic chemicals in the air.

- **Radon** concentrations in indoor air were based on analyses of DOH-provided test kits for years 1987- 2015.

- Information on **drinking water quality** was obtained from the Suffolk County Water Authority for the public water supply. Available data on private wells were obtained from the Suffolk County Department of Health Services.

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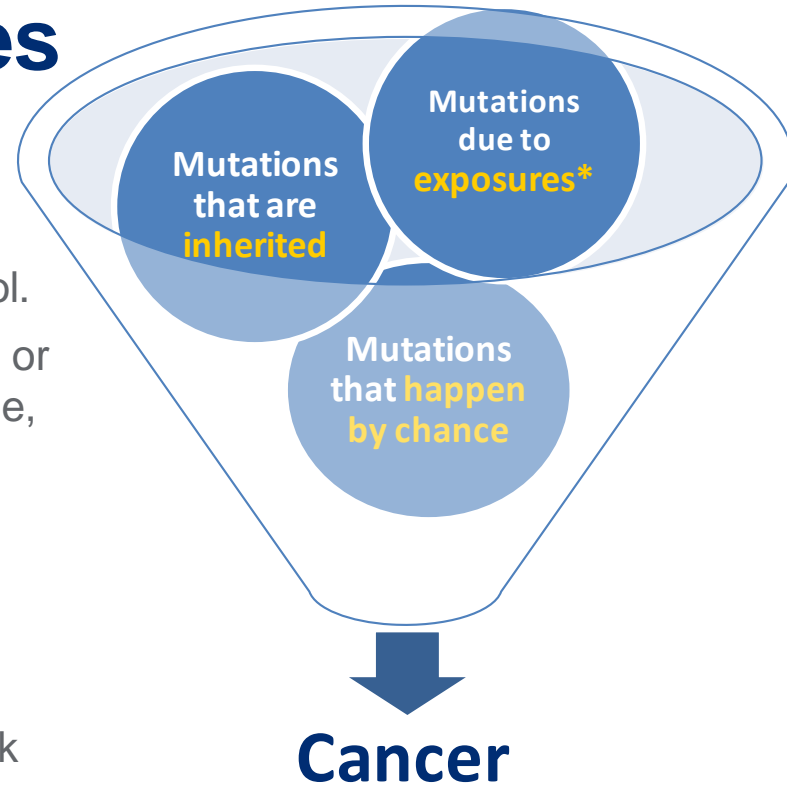
Data sources for environmental review

- Information on **industrial and inactive hazardous waste disposal sites** was obtained from an inventory of inactive hazardous waste sites and brownfield sites developed by DOH and DEC. Area residents who participated in public meetings also identified sites of concern.

- Data on **pesticide** applications by commercial applicators were obtained from the Pesticide Sales and Use Reporting database. This database does not include pesticide applications by property owners.

- **Traffic counts** were obtained from the NYS Department of Transportation traffic monitoring program.

Data sources on sociodemographic, behavioral and healthcare factors

- Information on **sociodemographic** characteristics was obtained from the US Census and the Census Bureau's American Community Survey.

- Information on **behavioral** and **healthcare** factors was obtained from the Behavioral Risk Factor Surveillance System (BRFSS) and the New York Statewide Planning and Research Cooperative System (SPARCS).

  o BRFSS is an annual statewide telephone survey designed by the US Centers for Disease Control and Prevention (CDC).

  o SPARCS contains data on hospital inpatient and outpatient discharges.

Background: What causes cancer?

- Cancer begins when the genes in a cell are damaged (mutations) and the cells grow out of control.

- Mutations may be ones you are born with (inherited), or that happen due to chance when cells grow and divide, or that happen after exposure to a cancer-causing substance.

- Several mutations may need to occur in a person to lead to cancer.

- Some people with several risk factors may never develop cancer, while other people with no known risk factors do.

*Exposures: UV radiation, smoking, alcohol, certain chemicals, etc..

Mutations that are **inherited**

Mutations due to **exposures***

Mutations that **happen by chance**

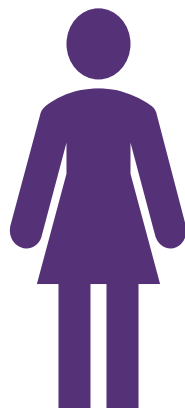**Cancer**

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Background: What causes cancer?

- Different cancers have different causes and risk factors.
- Anyone can get cancer; there are many factors that affect a person's chances of getting cancer.
- Some cancer risk factors can be changed, and others cannot:
  - Family history, genetics, race and ethnicity
  - Lifestyle factors: smoking, unhealthy diet, excessive alcohol, physical inactivity
  - Other exposures: Ultraviolet radiation from sunlight and indoor tanning devices, x-rays, certain chemicals that may be found in the air, water, food, drugs and workplace.
  - Chronic inflammation, infectious agents, immunosuppression
  - Often multiple interacting factors

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Background: Most Frequently Diagnosed Cancer Types in Females and Males, New York State, 2012-2016

Females	
Cancer Type	New Cases*
Breast	15,932
Lung	6,979
Colorectal	4,396
Uterine	4,090
Thyroid	3,138
All sites	56,389

Males	
Cancer Type	New Cases*
Prostate	13,767
Lung	6,824
Colorectal	4,585
Bladder	3,988
Lymphoma^	2,645
All sites	55,138

Average annual incident cases
^ Non-Hodgkin Lymphoma

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Findings

Findings: demographics

Characteristic	NYS	NYS excl. NYC	Suffolk County	CFS study area
	Percent	Percent	Percent	Percent
Race				
White alone	64.6	80.5	81.0	87.4
Black alone	15.6	8.9	7.7	4.5
Am. Indian, Alaskan Native alone	0.4	0.4	0.2	0.4
Asian alone	8.0	3.8	3.8	4.1
Other race alone	8.6	3.7	5.0	2.1
Two or more races	2.9	2.6	2.4	1.6
Ethnicity				
Hispanic	18.4	10.5	17.8	15.7
Non-Hispanic	81.6	89.5	82.1	84.3
High School/College Diploma, age 25+	85.6	89.7	89.9	91.5
Foreign Born	22.5	11.4	15.1	12.3
Above Poverty	84.3	88.1	93.0	93.9

The CFS study area is more similar to NYS excl. NYC than to NYS.

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Findings: demographics

When the more appropriate comparison population is used, expected numbers and percent excesses change. All differences remain statistically significant.

Cancer type	CFS study area	NYS Standard		NYS excl. NYC Standard	
	Observed	Expected	Percent excess	Expected	Percent excess
Lung/bronchus	311	199.3	*56	222.0	*40
Urinary Bladder (including in situ)	112	74.8	*50	86.3	*30
Thyroid	98	68.5	*43	67.3	*46
Leukemia	87	53.1	*64	57.7	*51

Further analyses were therefore based on NYS excl. NYC as the comparison population.

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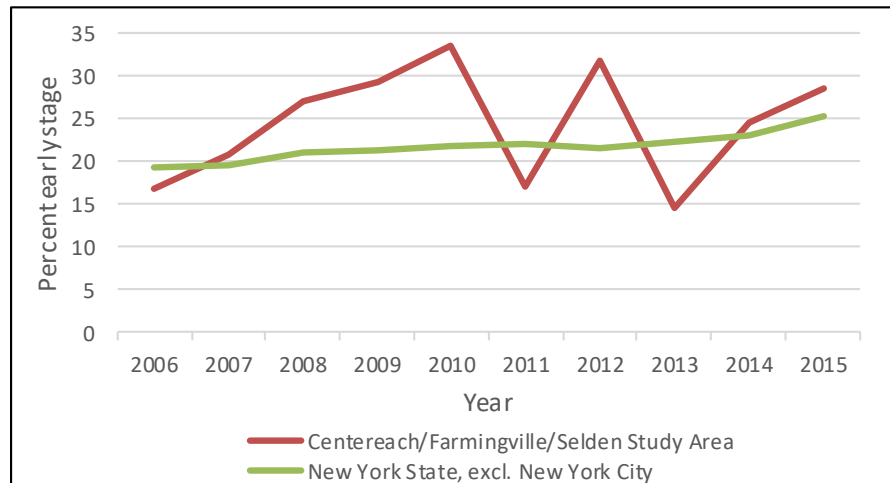
Lung cancer: risk factors

- Cigarette smoking and second hand smoke
- Radon
- Ionizing radiation
- Family history
- Air pollution
- Chemicals found mainly in the workplace, including asbestos, arsenic, chloromethyl ethers, beryllium, chromium, cadmium, nickel, silica, diesel exhaust, soot

Findings: Lung cancer

- Numbers of cases were elevated in both males and females. Older adults (65+) accounted for most of the excess.

- Lung cancer has been elevated in this area at least as far back as 1993-1997 (around 25% over NYS). The elevation was greater in 2011-2015 (about 50%).

- All major cell types of lung cancer were diagnosed in greater-than-expected numbers.

- Most people with lung cancer had a history of smoking at some time in their lives.

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Findings: Lung cancer

Screening for lung cancer can detect the disease at a stage early enough to improve survival. This technique was first recommended in late 2013. Screening increases the percent of cases diagnosed at an early stage.

The percent of lung cancers in the study area diagnosed at an early stage was similar to the comparison population.

Findings: Lung cancer

- Deaths from lung cancer were greater than expected in the CFS study area, with 205 deaths compared to 138 expected, a 48% excess.

  - This reflects the higher incidence in the study area and the low survival associated with this cancer.

Bladder cancer: risk factors

- Cigarette smoking
- Workplace exposures, including exposures to rubber, plastic, dye and metal workers, hairdressers, painters, bus and truck drivers.
- High levels of arsenic in drinking water
- Lifetime consumption of drinking water disinfection by-products
- Family history
- Ionizing radiation
- Diet low in fruits and vegetables
- Certain drugs

Findings: Bladder cancer

- Numbers of cases were elevated in both males and females. Older males (ages 65+) accounted for most of the excess.

- In 2005-2009, bladder cancer incidence in the CFS study area was about 18% higher than expected based on rates for NYS, similar to the elevation in Suffolk County as a whole.

- Most cases (>95%) were of the transitional cell type. This type accounted for most of the excess.

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Findings: Bladder cancer

- Most (82%) of the people with bladder cancer had smoked at some time in their lives.

- Deaths from bladder cancer were greater than expected in the study area, with 18 deaths compared with 13 expected, a 35% excess. This difference was not statistically significant, meaning it could have occurred by chance.

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Thyroid cancer: risk factors

- Medical care factors (overdiagnosis)
- Ionizing radiation
- Low dietary iodine (follicular thyroid cancer)
- Obesity (modest risk)
- Family history and some hereditary conditions

Findings: Thyroid cancer

- Numbers of cases were elevated in both males and females, and in almost all age groups. The elevations were greatest among older adults (ages 65+).

- Thyroid cancer has been elevated in Suffolk County compared to the rest of the state (about 20% over both NYS and NYS excl NYC) at least as far back as 1996. Thyroid cancer incidence in the CFS study area was elevated by about 55% over NYS in 2005-2009.

Findings: Thyroid cancer

- Cancers of the papillary cell type and tumors 2 cm or less in greatest dimension accounted for most of the excess cases.

- Death from thyroid cancer is rare. Thyroid cancer deaths were not elevated in the CFS study area (2 observed, 1.6 expected).

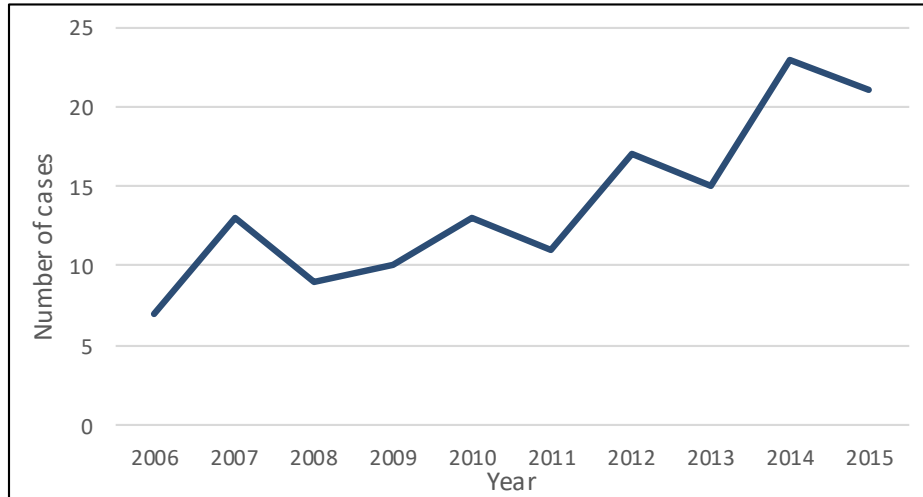# Leukemia: risk factors

Vary by type of leukemia and age group

- Ionizing radiation (all types except possibly CLL)

- Genetic conditions such as Down syndrome (ALL, AML)

- High birthweight (childhood ALL)

- Occupational exposures (adult ALL and AML and possibly CML)

- Certain chemotherapy drugs (AML and possibly CML)

- Smoking (AML and possibly CML)

- Obesity (AML)

- Family history (CLL)

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Findings: Leukemia

- Numbers of cases were elevated in both males and females. The elevation was greater, and only statistically significant, in males.

- Numbers of cases were elevated in two age groups: children ages 0-19 and adults ages 65+.

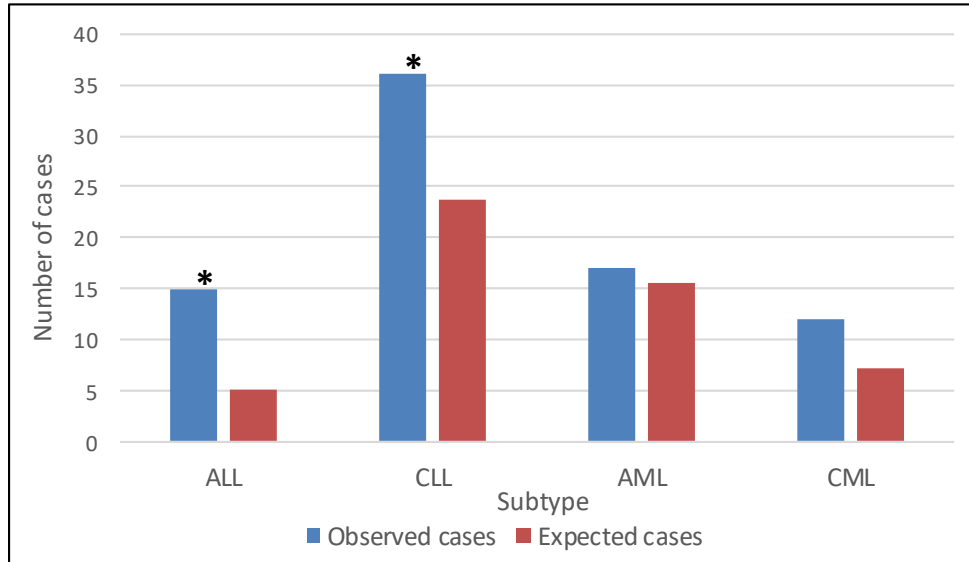NEW YORK STATE | Department of Health

Findings: Leukemia

Trend over time in the CFS study area

- The number of cases diagnosed in a year generally increased over time, with the greatest numbers of cases diagnosed in 2014 and 2015. Leukemia was not elevated in 2005-2009.

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Findings: Leukemia

Observed and expected cases by major subtype (ALL, CLL, AML, and CML).

*Denotes a statistically significant difference

- Most of the excess was accounted for by cases of ALL and CLL. Numbers of cases of CML were also above expected, but the difference was not statistically significant.

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Findings: Childhood Leukemia

- There were 11 children diagnosed with leukemia between 2011 and 2015, compared with 3.7 expected. Most of the children had ALL, the most frequently diagnosed type in children. The others had AML, the second most common.

- Most of the children did not live near another child with leukemia. Most of the CFS study area is in the Middle Country School District, and most of the children with leukemia lived in this school district.

- About half of the children with leukemia were diagnosed in 2015.

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Findings: Chronic Leukemias

Chronic leukemias can be detected by routine blood testing in a doctor's office, and many patients are never hospitalized for their condition. Reporting of chronic leukemia cases to the Cancer Registry therefore depends more on reporting from sources other than hospitals.

- More of the cases of CLL in the CFS study area were reported only by independent (non-hospital) laboratories compared to CLL cases in the comparison area.

Background: Environmental Causes of Cancer

- Certain chemicals/agents are known to be human carcinogens at high exposure levels over a long period of time.

    - Examples radon and lung cancer, vinyl chloride and liver cancer, asbestos and mesothelioma

    - Most knowledge on links between exposures to toxic substances and cancer (i.e., carcinogenicity) comes from occupational studies and laboratory studies of animals.

- Health risks associated with exposures to chemicals at typical levels found in the environment are less clear.

    - Carcinogens are present in the environment, **but** environmental exposures are generally substantially lower than occupational exposures or laboratory studies.

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Background: Environmental Causes of Cancer

- Environmental exposures are difficult to study because of
    - long cancer latency
    - mobile human populations
    - many factors that affect a person's chances of getting cancer.

- Smoking, poor diet, obesity and lack of physical activity thought to be more important risk factors for some types of cancers.

- Research continues to help us better understand
    - impact of lower levels of exposure on cancer burden
    - how mixtures of toxic substances influence cancer risk
    - interaction of genetic factors and personal behaviors with environmental factors.

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Background: Environmental Causes of Cancer

A word about exposure

Exposure is contact. People can be exposed to environmental contaminants by

- Breathing them in (inhalation)

- Consuming them in food or water (ingestion)

- Getting them on their skin (dermal contact).

Without exposure, there can be no health effects.

Findings: Environmental Data review

Outdoor air quality – *monitoring and modeled results*

- Available data for criteria air pollutant monitoring around CFS show decreasing concentrations (i.e., cleaner air) over time. The area is in compliance with US EPA National Ambient Air Quality Standards for all criteria pollutants except ozone.

- Air toxics (benzene, acetaldehyde, 1,3-butadiene, carbon tetrachloride, formaldehyde)
  - Concentrations at the Holtsville monitoring station just south of the study area are not unusual when compared to rest of NYS.
  - Estimated cancer risks for study area, based on modeled estimates, are similar to estimated risks for Suffolk County and NYS excl. NYC

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Findings: Environmental review

Radon in indoor air

Area	Mean Concentration (pCi/L)			Max Concentration (pCi/L)	% test results ≥ 4 pCi/L
	All floors (N)	Basement (N)	First Floor (N)		
CFS Study Area	0.98 (23)	1.31 (13)	0.55 (10)	5.8	4.35%
Suffolk County	1.54 (914)	1.8 (617)	0.98 (297)	42.6	5.47%
NYS excl. NYC	6.7 (129,645)	7.06 (89,701)	3.85 (39,944)	601.4	34.30%

- Radon levels are generally lower than Suffolk County and the rest of the state. Radon does not appear to be unusual in study area in relation to the rest of the state.

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Findings: Environmental review

Public drinking water supply

- Water is supplied by the Suffolk County Water Authority (SCWA) from a network of groundwater wells.

- Since 1999, over 120,000 samples from 37 points in the study area were analyzed for 120 different substances.

Findings: Environmental review

Public drinking water supply

- The only violations issued were for iron and manganese, and for lead and copper.

  - Less than 1% of all samples exceeded maximum contaminant levels (MCLs) for iron and iron+manganese. The MCLs are based on taste, odor and appearance, and are below levels associated with health effects.

  - Less than 1% of all samples exceeded MCLs for lead and copper. Drinking water exposures to lead and copper have not been associated with elevated risk of cancer in human populations.

- There were no exceedances of drinking water standards in the public water supply for cancer-related contaminants.

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Findings: Environmental review

Unregulated contaminant monitoring rule

SCWA participated in the US EPA's Third Unregulated Contaminant Monitoring Rule between 2013 and 2015. Under this rule, data are collected on up to 30 contaminants that do not have health-based standards but may be present in drinking water.

- Contaminants found in the public water system serving the study area were all below reference levels (levels at which no health effects are expected) set by the US EPA.

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Findings: Environmental review

Private wells

Approximately 2% of homes in the CFS study area are served by private wells. Private well water quality is not generally regulated. SCDHS provided data on private wells in the study area that they tested back to 1997.

- Overall, private water sources tested in the CFS study area have generally met drinking water standards, with very few results exceeding an MCL or action level.

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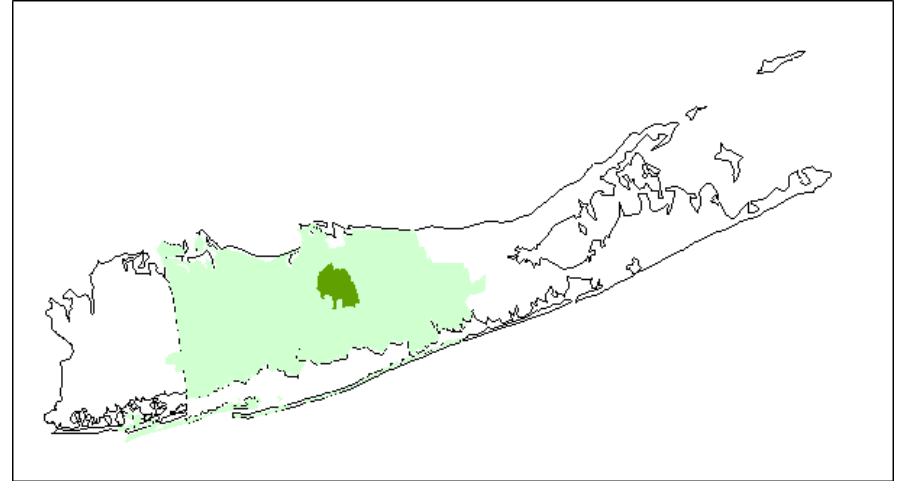
Findings: Environmental review

Industrial or inactive hazardous waste disposal sites

- No sites were identified within the boundaries of the CFS study area.

- Area residents expressed concerns about the Northville pipeline, which runs underground through the CFS study area, and a spill at the Northville Terminal in East Setauket, north of the CFS study area, as sites of concern.

  - Review of available data did not find any exposures to people in the study area to contaminants from the pipeline or the spill.

Findings: Environmental review

Pesticides

- Commercial applications in ZIP Codes approximating the study area were smaller in quantity per square mile and per household than in a comparison area of western Suffolk County.

- Nearly all the active ingredients were in products intended to keep lawns green and free from insects.

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Findings: Environmental review

Proximity to traffic

Percentage of people living within 500 m of roads, grouped by daily traffic volume.

Area	75,000 - 300,000 AADT	25,000 - <75,000 AADT	<25,000 AADT
CFS Study Area	5%	18%	76%
NYS excluding NYC	5%	14%	81%
NYC	29%	30%	41%
NYS	15%	21%	64%

- In general, the study area had a distribution similar to NYS excl NYC.

- Traffic emissions were also included in the air quality reviews.

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Findings: Behavioral factors

Tobacco use

- The BRFSS survey showed that 27% of respondents in the CFS study area were current smokers, compared to 17% in NYS, excl. NYC.

- Hospital discharge data (SPARCS) showed a greater prevalence of tobacco use indicators in persons from the CFS study area compared with NYS excl. NYC. The difference was greatest in older persons (41% of CFS area residents age 65+ compared with 31% of residents of NYS excl. NYC).

- The incidence of many other tobacco-related cancers (oral cavity, pancreatic, cervical and kidney) was also elevated.

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Findings: Behavioral factors

Obesity

- The BRFSS survey showed that 45% of respondents were obese, compared with 27% in NYS excl NYC.

- Hospital discharge data (SPARCS) showed a slightly greater prevalence of obesity indicators in people from the CFS study area compared with NYS excl NYC, particularly middle-aged adults ages 50-65 (12% obese compared to 10% obese) and older adults ages 65+ (16% obese compared to 11% obese).

- The incidence of some other obesity-related cancers (pancreatic and kidney cancers) was also elevated.

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Findings: Healthcare factors

Healthcare coverage

Includes health insurance, an HMO, or a government plan
- The BRFSS survey showed that 94% of respondents in the CFS study area had healthcare coverage, compared with 88% of respondents in NYS excl NYC.

Findings: Occupational factors

Percent employed in different groups of occupations

	NYS	NYS excl. NYC	Suffolk Co.	CFS study area*
	Percent	Percent	Percent	Percent
Groups with higher probabilities of workplace exposures[1]	18.27	19.52	20.32	20.36
All other occupations	81.73	80.48	79.68	79.64

[1]Occupations include production, construction, installation, maintenance and repair, and firefighting.

- A slightly greater percentage of people in the study area worked in occupations with greater probability of workplace exposures to elevated levels of hazardous substances than in NYS excl NYC or NYS.

Findings: Occupational factors

World Trade Center responders

- Rescue and recovery workers at the World Trade Center site were predominantly male. Studies have consistently shown elevated incidence of thyroid (and prostate) cancers among these workers. The elevations are believed to be due to enhanced medical monitoring.

- Stony Brook hospital conducts medical monitoring of World Trade Center workers. It is likely that many live in or near the study area.

- *However,* the risk of any one person developing thyroid cancer is low. Even with increased risk, these workers would only contribute a handful of cases.

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Limitations

Limitations

General considerations

- Latency and population migration

- Most cancers have multiple risk factors, all of which influence incidence.

Cancer data

- The completeness and accuracy of the data depend upon reporting from many sources. There may also be differences in how cancer is diagnosed, treated, and recorded in different areas of the state.

Limitations

Environmental data

- Environmental measurements are not always a good indication of exposure, and are not a good measure of individual exposures.

- Limited availability in space and time

- Data on past exposures, which are most important for cancer, are particularly hard to come by

- Effects of exposures to chemical mixtures are difficult to evaluate.

Limitations

Behavioral, healthcare and occupational data

- Sample size of the BRFSS in the CFS study area was small, and none of the differences was statistically significant.

- Hospital discharge data (SPARCS) were created for administrative purposes. Differences in likelihood of visiting a hospital for specific reasons limit applicability to factors in the community.

- ACS data are tabulated into broad categories, and have a wide margin of error in small areas.

Conclusions

Conclusions

- It is likely that higher rates of tobacco use contributed to the elevated rates of lung and bladder cancer in the Centereach/Farmingville/Selden area.

- Available information did not indicate any particular occupation or workplace that may have played a role in the elevations of lung and bladder cancers and leukemia, although this information was limited.

- Most of the increased incidence of thyroid cancer is likely due to the increased detection of small papillary tumors by imaging and other medical techniques.

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Conclusions

- Increased surveillance is believed to account for elevated diagnoses of thyroid cancers among people who had spent time in rescue and recovery efforts at the World Trade Center site. The contribution of these people to the excess of thyroid cancers in the CFS study area is likely small.

- An increased prevalence of obesity could have also made a small contribution to the increased incidence of thyroid cancer.

Conclusions

- The elevated number of cases of chronic leukemias in the CFS area might be related to greater reporting of cancers by independent laboratories. It might also be related to medical care factors such as healthcare coverage or greater contact with the health care system.

- The investigation uncovered no factors that might account for the elevated number of childhood leukemias. Many researchers have noted the tendency of childhood leukemia cases to cluster. These are often limited in time. Since about half of the cases occurred in the last year of the time period, DOH will continue to monitor the incidence of childhood leukemia in the study area.

- The area of elevated leukemia incidence of which the CFS area is a part is but one of five such areas identified in NYS.

Conclusions

- Environmental factors evaluated in this study, including environmental pollutants in outdoor air, radon in indoor air, contaminants in drinking water, industrial and inactive hazardous waste disposal sites, pesticides, and traffic density, show no unusual exposures that would likely be related to cancer incidence in the study area.

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Recommendations

Recommended Actions Based on Specific Cancers Elevated in the Centereach/Farmingville/Selden Study Area

Health Promotion and Cancer Prevention	Cancer Screening and Early Detection	Healthy and Safe Environment
• Tobacco prevention • Healthy nutrition • Physical activity	• Lung cancer screening • Thyroid cancer screening (Recommendation against screening in asymptomatic adults)	• Radon testing and mitigation • Reducing radiation from medical imaging • Safety in the workplace

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Recommended Actions to Reduce the Burden of All Cancers Statewide

For All New Yorkers

It is not always possible to know why one person develops cancer while another person does not. But the following are things that all individuals can do to reduce their risk of cancer:

- If you use tobacco, quit. If you don't use tobacco, don't start.

- Eat nutritious meals that include fruits, vegetables and whole grains.

- Get moving for at least 30 minutes a day on five or more days each week.

- Use sunscreen, monitor sun exposure and avoid tanning salons.

- Limit alcohol use.

- For women of child-bearing age, know the benefits of breastfeeding and, if possible, breast-feed infants exclusively for at least the first six months of life.

- Discuss with your healthcare provider what cancer screening tests might be right for you.

- Get cancer-preventive vaccines such as hepatitis B and HPV.

- Learn your family health history (if possible).

- Test your home for radon.

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Recommended Actions to Reduce the Burden of All Cancers Statewide

NYS Department of Health and Partner Organizations

Cancer Surveillance – NYS Cancer Registry

- Continue to meet the highest cancer registry standards for timeliness, completeness and quality of data, and make these data available to researchers, clinicians, public health officials, legislators, policymakers, community groups and the public.

Environmental Health

- Continue to identify and assess potential exposures throughout the state and take action to reduce those exposures.

- Continue to support programs to promote and maintain clean air, clean water and reduce human exposures to environmental hazards

- Promote awareness of programs and initiatives to reduce environmental hazards in our communities.

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Recommended Actions to Reduce the Burden of All Cancers Statewide

NYS Department of Health and Partner Organizations

Statewide Initiatives

Overarching goal is to reduce the burden of cancer by

- decreasing the number of new cancer cases,

- decreasing the number of cancers diagnosed at late stages,

- improving the quality of life of those diagnosed with cancer, and

- decreasing the number of deaths caused by cancer.

These efforts are detailed in two State plans

- *New York State 2018-2023 Comprehensive Cancer Control Plan*

- *New York State Prevention Agenda 2019-2024*

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Today's Announcement

- New $675,000 grant opportunity to support local **Cancer Prevention in Action** project.

- DOH to work with Suffolk County Cancer Prevention and Health Promotion Coalition to help to develop and implement strategies to reduce tobacco use and increase lung cancer screening among people with a history of heavy smoking.

Acknowledgments

This report was prepared by staff from several units from the Center for Community Health and Center for Environmental Health within the New York State Department of Health.

The New York State Department of Health would like to thank staff from the New York State Department of Environmental Conservation for their assistance in this project.

The New York State Department of Health appreciates the efforts of our partner organizations and many experts in the fields of cancer, environmental health, epidemiology, public health, and toxicology who provided valuable input.

Questions