

Executive Summary

This report summarizes cancer patterns and trends for Staten Island, NY. New York State Department of Health (DOH) researchers investigated Staten Island because the borough had the highest rate of all cancers combined in New York City based on 2011-2015 data. This investigation was conducted as part of [Governor Cuomo's Cancer Research Initiative](#) announced in October 2017, which examined cancer trends and the potential causes of cancer in four regions of the state that have higher cancer rates, based on 2011-2015 data.

During the Staten Island Investigation, DOH obtained input from interested members of the community. Researchers met with community members to present the design, goals, and approaches. Community members and stakeholders provided input at meetings and emailed additional feedback.

DOH will use these findings to work with partners to enhance community cancer prevention, recommend appropriate screening efforts, and support access to appropriate high-quality health care.

What was Evaluated

Cancer Data

Cancer rates

The rate of all cancers combined on Staten Island was 16% higher than that for NYC and 3% higher than that for NYS excluding NYC. When cancer types were evaluated independently, thyroid cancer was the only cancer that stood out as unusually high compared to other areas of New York State. Thus, thyroid cancer was reviewed in further detail using information from the New York State Cancer Registry.

Thyroid cancer risk factors

To gain insight into possible factors that may have contributed to the elevated incidence of thyroid cancer on Staten Island, DOH researchers evaluated the literature on the trends, patterns, and risk factors for this disease.

Tumor characteristics

DOH researchers reviewed information from the New York State Cancer Registry on the tumor characteristics of the thyroid cancers, such as type of cells that are cancerous and tumor size.

Demographic, Behavioral, Healthcare and Occupational Factors

DOH researchers reviewed available data about demographic, behavioral, healthcare and occupational factors known to be related to cancer. These included available information about smoking, obesity, and medical care access and practices including diagnostic imaging, surgery, and cancer screening.

Environmental Factors

DOH researchers worked with the Department of Environmental Conservation (DEC) to review available environmental data to look for unusual patterns or trends in the area compared to other areas of New York State. Data included radon concentrations in indoor air, outdoor air pollutants, drinking water contaminants, industrial and inactive hazardous waste disposal sites, and traffic density.

Findings

Cancer Data

Thyroid cancer rates

Thyroid cancer rates on Staten Island were 67% higher than the other four NYC boroughs and 69% higher than NYS excluding NYC. Thyroid cancer is the most common cancer among women aged 20-34 in New York State and on Staten Island, and it is also the most common cancer among women aged 35-39 on Staten Island.

Thyroid cancer risk factors

There is strong consensus in the scientific literature that the primary risk factor for thyroid cancer is medical system practices. These include the use of diagnostic imaging, cancer screening, and cancer diagnoses occurring post-surgery.

Increases in thyroid cancer correspond directly to an increase in routine diagnostic imaging – specifically, diagnostic imaging with a neck ultrasound, or another form of imaging in the absence of symptoms. According to an article in the *New England Journal of Medicine*, 70-80% of female thyroid cancer cases and 45% of male thyroid cancer cases diagnosed in the US fall into this category.

Tumor characteristics

Papillary carcinoma is the most common type of thyroid cancer in NYS and Staten Island. Papillary carcinoma was responsible for nearly all the increase in cancers on Staten Island and other areas of NYS. This cancer is slow growing and rarely fatal. In addition, nearly all the increase in Staten Island thyroid cancers has been for tumors small enough to be considered subclinical, meaning they were small enough to cause no symptoms.

Demographic, Behavioral, Healthcare and Occupational Factors

Demographics

While Staten Island is one of the five boroughs of NYC, its demographic makeup more closely resembles areas outside of the NYC area (NYS excluding NYC). Because of this, researchers used NYS excluding NYC as the appropriate comparison area for cancer analyses. Specifically, Staten Island has smaller proportions of Asians, Hispanics, and foreign-born people of all races and ethnicities than the other four boroughs of NYC. These races, ethnicities, and national origin

categories tend to have substantially lower cancer rates than native-born non-Hispanic whites and blacks.

Smoking

Many cancers are known to be smoking-related, although thyroid cancer is not one of them. Most smoking-related cancer deaths are associated with lung, larynx, bladder, esophageal, and oral cavity cancers. None of these cancers were shown to be significantly elevated compared to other areas of the state. In addition, smoking rates on Staten Island are generally below those of NYS excluding NYC.

Obesity

Obesity is associated with some cancers and is weakly associated with thyroid cancer. According to a phone survey sample conducted by the NYC Department of Health and Mental Hygiene, it is estimated that about 29% of the Staten Island population is obese.¹ Based on this, researchers calculated that obesity could be responsible for about 1% of the thyroid cancers on Staten Island.

Screening

Researchers attempted to measure the volume of diagnostic imaging in New York and Staten Island, but data were insufficient, particularly for the typical thyroid patient of age 47. The literature shows that screening events can increase local thyroid cancer rates because they identify cancers that are not likely to progress in a way to cause symptoms and where active treatment is not the standard of care. Some people residing on Staten Island have received free thyroid cancer screening at screening events, though no national organizations in the US currently endorse this practice.

Surgery

Thyroid surgery is performed more frequently on Staten Island than elsewhere. Thyroid surgeries are performed to treat cancer and benign thyroid conditions. In many cases, cancer is discovered after the removed tissue is evaluated. One study found that 26% of thyroid cancers were discovered in this manner. DOH researchers were not able to discern the surgery-diagnosis sequence from NYS's Cancer Registry data, or whether it is different in Staten Island than in other areas of NYS.

Occupation

Researchers evaluated whether World Trade Center response could have been a factor in elevated cancer incidence. Results showed that the number of first responders, firefighters, rescue, and recovery workers living in Staten Island and involved in the World Trade Center

¹ This obesity prevalence estimate is based on the New York City Department of Health and Mental Hygiene, 2015, Community Health Profiles 2015: Staten Island Community District. In the remainder of the report, information on obesity was obtained from the New York State Behavioral Risk Factor Surveillance System (BRFSS) to be consistent with data for the rest of the state. The BRFSS estimate of obesity is lower than the Community Health Profiles estimate.

response likely had a very small influence on the higher rates of thyroid and other cancers in the area for the following reasons:

- First responders make up a relatively small percent of the population.
- Most are male, which wouldn't explain similar elevations in thyroid cancer in women.
- Significant elevations in other cancers related to firefighters' occupational exposures were not observed.

Environmental Factors

DOH researchers worked with the Department of Environmental Conservation (DEC) to review available environmental data to look for evidence of unusual environmental exposures in the area compared to other areas of New York State. The findings of that evaluation showed no unusual environmental exposures that could explain the excess in cancer incidence on Staten Island.

Outdoor air and emissions data

Researchers reviewed air quality monitoring and computer modeled data for air pollutants and air toxics. Results showed that Staten Island has higher or similar risks compared with NYS excluding NYC.

Radon testing data

Radon is the second leading cause of lung cancer after smoking. Researchers evaluated radon testing frequency and compared average concentrations in Staten Island to the Environmental Protection Agency's (EPA) recommended action level, as well as other areas of the state. This evaluation showed that radon is not a significant environmental exposure on Staten Island. Lung cancer rates are 4% lower in Staten Island compared with NYS excluding NYC.

Public drinking water testing and compliance data

Researchers reviewed public drinking water data to identify potential drinking water exposures. Staten Island is served by the NYC Water Supply, which is considered one of the highest quality surface water sources in the country. Analysis of monitoring and compliance data identified no significant drinking water exposures.

Industrial and inactive hazardous waste disposal sites

Researchers reviewed information about existing sites on Staten Island. Staten Island residents also identified adverse health effects from exposures associated with the former Fresh Kills landfill as a concern. Researchers reviewed comprehensive reports from the Agency for Toxic Substances and Disease Registry and the NYC Department of Health and Mental Hygiene. This evaluation showed no information suggesting contamination from Fresh Kills or other sites is causing widespread exposures on Staten Island.

Traffic

Researchers evaluated the impacts of traffic as part of the outdoor air and emissions data evaluation described above. In addition, researchers assessed available data about how impacts

of traffic pollution compare with other areas of NYS. Staten Island has a higher percentage of people living near higher traffic roads than other areas of NYS, but a lower percentage than in NYC.

Ionizing radiation

Ionizing radiation exposure is an important risk factor for thyroid cancer, particularly at a young age. According to the literature, ionizing radiation exposure from certain forms of diagnostic imaging (X-rays, CT scans) is a risk factor for many types of cancer. Researchers could not distinguish the effects of radiation exposure from diagnostic imaging versus the effects of more frequent detections of thyroid cancer through the higher use of diagnostic imaging due to local medical care practices.

In addition, researchers considered whether the number of immigrants from Russia, Belarus, and Ukraine to Staten Island might have influenced the rates of thyroid cancer since the 1980s given their possible exposure to the Chernobyl nuclear accident. This evaluation showed more of these immigrants located in Brooklyn, where thyroid cancer rates were 33% percent lower than in Staten Island. This suggests immigration from these countries is not an important factor in the higher thyroid cancer rates in the area.

Conclusions

- While Staten Island is one of the five boroughs of NYC, its demographic makeup more closely resembles areas outside of the NYC area (NYS excluding NYC). Using the comparison areas of NYS excluding NYC and rest of NYC, thyroid cancer is the only cancer that is significantly elevated, and its excess has public health significance.
- There is strong consensus in the scientific literature that the primary risk factors for thyroid cancer relate to medical system practices. These include the use of diagnostic imaging, cancer screening, and post-surgery thyroid cancer diagnoses. The literature also shows that screening events and overuse of diagnostic imaging can increase local thyroid cancer rates because they identify insignificant cancers where active treatment is not the standard of care. Some people residing on Staten Island have received free thyroid cancer screening at screening events, though no national organizations in the US currently endorse this practice.
- Results from the environmental investigation did not show any unusual environmental exposures that could explain the excess in thyroid cancers on Staten Island.

Recommendations

The recommendations below are divided into two main sections: 1) recommended actions to address the specific cancer, thyroid cancer, that was elevated in the Staten Island Study Area, and 2) recommended actions to address all cancer types throughout New York State. Many of

the recommended activities are aligned with two existing State plans that address cancer prevention and control, the *New York State 2018-2023 Comprehensive Cancer Control Plan*, and the *New York State Prevention Agenda 2019-2024*.

Recommended Actions Based on the Specific Cancer Elevated in the Study Area

Thyroid Cancer Screening

Recommendation: The U.S. Preventive Services Task Force recommends *against* screening for thyroid cancer in asymptomatic adults. Educate the public and healthcare providers about recommendations *against* thyroid cancer screening in average risk, asymptomatic adults.

Radiation from Medical Imaging

Recommendation: Increase awareness of such programs as NYS's "Image Gently" and the national "Image Wisely" campaigns that educate physicians and the public about potential radiation exposure from CT scans and X-rays in both children and adults.

Recommended Actions to Reduce the Burden of All Cancers Statewide

Below are highlights of what individuals can do and what DOH and its partner organizations are doing. For more information on activities, by type of organization, that New Yorkers can do to help reduce the burden of cancer, see:

https://www.health.ny.gov/diseases/cancer/consortium/docs/2018-2023_comp_cancer_control_plan.pdf#page=62.

For All New Yorkers:

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.
- Get cancer-preventive vaccines such as hepatitis B and HPV.
- Learn your family health history (if possible) and discuss with your healthcare provider whether genetic counseling might be right for you.
- Discuss what cancer screening tests might be right for you with your healthcare provider.
- Test your home for radon.
- 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.

For NYS Department of Health and Partner Organizations:

Cancer Surveillance: The New York State Cancer Registry (NYSCR) was designated by the CDC (Centers for Disease Control and Prevention) as a Registry of Excellence and has achieved Gold-level certification since 1998. In 2018, the NYSCR became a member of the National Cancer Institute's Surveillance, Epidemiology and End Results Program (SEER), the nation's preeminent source of population-based cancer data.

Recommendation: 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: DOH's Center for Environmental Health (CEH) works collaboratively with other agencies including the NYS Department of Environmental Conservation, the federal Environmental Protection Agency (EPA), the Centers for Disease Control and Prevention (CDC), and the Agency for Toxic Substance and Disease Registry (ATSDR). CEH programs evaluate health effects associated with environmental exposures, develop policies, and maintain a variety of programs to reduce and eliminate exposures.

Recommendation: Continue to identify and assess potential exposures throughout the state and take action to reduce those exposures. NYS will continue to support programs to promote and maintain clean air, clean water and reduce human exposures to environmental hazards, with particular attention to the needs of environmental justice communities.

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

Statewide Initiatives: The overarching goals of cancer prevention and control efforts in New York State are detailed in two State plans, the *New York State 2018-2023 Comprehensive Cancer Control Plan*, and the *New York State Prevention Agenda 2019-2024*.

Recommendation: Continue to work with partners to implement cancer-related initiatives.

- More details about the NYS Comprehensive Cancer Control Plan can be found at: <https://www.health.ny.gov/diseases/cancer/consortium/index.htm>.
- More details about the NYS Prevention Agenda can be found at: https://www.health.ny.gov/prevention/prevention_agenda/2019-2024/.