

SKIN CANCER IN NEW YORK STATE

Eighth Annual Report 2015

**New York State Department of Health
New York State Cancer Registry**

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About skin cancer

Skin is composed of three layers: the epidermis (outermost), the dermis, and the subcutaneous layer (innermost). The three most common types of skin cancer begin in the cells of the epidermis: basal cells give rise to basal cell carcinoma; squamous cells, to squamous carcinoma; and melanocytes, to melanoma. Basal cell carcinomas account for about eight of ten skin cancers; squamous cell carcinomas, for about two of ten; and melanomas, for less than two percent of all skin cancers.¹⁻² Other types of skin cancer that are less common include Kaposi sarcoma, adnexal tumors, Merkel cell carcinoma, and cutaneous lymphoma.

Skin cancer is the most common type of cancer and accounts for about half of all cancers in the United States.³ According to the National Cancer Institute, more than 2 million Americans develop skin cancer annually.⁴ Skin cancer incidence has been increasing in the United States; some reasons for this are increased screening and diagnosis, increased exposure to UV light, and the increasingly aging population.¹

The three most common types of skin cancer are curable, if diagnosed at an early stage. Basal cell carcinomas generally grow slowly and are not very likely to spread. Squamous cell carcinomas tend to be somewhat more aggressive than basal cell carcinomas, but are less dangerous than melanoma. Melanomas of the skin are considered the most dangerous because they are more likely to spread to other parts of the body. In many instances, removing the cancerous lesions is all the treatment that is needed, and this is true even for early stage melanomas. For this reason, many skin cancers are diagnosed and treated in physicians' offices. Skin cancers that have spread require more treatment; melanomas, in particular, often require hospitalization.

Risk factors for skin cancer

Many risk factors for basal cell carcinoma, squamous cell carcinoma, and melanoma are similar. The strongest risk factor for skin cancer is exposure to UV light from the sun or from artificial light in tanning booths. UV light is composed of UVA, UVB, and UVC rays.¹ UVA

and UVB rays cause aging of the skin, eye damage, and skin cancer.¹ Older people are more likely to develop skin cancer because of the cumulative effect of lifetime sun exposure. Most of a person's lifetime skin damage occurs before the age of 18 years. Even when a child's sunburn or tan fades, the damage to cells caused by that burn or tan does not, and the effects cannot be reversed. The damage keeps adding up with each sunburn or tan and may one day result in skin cancer. It is, therefore, important that both children and adults protect their skin.

The risk of skin cancer varies significantly by how susceptible a person is to sunburn. Thus people with skin that burns and freckles easily and those with fair-colored hair and blue eyes have an increased risk of developing skin cancer.

The skin cancer rate among whites is much higher than among blacks, Asians, and Hispanics.⁵ Further, risk is higher in areas of the world with high UV radiation from the sun.¹ People in these areas might also be at higher risk because they spend more time in the sun as part of their jobs or for recreation. Worldwide, the highest rates of skin cancer are observed among the fair-skinned population of Australia.⁶

Other risk factors for skin cancer include having light-colored skin, older age, being male, a personal or family history of skin cancer, as well as the presence of certain medical conditions or use of certain medications that make the skin more sensitive to sunlight or those medical conditions or medications that suppress the immune system.^{1,2,7}

A risk factor specific for melanoma is the presence of atypical or numerous moles.^{2,7} Referred to medically as dysplastic nevi, moles that look different from a common mole or those that have an abnormal shape or color, are more likely to turn into cancer.

Prevention of skin cancer

Skin cancer is often preventable. It is important for people to avoid unnecessary unprotected exposure to the sun and artificial sources of UV light, such as tanning booths or sun lamps. When in the sun, people need to protect themselves by following some simple measures:^{8,9,10}

- Wearing wide-brimmed hats and long-sleeved shirts and long pants whenever possible;

- Wearing sunglasses to protect the eyes;
- Applying a “broad-spectrum” sunscreen (protects against UVA and UVB rays) with a sun protection factor (SPF) rating of 30 or higher that can block out at least 97 percent of UV rays. One ounce of sunscreen is considered the amount needed to completely cover the exposed areas of the body;
- Avoiding direct sun at midday, between 10 a.m. and 2 p.m., when the sun's rays are strongest; and
- Using sunscreen and covering skin in order to get protection even on cloudy days, because clouds do not block most UV rays.

Legislation and Program Initiatives

Effective August 15, 2012 New York State regulation prohibits anyone less than seventeen years of age from using UV radiation devices. In addition, anyone seventeen years of age must have a consent form signed by a parent or legal guardian before using UV radiation devices. Persons eighteen years of age or older are obligated to provide photo identification as proof of age before using UV radiation devices.¹¹

UV radiation is a form of energy from natural sunlight or from a tanning device such as sunlamp, tanning booth or tanning bed.¹² Manufacture and use of these products are regulated by the U.S. Food and Drug Administration (FDA), U.S. Federal Trade Commission (FTC), and New York State Public Health Law.^{13,14}

Operators of tanning facilities are required to post warning signs identifying the maximum exposure time for each particular device. In addition, operators are to ensure that patrons use adequate protective eyewear, and to provide protective eyewear to those who do not possess their own. New York State law also requires operators of tanning facilities to maintain a record of user visits, including date, duration of exposure and documentation of device used.

In 2012 the State Education Department (SED) changed its guidance regarding the use of sunscreen in schools; schools are no longer required to obtain a medical provider order to allow a student to carry and use sunscreen in school.¹⁵ In August 2013 legislation was enacted

regarding the use of sunscreen by children in schools and summer camps. Previously a note from a doctor authorizing use of sunscreen was required, now only written permission from a parent or guardian is required to be on file.¹⁶

The Department of Health has a long history of conducting prevention and awareness-raising activities to promote the adoption of behaviors that reduce exposure to UV radiation and help reduce the risk of skin cancer. These efforts to raise awareness about the dangers of UV exposure at early ages and build skills to prevent exposure are consistent with evidence-based skin cancer prevention interventions recommended by the Community Preventive Services Task Force.¹⁷ Prevention and promotion activities seek to; 1) reduce UV exposure, 2) increase knowledge and improve attitudes about UV protection among children and adults, and 3) change policies and create UV-safe environments.¹⁸ The NYS Department of Health partners with organizations such as the NYS Cancer Consortium, the federal Environmental Protection Agency and the Shade Foundation of America. General information as well as resources for educators and adults working with young, school-age children can be accessed at: <http://www.health.ny.gov/diseases/cancer/skin/>.

Background information about the sources of skin cancer data

Population-based cancer registries are the main source of cancer incidence data for the United States. In New York State, the central cancer registry is maintained by the New York State Department of Health (NYSDOH) and receives additional funding from the National Program of Cancer Registries (NPCR) of the Centers for Disease Control and Prevention (CDC). Cancer registries collect data from licensed healthcare providers. Hospitals are the primary source of cancer case reports; but treatment centers, laboratories, and some physicians' offices also report cancers. The goal is to collect information on every resident who is diagnosed with reportable cancer in the state so that accurate cancer incidence statistics are available.

The New York State Cancer Registry (NYSCR) receives approximately 200,000 reports of invasive cancers per year, representing over 100,000 new tumors. It currently takes about two years beyond the end of each calendar year for Cancer Registry data to be available. This time frame is in line with national standards and is consistent with the availability of cancer data from other state registries.

Five years of data are often combined and reported as an aggregate at the county level because the number of cases and rates for single years can vary considerably, particularly for most of the counties outside metropolitan areas. Incidence data on basal and squamous cell skin cancers, however, are neither reported to, nor collected by, most cancer registries in the United States, including the NYSCR. A primary reason why these data are not collected is that basal and squamous cell skin cancers are generally not life threatening and are usually treated in physicians' offices, so reporting by physicians' offices would need to be greatly expanded in order to assure complete reporting. The NYSCR currently collects information on more than 100,000 people diagnosed with cancer each year. Since approximately an equal number of people are diagnosed with basal or squamous cell skin cancer each year, the NYSCR would need to more than double its current resources to include basal and squamous cell skin cancer reporting. Because basal and squamous cell skin cancers are not included in the NYSCR, incidence data for these cancers cannot be provided.

The NYSCR does include reports on melanoma; however it is likely that the melanoma reporting is incomplete. Many early stage melanomas are treated successfully in physicians' offices, and physicians frequently fail to report these cases. When compared to Connecticut and New Jersey, the number of melanomas diagnosed in New York is 11 percent lower than expected for 2008-2012.¹⁹ Both Connecticut and New Jersey receive funding from the National Cancer Institute's Surveillance, Epidemiology and End-Results (SEER) program, and are believed to have more complete reporting from non-hospital sources. The NYSCR is working to improve reporting of melanoma by requiring independent pathology laboratories to report melanomas and by contacting physicians, particularly dermatologists, to request case reports. Since improvement in completeness of reporting is still needed, interpretation of melanoma statistics is difficult at this time. Recent increases in melanoma incidence are due in part to more complete reporting, but some studies have also noted a real increase in the disease.²⁰ Because improvements in non-hospital reporting mostly affect reports of melanomas that are in early stages, increased reporting causes an increase in the proportion of cases that are noted at early stages.

In addition to diagnostic and treatment information, the NYSCR collects demographic information about each patient. For each individual patient, the NYSCR collected age, gender, race, ethnicity, and residence at the time of diagnosis. This information is needed for public

health planning and evaluation as well as for research. The clinical information collected about each new skin cancer includes the place on the body where the cancer occurred, the size of the tumor, whether or not it has spread beyond the skin, and the initial treatment that was provided. These data are collected in a standard format throughout the country. For example, “place on the body” is grouped into four categories: leg and hip, arm and shoulder, trunk, and head and neck. Melanoma can also develop in the eye and in the mucous membranes, such as in the mouth, but data about non-cutaneous (non-skin) melanomas are not included in this report.

Another source of information about skin cancer in New York is the NYSDOH’s Statewide Planning and Research Cooperative System (SPARCS).²¹ SPARCS has information about inpatient hospital stays, outpatient (ambulatory) surgery, and emergency department visits. These data include patient demographics and minimal diagnostic and treatment information and can be used to count how many people required extensive surgery or hospitalization for skin cancer. The hospital and outpatient surgery data do not include minor surgeries performed in physicians’ offices. Because of the way SPARCS disease information is reported, skin cancer is grouped as melanoma or nonmelanoma skin cancer.

Mortality information comes from the death certificates that are completed for every New York resident who dies in the United States.²² The certifying physician provides the underlying cause of death. Death from skin cancer is rare. As with SPARCS data, causes of death are grouped as melanoma or nonmelanoma skin cancers.

Background information about rates and counts

How frequently a disease such as skin cancer is diagnosed is an important measure of the impact of the disease on a group of people. When examining the frequency of disease, registries usually include new, or incident, cases diagnosed in a particular time period. The number of incident cases, however, cannot be used to compare different groups. For example, it would not be appropriate to compare the number of melanomas that are diagnosed among residents of Manhattan to the number diagnosed among residents of Albany because Manhattan has five times more people than Albany. If there are five times more people, then we would expect five times more melanomas. Also, areas with the same population size would be expected to have different rates based on the proportion of non-Hispanic whites in the respective populations.

Because of the lower amount of melanin in their skin, non-Hispanic whites have a much higher rate of skin cancer than non-Hispanic blacks or Hispanics. To account for this, race-specific incidence rates of melanoma are calculated.

Since the risk of skin cancer increases with age, it also is important to be careful in comparing two groups of people when one group has younger people compared to the other group. A college town will have fewer people diagnosed with melanoma than a retirement community of the same size. To account for this, registries statistically adjust the rates to make them comparable even when the age structures are different. This is called “age-adjustment.” The rates presented in this report are age-adjusted and expressed as the number of cases per 100,000 people per year.

For more information about age-adjustment, please visit the NYSCR web page at <http://www.health.state.ny.us/statistics/cancer/registry/age.htm>.

New York State Specific Data

This section includes detailed information on the incidence of melanoma in New York State. Information on Merkel cell carcinoma, a rare form of skin cancer diagnosed mostly among older individuals, and tabulations of hospitalizations and deaths due to skin cancer, are also included.

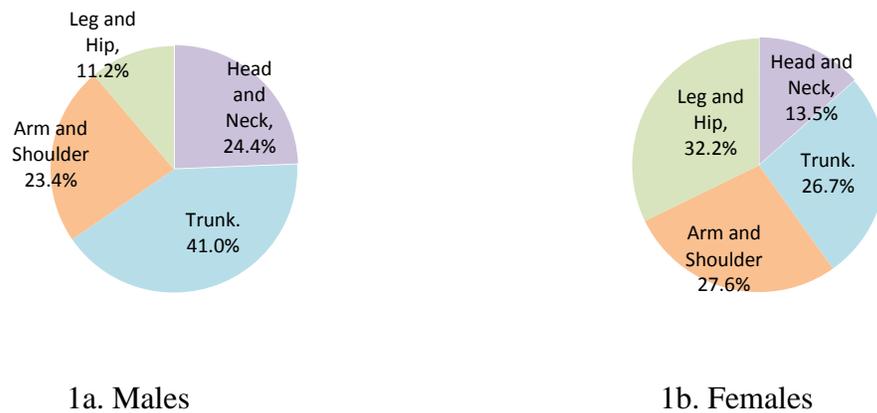
Melanoma in New York State

From 2008 through 2012, there were approximately 2,109 melanomas diagnosed among men and 1,607 melanomas diagnosed among women each year in New York State, accounting for approximately 4 percent of cancers among men and 3 percent of cancers among women. About 10,546 men and 8,037 women who currently reside in New York have had a diagnosis of melanoma within the past five years. For young adults age 20 to 34 years, melanoma ranks among the top five cancers, but the rate for this age category is lower than for every older age group. Over all ages, melanoma is the ninth most common type of cancer among both men and women.

Men are at higher risk for developing melanoma than women. Compared to women, men are more likely to work in outdoor occupations such as farming and construction. The age-adjusted incidence rate among males is 23 cases per 100,000 men per year. Among females, the age-adjusted rate is about 14 cases per 100,000 women per year.

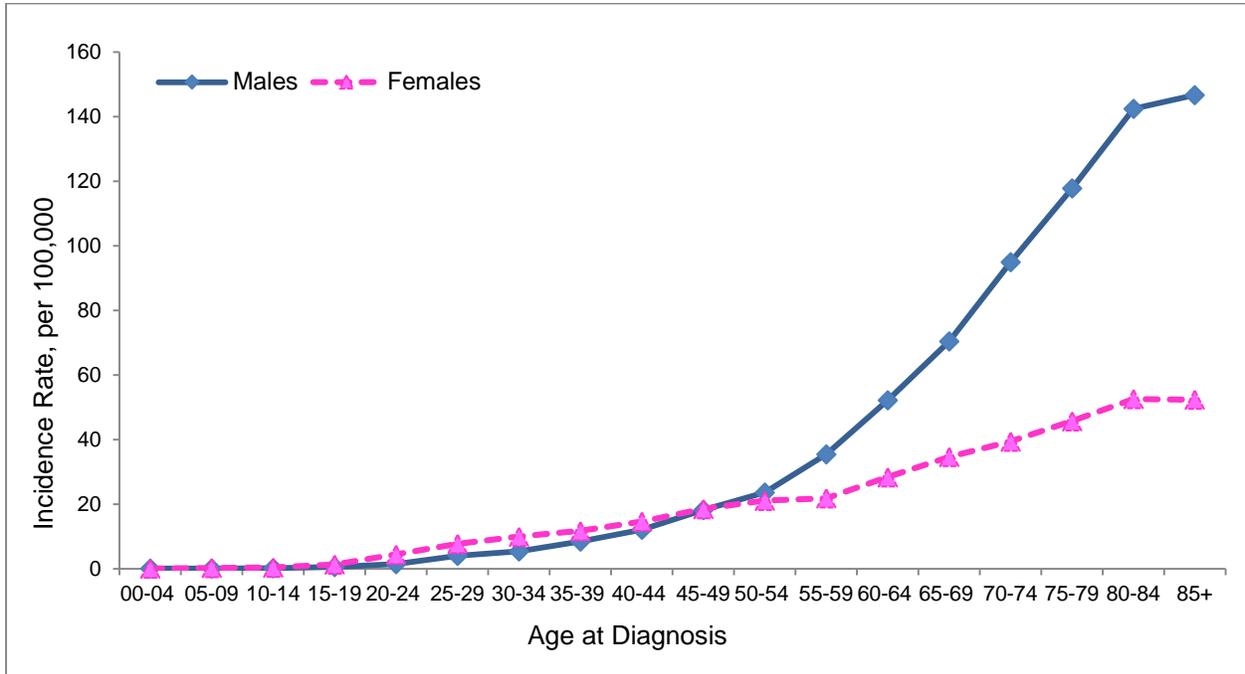
Melanoma can occur anywhere on the body. Among men, melanomas develop most commonly on the trunk, followed by the head and neck (Figure 1a.) Among women, the most common area of the body for melanomas to develop is the leg and hip region, followed by the arm and shoulder region, then the trunk (Figure 1b). The difference between men and women in terms of the region of the body where melanomas are most likely to develop is probably attributable to the differences in sun exposure due to differences in clothing.

Figure 1. Anatomic location of melanomas, New York State, 2008-2012



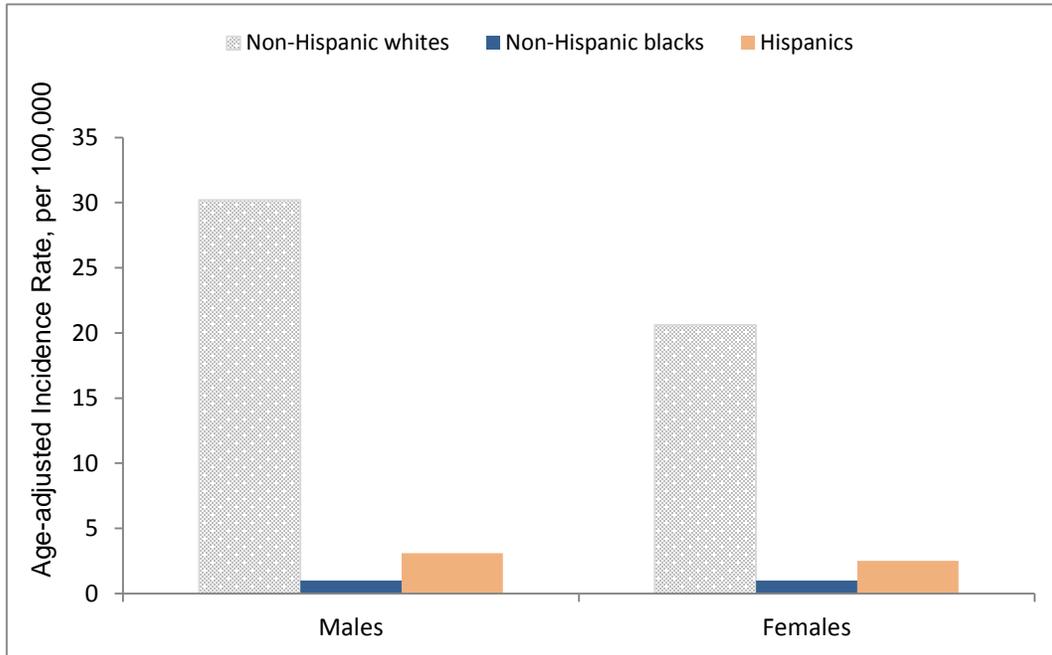
Like most forms of cancer, melanoma risk increases with age, as seen in Figure 2. Among people younger than age 50, the rates of melanoma are similar among men and women. After age 50, however, the rate among men increases more rapidly than among women.

Figure 2. Melanoma incidence rate by age group and gender,
New York State, 2008-2012



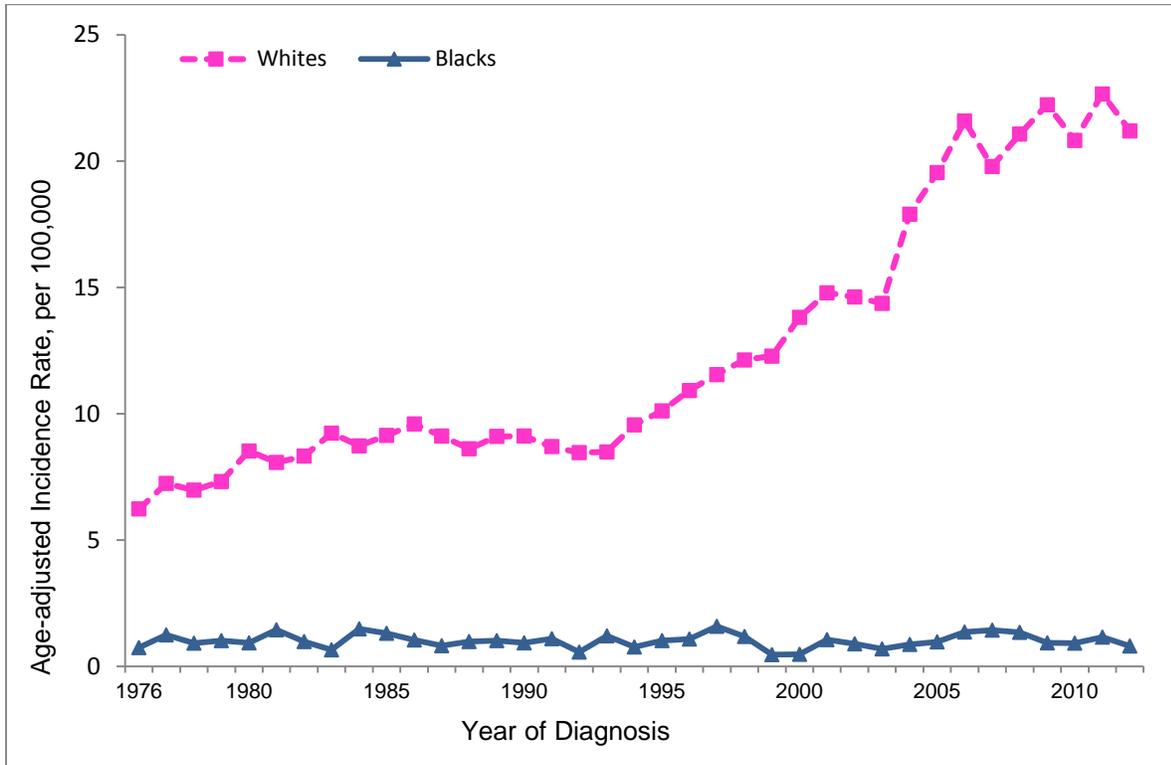
Fair skin is an established risk factor for melanoma. The melanoma incidence among non-Hispanic white men is 30 times higher than among non-Hispanic black men and 10 times higher than among Hispanic men. For women, the melanoma rate among non-Hispanic whites is 20 times higher than among non-Hispanic blacks and 8 times higher than among Hispanics (Figure 3).

Figure 3. Age-adjusted melanoma incidence rate by race and ethnicity and gender, New York State, 2008-2012



Among whites, the incidence of melanoma has been increasing since 1976, the first year for which data are available for New York, as shown in Figure 4. The incidence among blacks has remained low. Most of the increase in the more recent years may be due to more complete reporting of melanoma to the NYSCR, but studies have shown that melanomas are increasing in other areas of the United States as well, including the regions covered by the SEER program.

Figure 4. Age-adjusted melanoma incidence rates by year and race, males and females combined, New York State, 1976-2012



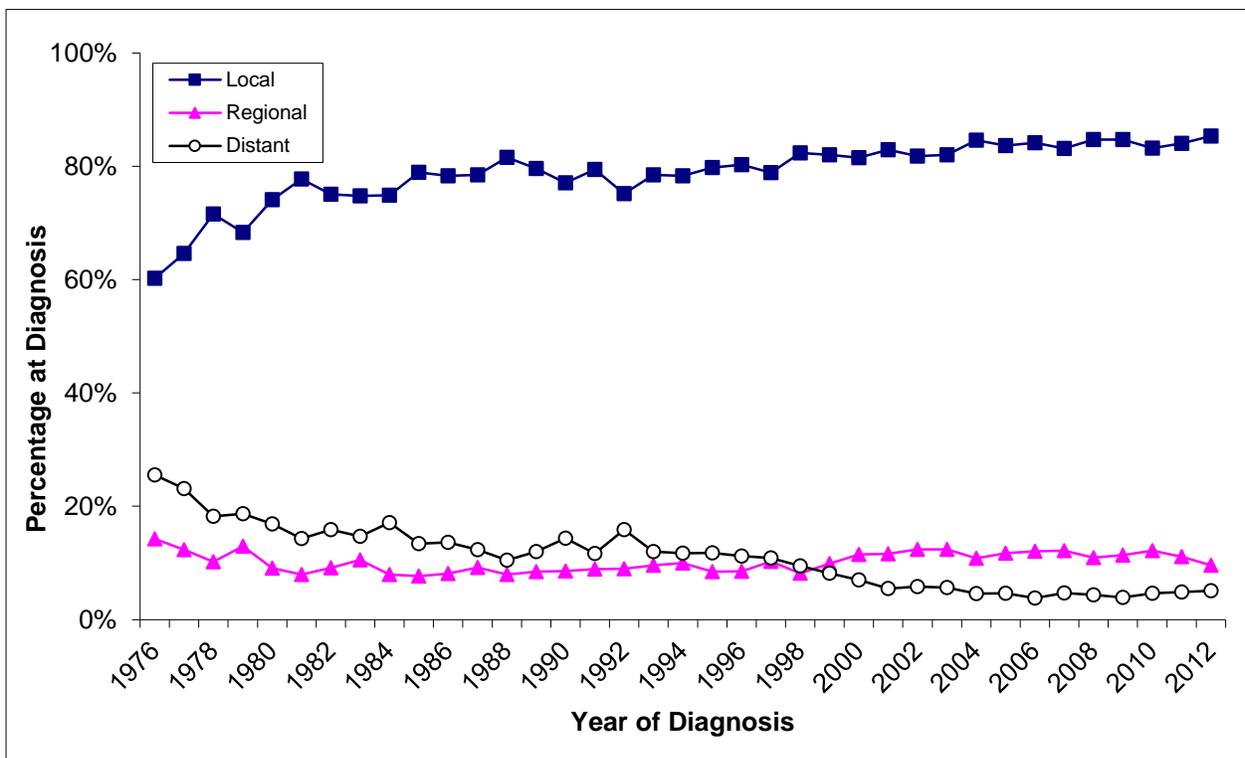
Melanoma rates vary across New York State. Since melanoma is less common among blacks and Hispanics, melanoma rates are higher in areas of the state that have a greater proportion of the population that is non-Hispanic white. For example, the lowest melanoma rates in the state are observed in the Bronx, where 87 percent of the population is black or Hispanic. The melanoma rates among non-Hispanic whites by county for 2008 to 2012 are shown in Figure 5. In counties with smaller populations, a difference of a few cases per year can make a large difference in the rate of the disease, making interpretation of the county rankings difficult. The melanoma incidence and mortality for every county and for neighborhoods in New York City are provided in the Appendix.

Figure 5. Age-adjusted melanoma incidence rate by county, non-Hispanic whites, males and females combined, New York State, 2008-2012



Melanoma can be treated successfully when diagnosed at an early stage. Therefore, it is important to have regular check-ups by health care professionals and to have health care professionals evaluate suspicious moles or skin changes. Moles should be evaluated if they are uneven in shape or color; are larger than the size of a pencil eraser; or change in shape, color, or size. In 2012, 85 percent of melanomas reported to the NYSCR were diagnosed before they had spread beyond the skin, and 5 percent were diagnosed after they had spread to distant organs. Figure 6 depicts the stage at diagnosis, in terms of *local*, *regional*, and *distant*. Melanomas that are “local” are confined to the skin. “Regional” melanomas have spread to subcutaneous tissue or to lymph nodes in the region of the tumor; and “distant” melanomas are those that have spread to underlying muscle or bone or to tissues and lymph nodes in other areas of the body. In the last ten years, there has been no significant change in the percent of melanomas diagnosed at “local”, “regional” or “distant” stages.

Figure 6. Percentage distribution of stage at diagnosis for melanoma of the skin by year, males and females combined, 1976-2012

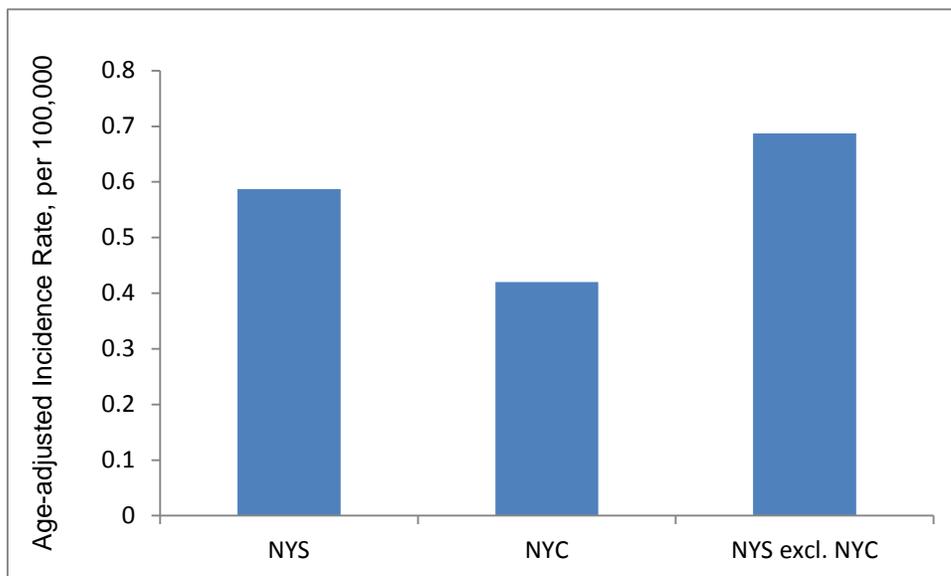


Merkel cell carcinoma in New York State

Merkel cell carcinoma (MCC) is a rare type of skin cancer originating in the top layer of the skin, that is known to grow rapidly.²³ In the United States there are approximately 1,500 new cases each year.²⁴ The incidence of MCC increases with age, with few cases observed among patients younger than fifty years. This type of skin cancer usually appears on sun-exposed skin as a single, painless lump, red or violet in color, firm in texture, and dome-like in shape. While there is no established cause of MCC, an increase of cases has been observed among patients who treat psoriasis with methoxsalen (psoralen) and ultraviolet A, and among those with chronic immune suppression.²⁴

In New York State the age-adjusted incidence rate of MCC is 0.59 per 100,000 population per year (Figure 7). By region, the rate in New York City is 0.42 per 100,000 population per year and in New York State exclusive of New York City the rate is 0.69. Approximately 127 individuals in New York State are diagnosed with MCC each year. While rare, this form of skin cancer can be aggressive, and complications are not uncommon.

Figure 7. Merkel Cell Carcinoma incidence rate by region, New York State, 2008-2012



Frequency of inpatient and outpatient care for skin cancer patients in New York State

The SPARCS hospitalization and ambulatory surgery data are indicators of the burden of skin cancer on the New York State health care system. Table 1 shows the number of patients receiving inpatient care with a skin cancer as the principal diagnosis by year. During 2008 to 2012, on average, 284 New York residents were hospitalized each year because of melanoma of the skin, and 432 were hospitalized because of other skin cancers. The trends showing decreasing hospitalizations over time may reflect the general shift towards treating patients in outpatient settings.

Table 1. Number of unique inpatient hospitalizations with skin cancer as the principal diagnosis, males and females combined, New York State, 2008-2012

Year	Melanoma	Other Skin Cancers
2008	349	446
2009	287	469
2010	275	419
2011	259	413
2012	250	412

The estimated number of outpatient surgeries for skin cancer from 2008 through 2012, when skin cancer was the primary reason for care, is shown in Table 2. The average number of outpatient surgeries for melanoma was 3,085 per year and for nonmelanoma skin cancer 9,297 per year. There was a significant increase in outpatient surgeries reported for skin cancer since 2011. This is most likely due to an amendment to Public Health Law Section 2816(2)(a)(iv) enacted in 2006 to authorize the collection of cancer diagnoses treated in outpatient clinics in New York State starting in 2011.²⁵

Table 2. Number of unique outpatient surgeries for skin cancer, males and females combined, New York State, 2008-2012

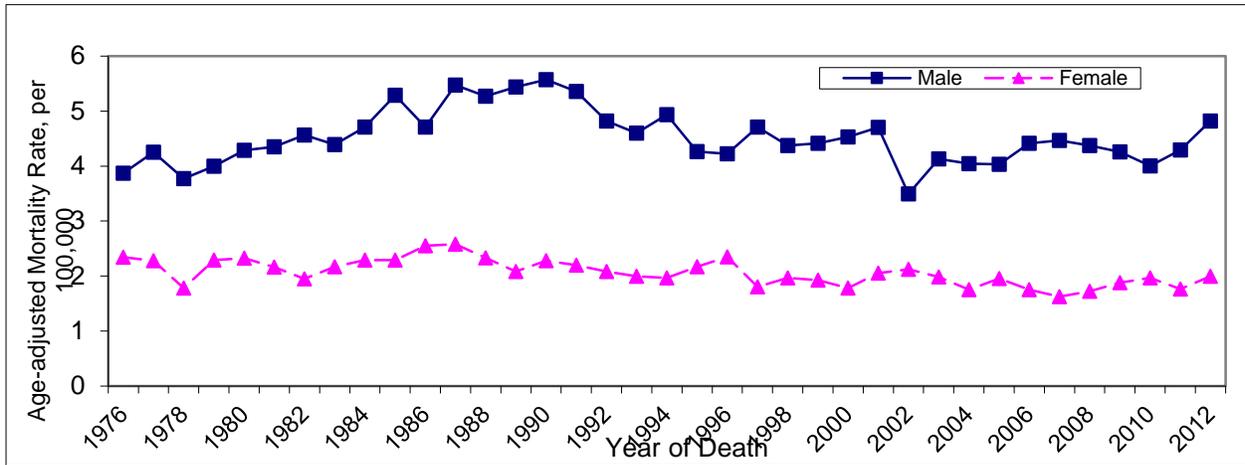
Year	Melanoma	Other Skin Cancers
2008	2,279	7,939
2009	2,533	7,901
2010	2,563	7,848
2011	3,986	11,592
2012	4,067	11,206

Mortality

About 633 New Yorkers die from skin cancer each year. Approximately 76 percent of these deaths—293 men and 186 women—are due to melanoma. Deaths from other types of skin cancer are less common, with 104 deaths among men and 51 among women per year. Some of the rare types of skin cancer are much more aggressive than basal and squamous cell skin cancers, and some of the nonmelanoma deaths are due to these rare, but often fatal, types of skin cancer.

Skin cancer is the fourteenth most common type of cancer death among men and the eighteenth among women in New York State. The skin cancer mortality rate for males increased between 1976 and 1987, followed by a gradual decrease to 2010, with an increasing trend from 2010 to 2012. The skin cancer mortality rate for females has gradually decreased over time since 1976. Figure 8 shows the mortality from skin cancer for 1976 through 2012 among men and women.

Figure 8. Age-adjusted skin cancer mortality rate by year and gender,
New York State, 1976-2012



Summary

Basal and squamous cell carcinomas are the most common types of skin cancer. However, due to the lack of population-based surveillance data, the skin cancer incidence rate in New York State is not known. It is generally believed that the rate has been increasing during the last several decades nationwide.

Melanoma is among the top ten cancer diagnoses for New York State residents as a whole and among the top five diagnoses for young adults, 20 to 34 years of age. Over the last 30 years, the melanoma incidence rate has also been increasing. Melanoma ranks nineteenth as a cancer cause of death in New York State. New regulations affecting tanning salon operators will limit the known risk factor of UV exposure to minors. Increasing awareness of the dangers of excess sun exposure and enlisting primary care providers in early detection are actions being used to reduce the burden of skin cancer for New Yorkers.

REFERENCES

1. American Cancer Society. "Skin cancer: basal and squamous cell." Last modified February 20, 2014. <http://documents.cancer.org/acs/groups/cid/documents/webcontent/003139-pdf.pdf>
2. American Cancer Society. "Melanoma skin cancer." Last modified December 23, 2014. <http://documents.cancer.org/acs/groups/cid/documents/webcontent/003120-pdf.pdf>
3. American Cancer Society. "Skin cancer facts." Last modified February 5, 2015. <http://www.cancer.org/Cancer/CancerCauses/SunandUVExposure/skin-cancer-facts>
4. National Cancer Institute. "Melanoma Treatment. Skin cancer." <http://www.cancer.gov/cancertopics/pdq/treatment/melanoma/HealthProfessional>
Last modified November 7, 2014.
5. National Cancer Institute. "SEER Stat Fact Sheets: Melanoma of the Skin." Accessed March 6, 2015. <http://seer.cancer.gov/statfacts/html/melan.html>
6. Erdmann F, Lortet_Tieulent J, Schuz J, Zeeb H, Greinert R, Bretibart, EW, Bray F. "International trends in the incidence of malignant melanoma 1953-2008—are recent generations at higher or lower risk?" *International Journal of Cancer* 132(2013): 385-400.
7. National Cancer Institute. "What You Need To Know About Melanoma and Other Skin Cancers. Risk Factors." Last modified June 2010. <http://www.cancer.gov/publications/patient-education/skin.pdf>
8. Centers for Disease Control and Prevention. "Skin cancer. What Can I Do to Reduce My Risk?" Last modified May 29, 2014. http://cdc.gov/cancer/skin/basic_info/prevention.htm
9. American Academy of Dermatology. "How to apply sunscreen." Accessed June 12, 2015. <http://mysite/personal/tmh01/Shared%20Documents/Skin%20Cancer%20Reports/Y2015/SkinCancerReport%202015%20draft.docx>
10. Skin Cancer Foundation. "Sunscreens Explained." Accessed June 12, 2015 <http://mysite/personal/tmh01/Shared%20Documents/Skin%20Cancer%20Reports/Y2015/SkinCancerReport%202015%20draft.docx>
11. New York State Department of Health. "Indoor Tanning." Last modified January 2014. <http://www.health.ny.gov/environmental/indoors/tanning/>
12. New York State Department of Health. "Tanning Hazards Information Sheet." Last modified January 2014. http://www.health.ny.gov/environmental/indoors/tanning/fact_sheet.htm
13. National Tanning Training Institute. "Training And Certification For Tanning Salon Owners And Operators." Accessed March 6, 2015. <http://www.tanningtraining.com/btc/ch10.html?prodid=6>

14. U.S. Department of Health & Human Services. “CFR – Code of Federal Regulations Title 21”. Last modified September 1, 2014.
<http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=1040.20>
15. NYSED.gov. “School Health Services”. Last modified March 5, 2015.
<http://www.p12.nysed.gov/sss/schoolhealth/schoolhealthservices/>
16. Laws of New York, Public Health, Article 13-B Section 1394. Regulation of Overnight, Summer Day, and Traveling Summer Day Camps For Children. Accessed March , 2015.
<http://public.leginfo.state.ny.us/lawssrch.cgi?NVLWO:>
17. Community Preventive Services Task Force. “Preventing Skin Cancer: Education and Policy Approaches.” Last modified May 22, 2014.
<http://www.thecommunityguide.org/cancer/skin/education-policy/index.html>
18. Community Preventive Services Task Force. “Cancer Prevention and Control: Skin Cancer Prevention.” Last modified July 2014.
<http://www.thecommunityguide.org/about/What-Works-Skin-Cancer-fact-sheet.pdf>
19. Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov)
SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2014 Sub (2000-2012) <Katrina/Rita Population Adjustment> - Linked To County Attributes - Total U.S., 1969-2013 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014, based on the November 2014 submission.
20. Little EG, Eide MJ. “Update on the Current State of Melanoma Incidence.” *Dermatol Clin* 30(2012):355-361.
21. New York State Department of Health. “Statewide Planning and Research Cooperative System (SPARCS).” Last modified February 2015.
<http://www.health.ny.gov/statistics/sparcs/>
22. New York State Department of Health. “Vital Statistics of New York State.” Last modified December 2014. http://www.health.ny.gov/statistics/vital_statistics/
23. National Cancer Institute. “Merkel Cell Carcinoma Treatment. General Information About Merkel Cell Carcinoma.” Last modified May 5, 2014.
<http://www.cancer.gov/cancertopics/pdq/treatment/merkelcell/Patient>
24. National Cancer Institute. “Merkel Cell Carcinoma Treatment. General Information About Merkel Cell Carcinoma.” Last modified February 25, 2015.
<http://www.cancer.gov/cancertopics/pdq/treatment/merkelcell/healthprofessional>

25. New York State Department of Health. "SPARCS Expanded Outpatient Data Collection 2011." Accessed February 28, 2014.
http://www.health.ny.gov/statistics/sparcs/sysdoc/eodc_data_elements.pdf

Appendix A. Melanoma of the Skin Incidence by County, New York State, 2008-2012

County	<i>Males</i>			<i>Females</i>			County	<i>Males</i>			<i>Females</i>		
	Avg Ann Cases	Rate per 100,000	95% CI (+/-)	Avg Ann Cases	Rate per 100,000	95% CI (+/-)		Avg Ann Cases	Rate per 100,000	95% CI (+/-)	Avg Ann Cases	Rate per 100,000	95% CI (+/-)
New York State	2109.2	22.5	0.4	1607.4	14.1	0.3	Monroe	102.0	28.0	2.5	85.6	20.0	1.9
New York City	489.4	13.8	0.6	422.2	8.9	0.4	Montgomery	6.8	26.1	9.0	4.4	14.9	6.6
New York State Excl New York	1619.2	27.6	0.6	1184.2	17.7	0.5	Nassau	229.4	31.8	1.9	165.2	19.4	1.4
Bronx	28.4	5.8	1.0	27.2	3.6	0.6	Niagara	33.0	27.2	4.2	22.6	17.1	3.3
Kings (Brooklyn)	120.4	11.7	1.0	102.8	7.3	0.6	Oneida	28.8	21.8	3.6	19.8	14.4	3.0
New York (Manhattan)	186.0	24.4	1.6	149.6	15.1	1.1	Onondaga	50.0	21.5	2.7	39.4	14.8	2.1
Queens	111.8	10.9	0.9	103.6	7.7	0.7	Ontario	23.0	35.6	6.8	15.6	23.1	5.4
Richmond (Staten Island)	42.8	18.6	2.6	39.0	14.3	2.0	Orange	36.6	22.0	3.3	25.6	12.8	2.3
Albany	36.6	24.4	3.6	29.2	15.8	2.7	Orleans	5.4	24.3	9.4	5.4	21.2	8.2
Allegany	5.4	19.7	7.6	4.8	18.0	7.5	Oswego	12.2	21.1	5.5	10.2	15.9	4.5
Broome	34.4	30.7	4.7	21.8	18.2	3.6	Otsego	10.0	28.4	8.2	6.8	16.8	5.8
Cattaraugus	11.8	25.2	6.6	5.2	11.1	4.4	Putnam	12.4	24.5	6.4	10.2	17.6	5.0
Cayuga	11.8	26.1	6.8	10.0	22.1	6.4	Rensselaer	24.4	29.9	5.4	16.0	16.9	3.8
Chautauqua	20.8	27.2	5.4	15.8	19.4	4.6	Rockland	34.0	22.6	3.5	26.8	14.8	2.6
Chemung	15.6	31.2	7.1	10.8	20.0	5.7	St. Lawrence	15.2	26.3	6.1	15.6	27.1	6.2
Chenango	10.0	30.6	8.8	6.2	20.5	7.7	Saratoga	36.4	31.6	4.7	24.0	18.1	3.3
Clinton	9.0	21.0	6.3	7.2	15.4	5.2	Schenectady	20.0	24.7	4.9	13.2	14.1	3.6
Columbia	8.8	20.8	6.4	6.8	18.5	6.7	Schoharie	3.4	19.2	9.4	3.6	20.1	9.9
Cortland	4.4	19.1	8.1	3.0	11.0	5.6	Schuyler	2.6	22.7	12.6	4.4	33.7	14.3
Delaware	9.6	29.2	8.5	6.0	17.1	6.4	Seneca	3.8	18.5	8.4	3.8	20.2	9.4
Dutchess	34.4	22.1	3.4	24.0	13.8	2.5	Steuben	15.4	28.1	6.4	10.6	19.7	5.5
Erie	150.6	30.7	2.2	115.8	20.4	1.7	Suffolk	243.2	32.6	1.9	166.0	18.7	1.3
Essex	6.0	23.0	8.4	6.0	23.2	9.0	Sullivan	9.0	20.1	6.1	7.4	15.8	5.2
Franklin	7.6	25.9	8.5	3.6	12.4	5.8	Tioga	8.8	31.5	9.5	6.8	23.1	8.2
Fulton	4.8	15.6	6.3	4.4	11.6	5.0	Tompkins	12.8	32.3	8.1	10.2	20.9	5.9
Genesee	12.4	36.4	9.2	6.0	17.1	6.4	Ulster	25.0	25.2	4.5	18.4	16.1	3.4
Greene	8.6	26.7	8.1	5.6	17.8	6.9	Warren	14.0	34.8	8.4	6.8	17.3	6.2
Hamilton	1.0	24.3	22.4	0.8	14.8	14.6	Washington	10.2	28.4	8.0	6.4	17.7	6.4
Herkimer	8.2	20.3	6.3	5.6	13.8	5.5	Wayne	14.6	29.3	6.9	10.2	19.5	5.5
Jefferson	10.6	21.5	5.9	7.8	13.2	4.2	Westchester	120.8	25.0	2.0	89.0	15.0	1.4
Lewis	4.0	25.6	11.4	3.2	22.6	11.5	Wyoming	7.2	30.1	10.2	6.4	31.1	11.2
Livingston	8.6	25.1	7.7	6.4	19.3	7.0	Yates	4.8	33.4	13.7	3.4	25.3	12.8
Madison	9.0	22.9	6.9	8.4	20.5	6.4							

Rates are per 100,000 persons, age-adjusted to the 2000 US population, with 95% confidence intervals. Incidence data are provisional, November 2014. Rates based on fewer than 4 cases or deaths per year are unstable and should be used with caution.

Appendix B. Melanoma of the Skin Incidence by Borough and UHF Neighborhood New York City, 2008-2012

Borough/Health District	Males			Females		
	Avg Ann Cases	Rate per 100,000	95% CI (+/-)	Avg Ann Cases	Rate per 100,000	95% CI (+/-)
New York State	2109.2	22.5	0.4	1607.4	14.1	0.3
New York City	489.4	13.8	0.6	422.2	8.9	0.4
Bronx	28.4	5.8	1.0	27.2	3.6	0.6
Central Bronx	1.4	1.9	1.4	1.2	1.5	1.3
Bronx Park and Fordham	3.4	4.3	2.1	2.8	2.2	1.2
High Bridge and Morrisania	0.6	0.6	0.7	1.6	1.7	1.2
Hunts Point and Mott Haven	0.8	2.5	2.6	1.0	1.6	1.4
Kingsbridge and Riverdale	8.2	15.9	5.0	8.6	11.3	3.7
Northeast Bronx	4.2	5.2	2.2	4.2	3.1	1.4
Southeast Bronx	10.2	8.0	2.2	8.0	4.4	1.4
Kings (Brooklyn)	120.4	11.7	1.0	102.8	7.3	0.6
Central Brooklyn	4.0	3.0	1.3	3.0	1.6	0.8
Southwest Brooklyn	16.2	15.1	3.3	13.2	10.0	2.5
Borough Park	20.2	13.4	2.6	14.8	7.8	1.8
Canarsie and Flatlands	10.6	12.3	3.4	7.2	5.5	1.8
Southern Brooklyn	33.4	19.5	3.0	30.0	14.5	2.5
Northwest Brooklyn	18.6	18.8	4.0	15.8	12.3	2.8
Flatbush	4.6	4.2	1.8	2.4	1.3	0.8
East New York and New Lots	1.4	3.2	2.6	2.2	2.5	1.5
Greenpoint	4.8	7.6	3.2	8.2	12.6	3.9
Sunset Park	4.2	9.1	4.1	2.8	4.5	2.4
Bushwick and Williamsburg	2.0	2.4	1.6	2.2	2.1	1.3
New York (Manhattan)	186.0	24.4	1.6	149.6	15.1	1.1
Central Harlem	2.6	4.3	2.4	3.0	3.2	1.6
Chelsea and Clinton	20.2	24.3	4.9	14.0	16.5	4.0
East Harlem	1.8	3.8	2.6	1.8	3.0	2.0
Gramercy Park and Murray Hill	29.6	40.0	6.8	24.2	26.1	4.9
Greenwich Village and Soho	9.6	20.4	5.9	8.2	15.2	4.8
Lower Manhattan	5.4	22.0	9.1	5.2	18.4	7.3
Lower East Side	18.8	18.1	3.7	15.0	11.8	2.7
Upper East Side	55.2	49.0	5.9	47.8	31.9	4.3
Upper West Side	37.0	32.0	4.7	26.4	18.0	3.2
Inwood and Washington Heights	5.2	5.4	2.1	4.0	2.8	1.2
Queens	111.8	10.9	0.9	103.6	7.7	0.7
Northeast Queens	8.4	15.7	4.8	7.2	11.3	3.9
North Queens	16.8	11.5	2.5	14.6	8.2	2.0
Central Queens	5.2	10.0	3.9	5.0	7.6	3.1
Jamaica	4.4	3.7	1.6	3.2	1.8	0.9
Northwest Queens	9.8	9.6	2.8	10.6	8.9	2.4
West Central Queens	21.0	15.7	3.0	20.4	11.7	2.4
Rockaway	12.4	24.2	6.1	8.4	12.1	3.8
Southeast Queens	8.6	9.8	3.0	8.4	6.4	2.0
Southwest Queens	11.0	9.1	2.5	9.4	6.5	1.9
West Queens	13.8	7.5	1.8	15.4	6.1	1.4
Richmond (Staten Island)	42.8	18.6	2.6	39.0	14.3	2.0
Port Richmond	4.6	17.2	7.3	3.0	8.8	4.5
South Shore	22.8	22.7	4.3	19.8	17.5	3.5
Stapleton and St. George	8.0	13.3	4.2	8.6	11.8	3.6
Mid-Island	7.4	15.4	5.1	7.6	12.9	4.2

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