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Making Progress on HPV Vaccination in New York State



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Executive Summary

The development of coronavirus vaccines has generated renewed interest in the power of vaccination to improve population health. With the recent emergency approval of the COVID-19 vaccine for children ages 5 and up, governments, schools, and other groups are taking steps to ensure that children are immunized. This is a unique moment to assess childhood vaccination coverage and policies for other vaccine-preventable diseases, including the human papillomavirus (HPV).

HPV is a common virus spread through sexual contact. Nearly 43 million Americans have HPV, making it the single most common sexually transmitted infection.¹ HPV can cause six types of cancers, including cervical cancer.² From 2013 to 2017, an average of 2,730 New Yorkers were diagnosed with an HPV-related cancer each year, with about 60% of cases among women and 40% among men.³ The HPV vaccine prevents the development of more than 90% of these cancers, making it one of only two vaccines that prevent cancer.^{4,5} The HPV vaccine is administered to adolescents so they are fully protected against the virus before ever being exposed to it. The Centers for Disease Control and Prevention recommends that adolescents receive two doses of the HPV vaccine when they are ages 11–12 years.⁶

This report examines HPV vaccination coverage in New York State from 2018 to 2020. Vaccination coverage refers to the percentage of 13-year-olds who completed the two-dose HPV vaccine series by the age of 13 years. Data on adolescent vaccination were made available through the New York State Immunization Information System (see more details

¹ Centers for Disease Control and Prevention, "Sexually Transmitted Infections Prevalence, Incidence, and Cost Estimates in the United States," Centers for Disease Control and Prevention, January 25, 2021, <https://www.cdc.gov/std/statistics/prevalence-2020-at-a-glance.htm>.

² Centers for Disease Control and Prevention, "Cancers Caused by HPV," July 23, 2021, <https://www.cdc.gov/hpv/parents/cancer.html>.

³ New York State Department of Health, "HPV-Related Cancer Incidence and HPV Vaccination Rates in New York State, 2013-2017," https://www.health.ny.gov/statistics/cancer/docs/hpv_related_cancer_13-17.pdf.

⁴ Centers for Disease Control and Prevention, "Cancers Caused by HPV are Preventable," September 2020, <https://www.cdc.gov/hpv/hcp/protecting-patients.html>.

⁵ American Cancer Society, "Cancer Vaccines and Their Side Effects," January 8, 2020, <https://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/immunotherapy/cancer-vaccines.html>.

⁶ Centers for Disease Control and Prevention, "HPV Vaccine Schedule and Dosing," August 15, 2019, <https://www.cdc.gov/hpv/hcp/schedules-recommendations.html>.



Executive Summary (continued)

on the data in the **Methods** section). *Data on New York City immunizations are maintained by a separate immunization information system and were not made available for analysis. Approximately 60% of the statewide population of 13-year-olds resides outside of New York City.*^{7,8}

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- ⁷ 2019 county population estimates of age group 10–14 were divided by 5 to estimate the number of 13-year-olds per county. See: United States Census Bureau, "Annual County and Resident Population Estimates by Selected Age Groups and Sex: April 1, 2010 to July 1, 2019 (CC-EST2019-AGESEX)," <https://www.census.gov/data/tables/time-series/demo/popest/2010s-counties-detail.html>.
- ⁸ Total statewide population of 13-year-olds calculated in endnote 7 was compared with separate data and found to be similar. See: United States Census Bureau, "Annual Estimates of the Resident Population by Single Year of Age and Sex for New York: April 1, 2010 to July 1, 2019," <https://www.census.gov/data/tables/time-series/demo/popest/2010s-state-detail.html>.



Key Findings

- Overall **adolescent HPV vaccination coverage increased in New York State** (all data are exclusive of New York City) from 2018 to 2020. In 2020, 24.5% of 13-year-olds had received both shots of the HPV vaccine series by age 13. By comparison, 20.1% of similarly aged adolescents completed the HPV vaccine series by age 13 in 2018.
- Although these gains are encouraging, **New York State regions outside of New York City are still falling far short of the State's Prevention Agenda goal of 37.4%** coverage among 13-year-olds by 2024.⁹
- **Both girls and boys experienced an increase in HPV vaccination coverage over the study period.** While the gap between genders decreased slightly over the time period, a difference of 2.5 percentage points in vaccination coverage remained between 13-year-old girls (25.9%) and boys (23.4%) in 2020.
- Contrary to trends for many other vaccinations, **Hispanic or Latino and Black or African-American adolescents had the highest rates of HPV vaccination coverage over the study period.** The coverage rate increased for all races and ethnicities from 2018–2020 but remained consistently lower for Asian and white adolescents.
- There was substantial variation in HPV vaccination coverage across counties in New York State, with **only two counties (Cortland and Niagara) meeting the State's Prevention Agenda goal of 37.4%**. The 2020 coverage rate in the county with the lowest rate, Jefferson, was less than one-quarter as high as the county with the highest rate, Cortland (9.9% compared with 40.8%).
- The **lowest regional rates of HPV vaccination coverage were consistently found in the Lower Hudson and Long Island regions** (in 2020, 20.5% and 20.9%, respectively). These regions also had the lowest vaccination coverage for other pediatric vaccinations, studied in an earlier NYSHealth report [here](#).

New York State is making important progress in improving HPV vaccination rates; policy changes and public health interventions seem to be working. Factors that may have contributed to the recent increase in vaccination coverage include improving provider communication strategies about HPV with parents, expanding adolescent self-consent policies, and using school-based health centers as HPV vaccinators.

⁹ New York State Department of Health, "Prevention Agenda 2019-2024: Prevent Communicable Diseases Action Plan," https://www.health.ny.gov/prevention/prevention_agenda/2019-2024/comm.htm#FA1.



Key Findings (continued)

Differences by race and ethnicity persist, however. The higher vaccination coverage rate among Hispanic or Latino and Black or African-American adolescents may in part be explained by the higher incidence of HPV-related cancers among those groups compared with their white counterparts, which may have led to increased vaccination awareness, outreach, and/or demand.

Despite the notable gains, most New York regions are still not meeting the State's targets for HPV vaccinations. In some counties, the gap between current rates and the target is considerable. Although it is encouraging to see gains for all genders, racial and ethnic groups, and geographic regions of the State, persistent disparities must be closed so that all adolescents are equally protected. To end these gaps, New York State could consider additional policies, including requiring the HPV vaccine for school attendance and studying the potential of pharmacists to administer the HPV vaccine to young people.



HPV Vaccination Coverage in NY

HPV is a common virus spread through sexual contact. Nearly 43 million Americans have HPV, making it the single most common sexually transmitted infection.¹⁰ HPV can cause six types of cancers, including cervical cancer.¹¹ From 2013 to 2017, an average of 2,730 New Yorkers were diagnosed with an HPV-related cancer each year, with about 60% of cases among women and 40% among men.¹²

In the United States, the Advisory Committee on Immunization Practices (ACIP) issues recommendations to the Centers for Disease Control and Prevention (CDC) to determine which vaccinations adolescents should receive. A 2-vaccine series recommended by ACIP protects against the development of more than 90% of HPV-related cancers, including cervical cancer and precancers, oropharyngeal cancer, and vaginal and penile cancers.¹³ The CDC recommends that adolescents receive their HPV vaccination at ages 11–12 years, but the series may be started as early as age 9 and given to young adults through age 26.¹⁴

In this analysis, HPV vaccination coverage was assessed among 3 cohorts of 13-year-old adolescents (see **Table 1**) in 2018, 2019, and 2020. The vaccination coverage rate measures whether they completed the 2-dose HPV vaccine series before the age of 13 years. For example, adolescents in the 2018 cohort were born from July 2, 2004–July 1, 2005. On July 1, 2018, when the adolescents in this cohort were between the ages of 13 and 14, their vaccination coverage was assessed to determine if they completed the HPV vaccine series before the age of 13 years. Only adolescents with at least one administered vaccine (any kind) recorded in the New York State Immunization Information System (NYSIIS) or a New York State (exclusive of New York City) birth certificate are included in each cohort.

¹⁰ Centers for Disease Control and Prevention, “Sexually Transmitted Infections Prevalence, Incidence, and Cost Estimates in the United States,” <https://www.cdc.gov/std/statistics/prevalence-2020-at-a-glance.htm>.

¹¹ Centers for Disease Control and Prevention, “Cancers Caused by HPV,” <https://www.cdc.gov/hpv/parents/cancer.html>.

¹² New York State Department of Health, “HPV-Related Cancer Incidence and HPV Vaccination Rates in New York State, 2013-2017,” https://www.health.ny.gov/statistics/cancer/docs/hpv_related_cancer_13-17.pdf.

¹³ Centers for Disease Control and Prevention, “Cancers Caused by HPV are Preventable,” September 2020, <https://www.cdc.gov/hpv/hcp/protecting-patients.html>.

¹⁴ Centers for Disease Control and Prevention, “HPV Vaccination: What Everyone Should Know,” November 16, 2021, <https://www.cdc.gov/vaccines/vpd/hpv/public/index.html>.



HPV Vaccination Coverage in NY (continued)

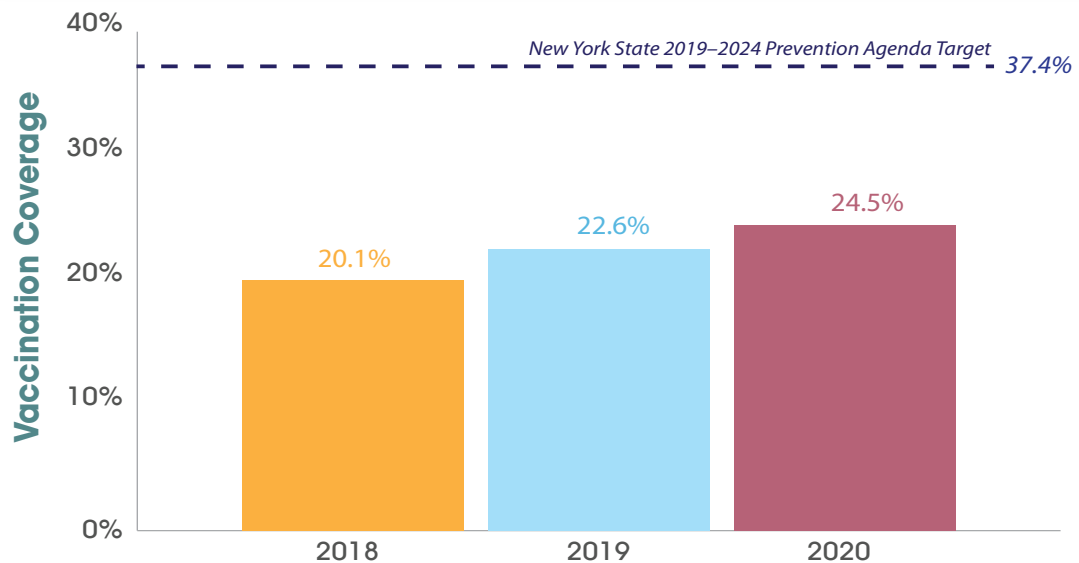
Table 1: Cohorts of Adolescents Studied

Cohort Name	Coverage assessed on July 1 of (age 13 years on this date)	Adolescents born	Number of adolescents in cohort
2018 Cohort	2018	July 2, 2004–July 1, 2005	178,332
2019 Cohort	2019	July 2, 2005–July 1, 2006	175,500
2020 Cohort	2020	July 2, 2006–July 1, 2007	177,961

OVERALL

Among 13-year-old adolescents, the HPV vaccination coverage rate grew from 20.1% in July 2018 to 24.5% in July 2020 (see **Figure 1**). Despite these improvements, the coverage rate for the HPV series in parts of the State outside New York City is still well below the State's 2019–2024 Prevention Agenda goal of 37.4% for 13-year-olds.¹⁵

FIGURE 1. HPV Vaccination Coverage in New York State Among 13-Year-Old Adolescents



Note: Age is calculated as of July 1st of each year. Data do not include New York City vaccinations.

Source: NYSHealth analysis of New York State Immunization Information System data.

¹⁵ New York State Department of Health, "Prevention Agenda 2019-2024: Prevent Communicable Diseases Action Plan," https://www.health.ny.gov/prevention/prevention_agenda/2019-2024/comm.htm#FA1.



HPV Vaccination Coverage in NY (continued)

New York State has experienced similar incremental gains from 2018–2020 with early childhood vaccinations (such as the Measles, Mumps, and Rubella vaccine), although also still falling short of key public health targets. Many experts anticipated that the emerging COVID-19 pandemic would lead to a decrease in vaccination rates in 2020, but creative approaches for administering vaccines safely (including drive-through and mobile clinics) likely contributed to increased childhood immunizations during that time. These trends, as well as a discussion of the potential impact of COVID-19 on vaccinations, are included in a September 2021 NYSHealth report, "[Getting a Fair Shot: Progress and Disparities in Early Childhood Vaccination in New York State.](#)"

Data on New York City immunizations are maintained by a separate immunization information system and were not made available for analysis. However, the New York City Department of Health and Mental Hygiene reports data on HPV vaccination coverage among adolescents ages 13–17 years. In 2020, 49.9% of adolescents ages 13–17 years in New York City received a complete HPV series.^{16,17} The New York City HPV vaccination coverage rate may be higher than the State rate in part because it is measured among a wider age range, allowing more time for adolescents to initiate and complete the vaccine series.

BY GENDER

HPV vaccination coverage increased among both girls and boys from 2018 to 2020. The coverage rate for girls increased from 21.8% to 25.9% and the rate for boys increased from 18.7% to 23.4% (see [Figure 2](#)). Although the gap in coverage between genders decreased over this period, a difference of 2.5 percentage points in vaccination coverage persisted between adolescent girls and boys in 2020.

Adolescent girls historically have had higher rates of HPV vaccination coverage, both in New York State and nationally.¹⁸ This disparity may be influenced in part by parental underestimation of the need to vaccinate adolescent boys against HPV, considering HPV's association with cervical cancer. Furthermore, the HPV vaccine was originally approved for adolescent girls in 2006 and later expanded to boys in 2009, creating lingering misperceptions of the universal need for HPV vaccination regardless of gender.

¹⁶ Dave A. Chokshi, "Fiscal 2021 Mayor's Management Report - Department of Health and Mental Hygiene," <https://www1.nyc.gov/assets/operations/downloads/pdf/mmr2021/dohmh.pdf>.

¹⁷ Dave A. Chokshi, "Department of Health and Mental Hygiene Indicator Definitions, Fiscal 2021 Mayor's Management Report," https://www1.nyc.gov/assets/operations/downloads/pdf/mmr2021/dohmh_idf.pdf.

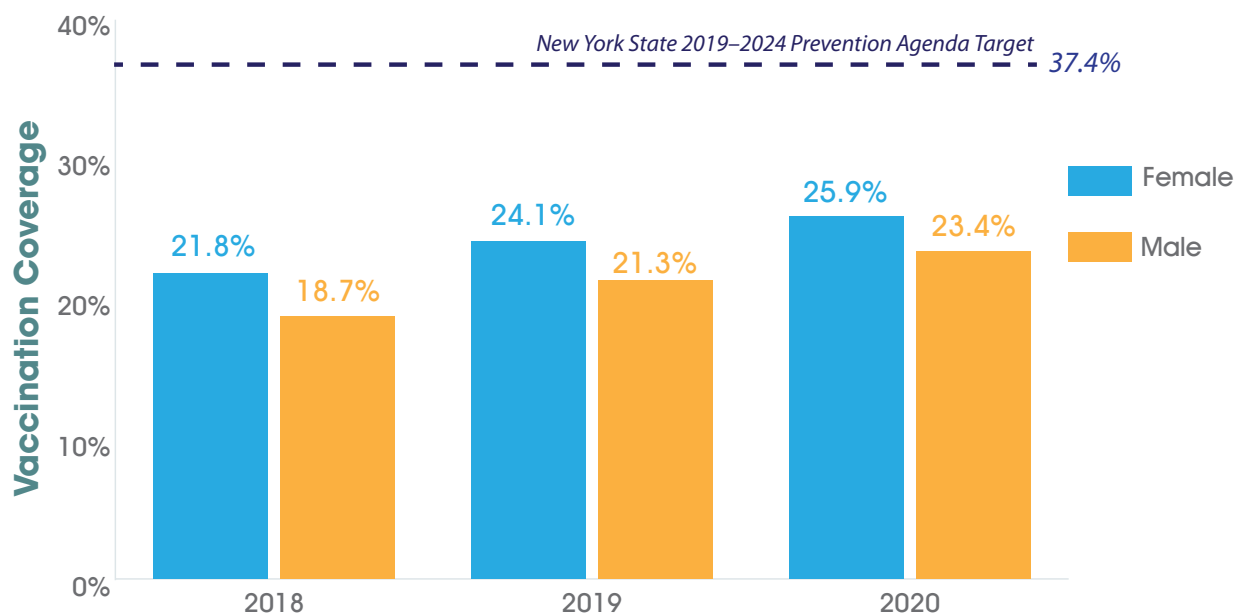
¹⁸ Centers for Disease Control and Prevention, "TeenVaxView: ≥2 Doses HPV Vaccination Coverage by Year among Females and Males Age 13-17 Years, National Immunization Survey-Teen," <https://www.cdc.gov/vaccines/imz-managers/coverage/teenvaxview/data-reports/index.html>.



HPV Vaccination Coverage in NY (continued)

The gap in vaccination coverage between boys and girls appears to increase as adolescents get older. A different State data source measured HPV vaccination coverage among New York adolescents ages 13–17 years in 2019 and found that adolescent boys had a coverage rate nearly 7 percentage points lower than girls.¹⁹

FIGURE 2. HPV Vaccination Coverage in New York State Among 13-Year-Old Adolescents, by Gender



Note: Age is calculated as of July 1st of each year. Data do not include New York City vaccinations.
Source: NYSHealth analysis of New York State Immunization Information System data.

BY RACE/ETHNICITY

The vaccination coverage rate for all races and ethnicities increased from the earliest to the most recent cohorts studied (see **Figure 3**). Hispanic or Latino adolescents consistently had the highest rates of vaccination coverage, with a rate of 40.3% in 2020. Black or African-American adolescents had a slightly lower rate of 36.1%. Asian and white adolescents had considerably lower vaccination coverage, with rates of 28.9% and 27.2%, respectively. These disparities do not appear to be closing; the gap between Hispanic or Latino and both white and Asian adolescents grew from 2018 to 2020. These patterns are similar on the national

¹⁹ Centers for Disease Control and Prevention, "TeenVaxView: ≥ 2 Doses HPV Vaccination Coverage by Year among Females and Males Age 13-17 Years, National Immunization Survey-Teen," <https://www.cdc.gov/vaccines/imz-managers/coverage/teenvaxview/data-reports/index.html>.



HPV Vaccination Coverage in NY (continued)

level. From 2015–2019, Hispanic adolescents ages 13–17 years had the highest rate of HPV vaccination coverage, whereas white adolescents had the lowest rate.²⁰

(Note: The data used for this report do not include information on vaccinations for adolescents in New York City, which is home to a higher proportion of New Yorkers of color than the rest of the State. Data from the rest of the State may not be reflective of vaccination coverage in New York City. Additionally, the data do not have complete race or ethnicity information for all vaccinations. See *Limitations* for more details.)

The higher vaccination coverage rate among Hispanic or Latino and Black or African-American adolescents is a trend that differs from other vaccinations (see prior [NYSHealth research](#)) and may be influenced by many factors. First, in New York State from 2013–2017, Black non-Hispanic and Hispanic women had the highest rates of HPV-related cancers.²¹ This disproportionate disease burden may have influenced HPV vaccination awareness, outreach, and/or demand. Second, a separate State data source shows that New York (inclusive of New York City) adolescents ages 13–17 years insured through Medicaid had the highest rates of HPV vaccination completion compared with those covered by all other types of insurance.²² Adolescents of color are more likely to be insured through Medicaid in New York State, which may also contribute to their higher vaccination coverage rate.²³ Finally, researchers have found that living in lower-income communities is associated with higher HPV vaccination initiation.²⁴ Although having a low income is typically associated with barriers to health care access, adolescents in these communities may be more likely to use safety-net immunization services like the Vaccines for Children (VFC) program. This federally funded program provides vaccines at no cost to children who might otherwise be unvaccinated because of inability to pay.²⁵ VFC

²⁰ Centers for Disease Control and Prevention, “Vaccination Coverage among Adolescents Age 13–17 Years, Survey Years 2015-2019, United States, National Immunization Survey-Teen,” accessed October 2021, <https://www.cdc.gov/vaccines/imz-managers/coverage/teenvaxview/data-reports/index.html>.

²¹ New York State Department of Health, “HPV-Related Cancer Incidence and HPV Vaccination Rates in New York State, 2013-2017,” https://www.health.ny.gov/statistics/cancer/docs/hpv_related_cancer_13-17.pdf.

²² Centers for Disease Control and Prevention, “TeenVaxView: Vaccination Coverage among Adolescents Age 13–17 Years, Survey Years 2015-2019, New York, National Immunization Survey-Teen,” <https://www.cdc.gov/vaccines/imz-managers/coverage/teenvaxview/data-reports/index.html>.

²³ Centers for Disease Control and Prevention, “Vaccination Coverage among Adolescents Age 13–17 Years, Survey Years 2015-2019, New York, National Immunization Survey-Teen,” <https://www.cdc.gov/vaccines/imz-managers/coverage/teenvaxview/data-reports/index.html>.

²⁴ Kevin A. Henry et al., “Geographic Factors and Human Papillomavirus (HPV) Vaccination Initiation among Adolescent Girls in the United States,” *Cancer Epidemiology Biomarkers & Prevention* 25, no. 2 (February 2016): 309–17, <https://doi.org/10.1158/1055-9965.EPI-15-0658>.

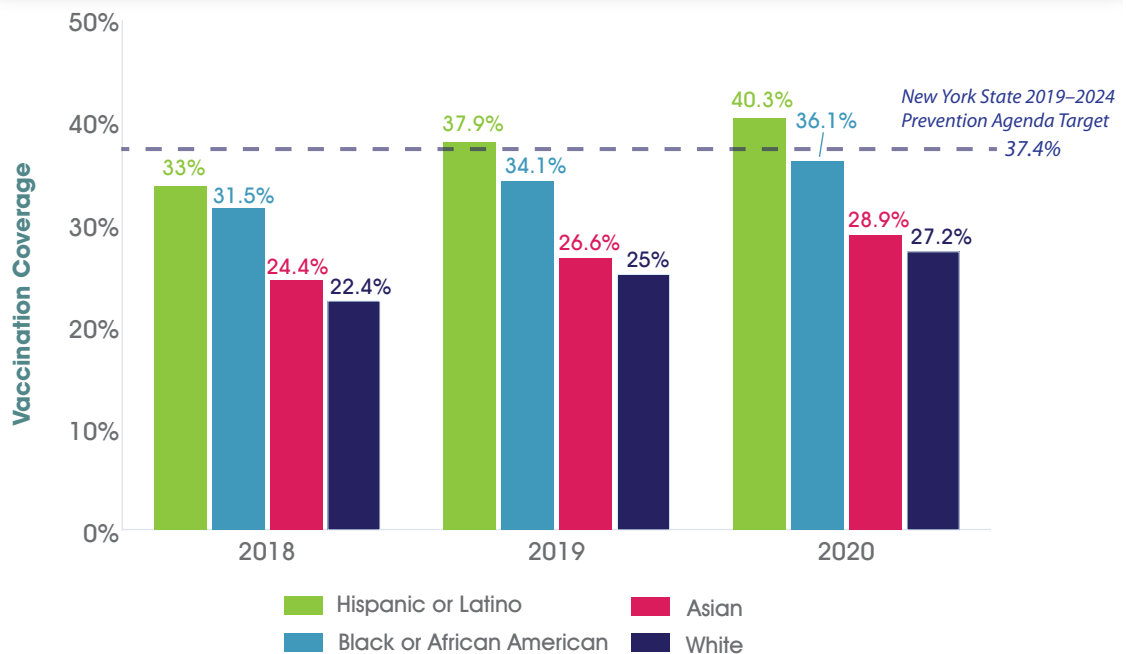
²⁵ Centers for Disease Control and Prevention, “Vaccines for Children Program (VFC),” February 18, 2016, <https://www.cdc.gov/vaccines/programs/vfc/index.html>.



HPV Vaccination Coverage in NY (continued)

providers participate in a CDC immunization quality improvement program, through which local health departments work with VFC providers to implement evidence-based strategies to increase vaccination coverage levels and decrease missed vaccination opportunities (e.g., scheduling the next vaccination visit before the patient leaves, giving a strong vaccine recommendation, leveraging immunization information systems to identify patients).²⁶ Hispanic or Latino and Black or African-American adolescents may in part have higher rates of HPV vaccination coverage because they are more likely to see a provider trained in these strategies.

FIGURE 3. HPV Vaccination Coverage in New York State Among 13-Year-Old Adolescents, by Race/Ethnicity



Note: Data do not include New York City vaccinations. Adolescents with an ethnicity of Hispanic or Latino in the data were categorized as Hispanic or Latino. Adolescents with an ethnicity of non-Hispanic or "ethnicity unknown" were categorized as Black or African American, white, or Asian, according to their race identified in the data.

Source: NYSHealth analysis of New York State Immunization Information System data.

BY GEOGRAPHIC AREA (COUNTY & REGION)

Significant differences in vaccination coverage exist across counties in New York State. Among the 2020 cohort of adolescents, the vaccination coverage rate in the county with the lowest

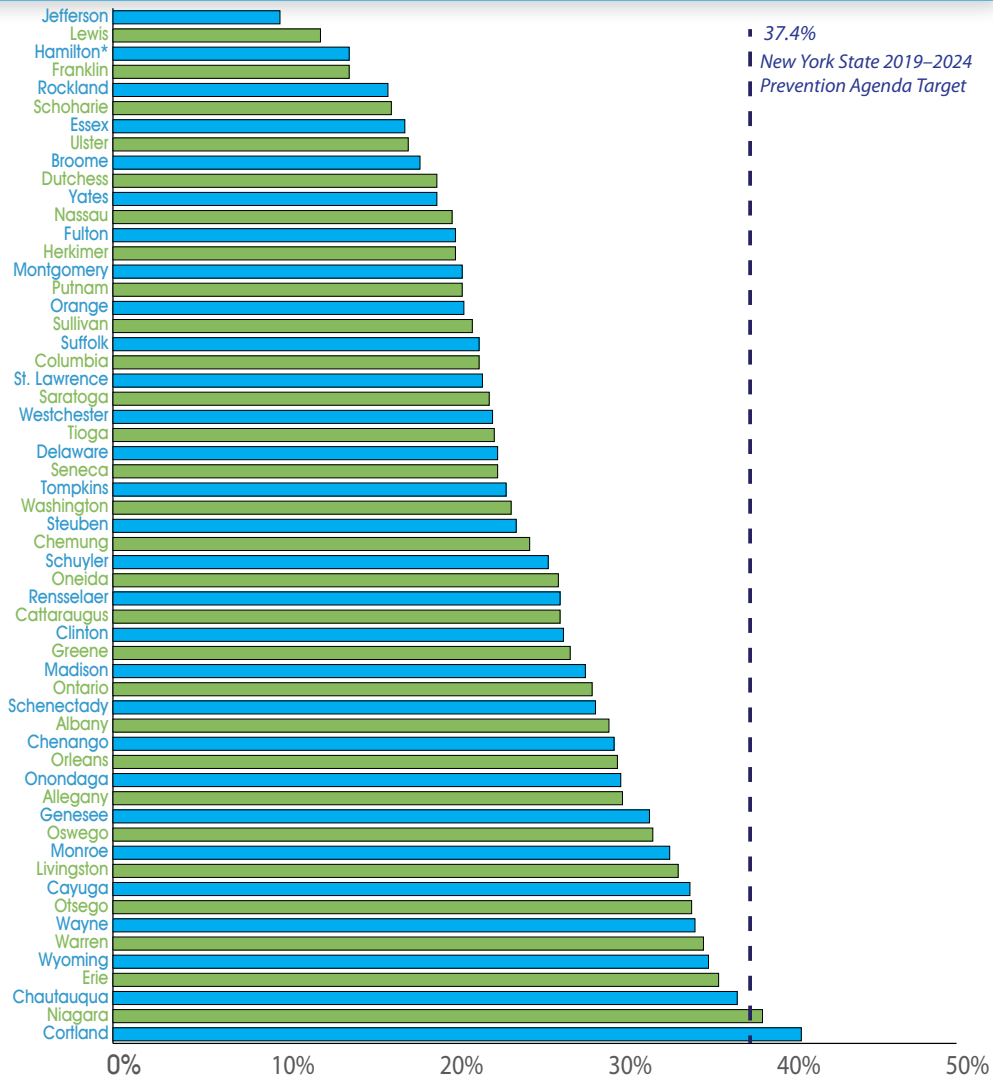
²⁶ Centers for Disease Control and Prevention, "Immunization Quality Improvement for Providers (IQIP)," July 13, 2020, <https://www.cdc.gov/vaccines/programs/iqip/at-a-glance.html>.



HPV Vaccination Coverage in NY (continued)

rate, Jefferson (9.9%), was approximately one-quarter as high as the county with the highest rate, Cortland (40.8%) (see **Figure 4**). Only two counties have reached the State Prevention Agenda target of 37.4% (Cortland and Niagara). Counties with the lowest vaccination coverage tend to cluster in the Lower Hudson, Long Island, and Central regions of New York State.

FIGURE 4. HPV Vaccination Coverage in New York State Among 13-Year-Old Adolescents, by County (2020)



Note: Data do not include New York City vaccinations. County refers to residence of the adolescent. Asterisk indicates that the county has a sample size of less than 50.

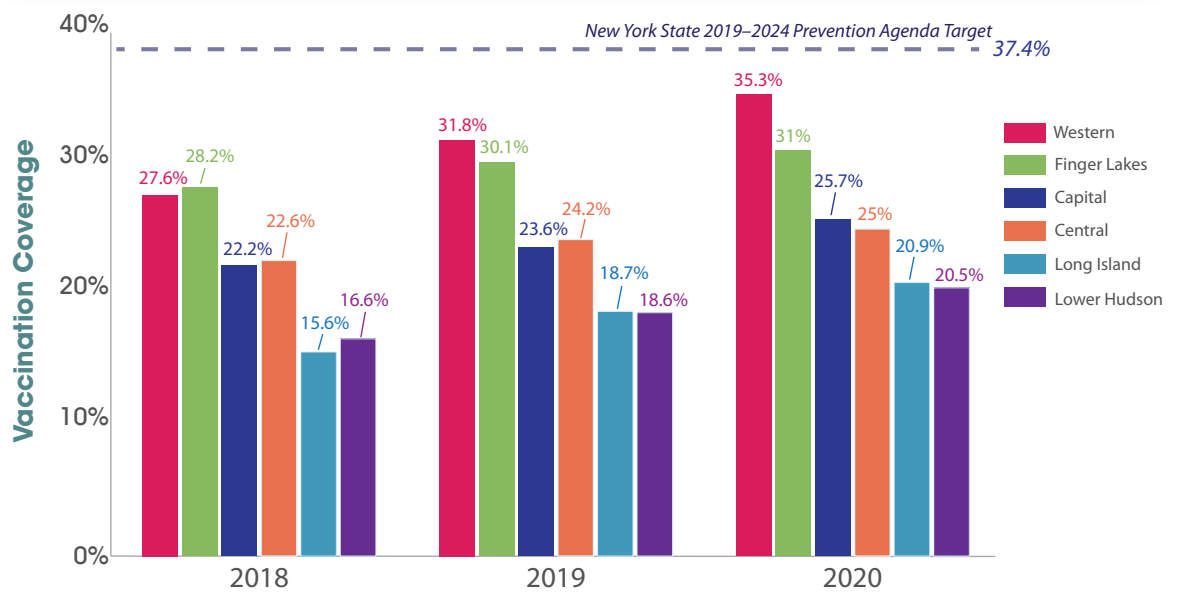
Source: NYSHealth analysis of New York State Immunization Information System data.



HPV Vaccination Coverage in NY (continued)

Sizeable regional disparities are also present. The Lower Hudson and Long Island regions had the lowest vaccination coverage (20.5% and 20.9%, respectively) among the most recent cohort of adolescents studied (see **Figure 5**). These rates were substantially lower than the rate in Western New York (35.3%), which exhibited the highest regional coverage rate. These same regions had the highest and lowest vaccination rates for early childhood vaccination rates (such as the Measles, Mumps, and Rubella vaccine), studied in a separate NYSHealth [analysis](#).

FIGURE 5. HPV Vaccination Coverage in New York State Among 13-Year-Old Adolescents, by Region



Note: Data do not include New York City vaccinations. County or region refers to residence of the adolescent.

Source: NYSHealth analysis of New York State Immunization Information System data.



Discussion

It is encouraging that New York State has succeeded in increasing HPV vaccination coverage in recent years. Below we examine factors that may have contributed to this improvement and what more can be done to accelerate progress.

FACTORS INFLUENCING INCREASES IN HPV VACCINATION COVERAGE

Strong Provider Recommendation

Research shows that a strong provider recommendation is the greatest predictor of an adolescent receiving the HPV vaccine. In fact, among New York State parents in 2019 who reported not planning to vaccinate their child against HPV in the next year, the most commonly cited reason was that their child's health care provider had not recommended it.²⁷ Several initiatives in New York State have worked to integrate strong provider recommendations into all visits adolescents have with their health care providers. For example, the New York State HPV Coalition implemented a provider quality improvement project to train practices in strategies that increase HPV vaccination coverage, including how to communicate vaccine recommendations effectively.²⁸

Provider recommendations are most effective when they use evidence-based communication strategies. For example, studies show that parents are more likely to vaccinate their children when a provider uses a presumptive approach (e.g., "Now that your child is 11, they are due for their vaccination to protect against HPV-related cancers") instead of a participatory approach (e.g., "Would you like to do the HPV vaccine today?").²⁹ A bundled approach, in which providers recommend the HPV in the "same way, same day" as other vaccinations, is also effective.

Many providers, however, have been unprepared to give strong HPV vaccination recommendations. Some providers have shied away from discussing the HPV vaccine with parents, given its association with sexual activity.³⁰ Other providers have an incomplete understanding of the need to vaccinate adolescent boys.³¹ To combat this challenge nationally, the American Cancer Society has worked to reframe the conversation about HPV,

²⁷ NYSHealth analysis of 2019 National Immunization Survey-Teen data. Data available from: <https://www.cdc.gov/vaccines/imz-managers/nis/datasets-teen.html>.

²⁸ New York State HPV Coalition, "New York State HPV Action Plan 2018-2023," August 2019, <http://www.nyshpv.org/wp-content/uploads/2019/09/NEW-YORK-STATE-HPV-VACCINATION-ACTION-PLAN-3.pdf>.

²⁹ Annika M. Hofstetter et al., "Clinician-Parent Discussions about Influenza Vaccination of Children and Their Association with Vaccine Acceptance," *Vaccine* vol. 35, no. 20 (May 9, 2017): 2709–15, <https://doi.org/10.1016/j.vaccine.2017.03.077>.

³⁰ Melissa B. Gilkey et al. "Quality of Physician Communication about Human Papillomavirus Vaccine: Findings from a National Survey," *Cancer Epidemiology, Biomarkers & Prevention* vol. 24, no. 11 (2015): 1673-9, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4633386/>.

³¹ Ibid.



Discussion (continued)

moving focus away from how HPV is transmitted (through sexual activity) and toward what the HPV vaccine prevents (cancer).³² With NYSHealth funding, the American Academy of Pediatrics, the American Cancer Society New York Chapter, and the New York State HPV Coalition implemented quality improvement projects in 2019–2020 among providers, health plans, and school-based health centers (SBHCs) to increase HPV vaccination in New York State.³³ The provider quality improvement project included a provider education program among more than 50 practices statewide to address gaps in knowledge and attitudes about the HPV vaccine.³⁴ The program educated providers about the value of the HPV vaccine and equipped them with the skills to discuss HPV vaccination with parents.

Advancements of Electronic Health Records (EHRs) and Immunization Information Systems

With technological advancements of EHRs and immunization information systems, providers can more easily create reports of patients due or overdue for vaccines. Sophisticated EHRs support bidirectional information exchange, allowing providers to submit immunization data from their EHR to NYSIIS and to request that immunization data from NYSIIS be sent to their EHR.³⁵ This bidirectionality is particularly helpful for assessing the vaccination status of patients who do not have a consistent source of primary care; providers can use NYSIIS data to track which vaccines have been administered to their patients at other points of care. NYSIIS and some EHR systems can also automatically send reminders to parents for upcoming and overdue vaccines via mail, phone, or text.

Quality improvement initiatives are increasing the use of NYSIIS among providers to better track their patients due or overdue for vaccines and generate reminders. The CDC has designed an immunization quality improvement program, known as IQIP, to increase on-time vaccination of children and adolescents among providers that participate in the VFC

³² Ibid.

³³ New York State Health Foundation, "Improving HPV Vaccination Rates Among Adolescents in New York State," <https://nyshealthfoundation.org/grantee/american-academy-of-pediatrics-ny-chapter-1/>.

³⁴ New York State HPV Coalition, "New York State HPV Action Plan 2018-2023," August 2019, <http://www.nyshpv.org/wp-content/uploads/2019/09/NEW-YORK-STATE-HPV-VACCINATION-ACTION-PLAN-3.pdf>.

³⁵ Neil Murthy et al., "Progress in Childhood Vaccination Data in Immunization Information Systems — United States, 2013–2016," *MMWR. Morbidity and Mortality Weekly Report* 66, no. 43 (November 3, 2017): 1178–81, <https://doi.org/10.15585/mmwr.mm6643a4>.



Discussion (continued)

program.^{36,37} Local health departments in New York State implement the IQIP program and conduct site visits annually to one-quarter of their county's VFC providers.³⁸ During these visits, local health departments support VFC providers in leveraging NYSIIS to increase vaccination coverage. Continued technical assistance will help providers make full use of NYSIIS and may be particularly effective in increasing vaccination coverage among adolescents of color, who are more likely to be seen by VFC providers.

Expanded Adolescent Self-Consent Policies

Health care providers are typically required to obtain parental consent before administering vaccinations to minors. Providers nationwide report that this is a significant barrier to HPV vaccination access.³⁹ In some cases, parents refuse the HPV vaccine because of its association with sexual activity. In other cases, the consent requirement is a logistical challenge, because adolescents may present to appointments without a parent, especially in a SBHC.

In 2016, the New York State Department of Health issued regulations to permit providers to administer the HPV vaccine to sexually active adolescents without parental consent.^{40,41} This policy has helped to increase HPV vaccination access among adolescents who otherwise would have been unable to receive the vaccine.

Integrating HPV Vaccination into School-Based Health Centers

School-Based Health Centers are medical centers located within public schools. Run by local hospitals, medical centers, and community organizations, SBHCs can provide students with

³⁶ The Vaccines for Children program provides vaccines purchased by the federal government to providers to administer to low-income children. See: Centers for Disease Control and Prevention, "Vaccines for Children Program," February 18, 2016, <https://www.cdc.gov/vaccines/programs/vfc/index.html>.

³⁷ Centers for Disease Control and Prevention, "Immunization Quality Improvement for Providers," July 13, 2020, <https://www.cdc.gov/vaccines/programs/iqip/index.html>.

³⁸ New York State Association of County Health Officials (NYSACHO). "Update LHD IAP Work Plan (for the period starting 4/1/20)." Document obtained via email correspondence with NYSACHO.

³⁹ Carol A. Ford et al., "Minor Consent and Delivery of Adolescent Vaccines," *The Journal of Adolescent Health* : Official Publication of the Society for Adolescent Medicine 54, no. 2 (February 2014): 183–89, <https://doi.org/10.1016/j.jadohealth.2013.07.028>.

⁴⁰ 10 NYCRR §23.4 (2016).

⁴¹ New York State Department of Health, "Guidance for Local Health Departments (LHD) and Health Care Providers on STI Billing and Minor's Consent to Prevention Services and HIV-related Services," November 2019, https://www.health.ny.gov/diseases/communicable/std/docs/faq_billing_consent.pdf.



Discussion (continued)

primary care, mental health services, and vaccinations. More than 260,000 students in New York State are enrolled in a school with an SBHC.⁴²

SBHCs are critical sites for HPV vaccination. In addition to providing HPV vaccines, SBHCs also conduct important work educating both students and parents about the importance of HPV vaccination. In partnership with the New York School-Based Health Alliance, the New York State HPV Coalition has recently worked to enhance HPV vaccinations at SBHCs. Among other efforts, the groups authored a guide for providing SBHCs with technical assistance on developing parental consent policies, modifying office practices, and adopting effective communication strategies.⁴³ These efforts may have contributed to recent increases in HPV vaccination coverage among adolescents.

WHAT MORE SHOULD BE CONSIDERED TO INCREASE VACCINATION COVERAGE AND ELIMINATE DISPARITIES?

Although the preceding efforts have contributed to increases in HPV vaccination coverage among adolescents, more work remains to meet State targets and close disparities by gender, race and ethnicity, and geography. The following strategies may help New York State build upon recent gains and protect even more adolescent New Yorkers from HPV.

Require the HPV vaccine for school attendance

School mandates are the most effective compliance mechanism for ensuring that school-age children receive their recommended vaccinations. New York State already requires that middle school and high school students receive the Tdap (Tetanus, Diphtheria, Pertussis) vaccine and the Meningococcal conjugate vaccine—in addition to 5–7 other vaccinations required for younger ages.⁴⁴ Adding the HPV vaccine as a requirement for school attendance would help to further increase vaccination coverage.

It is important to note that states and jurisdictions that require the HPV vaccine for school attendance have had mixed success.⁴⁵ However, some of these requirements only apply to

⁴² New York State Department of Health, “School-Based Health Centers Fact Sheet,” May 2021, <https://www.health.ny.gov/statistics/school/skfacts.htm>.

⁴³ Jana Shaw and Michael Seserman, “NYS HPV Vaccination Guide for School-Based Health Centers,” New York State HPV Coalition, June 2019, <http://www.nyshpv.org/wp-content/uploads/2019/06/NYS-Guide-to-Increase-HPV-Vaccination-FINAL-6.10.19.pdf>.

⁴⁴ New York State Department of Health, “School Vaccination Requirements,” September 2020, https://www.health.ny.gov/prevention/immunization/schools/school_vaccines/.

⁴⁵ National Conference of State Legislatures, “HPV Vaccine: State Legislation and Regulation,” <https://www.ncsl.org/>



Discussion (continued)

adolescent girls and/or allow parents to opt out of the requirement.^{46,47} Given that New York State prohibits nonmedical exemptions to school vaccination requirements, adding the HPV vaccine to school entry requirements would likely be more effective than in states that have seen less success. Legislation introduced during the 2019–2020 New York State legislative session would have designated the HPV vaccine series as a required school immunization for all students, but the bill died in committee.⁴⁸

Study the role of pharmacists as adolescent vaccinators

In recent years, many states have begun expanding the types of providers who can administer vaccinations, either by expanding a licensure's scope of practice or through standing order procedures.⁴⁹ Although all states grant the authority to pharmacists to vaccinate, each state has different rules regarding the vaccines they can administer and the age groups they can vaccinate. New York State is one of only two states in the United States that does not permit pharmacists to administer the HPV vaccine.⁵⁰

In 2021, Governor Hochul signed legislation authorizing pharmacists to administer immunizations recommended by the CDC to patients 18 years and older.⁵¹ Although this legislation may increase HPV vaccination access among young adults who have not yet received the vaccine series, it will not allow pharmacists to administer the series during the recommended ages of 11–12 years.

Recognizing the potential of pharmacists to increase childhood vaccination coverage during the coronavirus pandemic, the U.S. Department of Health and Human Services (HHS) issued a directive in August 2020 authorizing state-licensed pharmacists in all 50 states to administer ACIP-recommended vaccines to children ages 3–18 years.⁵² New York State should conduct

⁴⁶ D.C. Code § 7-1651.04(b)

⁴⁷ Virginia Department of Health, "Virginia Adolescent Vaccination Schedule 7 Years–18 Years," <https://www.vdh.virginia.gov/content/uploads/sites/11/2021/03/VDH-Vaccine-Schedule.pdf>.

⁴⁸ S298B. 2019 Reg. Sess (NY 2019).

⁴⁹ National Council of State Legislatures, "State Immunization Policy Overview," <https://www.ncsl.org/research/health/immunizations-policy-issues-overview.aspx>.

⁵⁰ American Pharmacists Association and National Alliance of State Pharmacy Associations, "Pharmacist-Administered Vaccines," June 2020, <https://aphanet.pharmacist.com/sites/default/files/files/practice/07-2020/pharmacist-administered-vaccines-june-2020.pdf>.

⁵¹ S4807A. 2021 Reg. Sess (NY 2021).

⁵² U.S. Department of Health & Human Services, "HHS Expands Access to Childhood Vaccines during COVID-19 Pandemic," August 19, 2020, <https://www.hhs.gov/about/news/2020/08/19/hhs-expands-access-childhood-vaccines-during-covid-19-pandemic.html>.



Discussion (continued)

an assessment of pharmacists providing adolescent and pediatric vaccinations under this authorization to evaluate its outcomes. If the benefits to vaccination coverage are large, and the risks minimal, the evidence may point in favor of permanently authorizing pharmacists to administer adolescent and pediatric vaccinations.





Conclusion

From 2018 to 2020, New York State made gains in HPV vaccination coverage among 13-year-olds. The improvement may have been influenced by a number of factors, including efforts to strengthen health care providers' communication and recommendation of the vaccine to parents of adolescents; technological advances that allow providers to better identify children due or overdue for vaccinations and generate parent reminders; expansion of adolescent self-consent policies; and the integration of HPV vaccines into SBHCs.

Despite this progress, New York's overall HPV vaccination coverage rate falls short of the State's Prevention Agenda objectives, and it is far below the target in pockets of the State. Disparities by race, ethnicity, gender, and geography persist despite overall increases in vaccination coverage. New York State could explore promising strategies to establish HPV vaccine requirements for school attendance and assess an expanded role for pharmacists in administering the vaccine to adolescents. Such measures could ensure that the State continues to make progress in protecting young people against the consequences of HPV.



Methods

DATA

The data used for the analysis were obtained from NYSIIS. We are grateful to Claire McGarry, Research Scientist at NYSIIS, for fulfilling the data request.

Since January 1, 2008, all health care providers in New York State are required to report all immunizations administered to persons less than 19 years of age to the New York State Department of Health via NYSIIS.⁵³ NYSIIS does not contain data for immunizations administered in New York City, which manages its own immunization registry. See [Appendix](#) for the denominator and vaccination coverage rate for the groups of cohorts studied (overall and by gender, race/ethnicity, region, and county).

COHORTS STUDIED

Vaccination coverage was assessed among the three cohorts of adolescents in the following table. Only adolescents with at least one administered vaccine (any kind) recorded in NYSIIS or a New York State (exclusive of New York City) birth certificate are included in each cohort.

Cohort Name	Coverage assessed on July 1 of (age 13 years on this date)	Adolescents born	Number of adolescents in cohort
2018 Cohort	2018	July 2, 2004–July 1, 2005	178,332
2019 Cohort	2019	July 2, 2005–July 1, 2006	175,500
2020 Cohort	2020	July 2, 2006–July 1, 2007	177,961

Source: NYSHealth analysis of New York State Immunization Information System data.

CALCULATION OF RATES

For each cohort analyzed in this report, the HPV vaccination coverage rate is calculated as the percentage of the applicable population that completed the vaccine series before the age of 13 years. The applicable population is 13-year-old adolescents within each birth cohort with a record in NYSIIS or a New York State (exclusive of New York City) birth certificate.

$$\text{vaccination coverage} = \left(\frac{\text{adolescents ages 13 years who completed HPV series before age 13 years}}{\text{all adolescents ages 13 years with } \geq 1 \text{ vaccine (any kind) recorded in NYSIIS or a New York State (New York City-exclusive) birth certificate}} \right) \times 100$$

⁵³ New York State Department of Health, "New York State Immunization Information System (NYSIIS)," https://www.health.ny.gov/prevention/immunization/information_system/.



Methods (continued)

Vaccination coverage analyses typically use data from an immunization information system or census data for the denominator.⁵⁴ In this analysis, the data for the denominator is based on NYSIIS. The State's Prevention Agenda, however, uses census data in the denominator to calculate adolescent HPV vaccination coverage. See **Limitations** for more details on the advantages and disadvantages of each denominator data source.

Vaccination coverage was assessed using a point-in-time assessment, as of July 1st of each year. A point-in-time assessment is an appropriate method to track coverage rates over time, as it allows cohorts from one assessment period to the next to be held to the same age range.⁵⁵

CATEGORIZATIONS

For analyses by race and ethnicity, adolescents with an ethnicity of Hispanic or Latino recorded in NYSIIS were categorized as Hispanic or Latino. Adolescents with an ethnicity of non-Hispanic or Latino or "ethnicity unknown" were categorized as Black or African American, white, or Asian, according to their race identified in NYSIIS. Adolescents with an ethnicity of "ethnicity unknown" were categorized by race to maintain as much data on race as possible. An analysis was also conducted where adolescents with an ethnicity of "ethnicity unknown" were excluded from the analysis, and the vaccination coverage trends by race and ethnicity were similar to those produced by the less-restrictive categorization approach. Geographic analyses are based on the residence of the adolescent recorded within NYSIIS.

⁵⁴ American Immunization Registry Association, "Analytic Guide for Assessing Vaccination Coverage Using an IIS," November 2015, <https://repository.immregistries.org/resource/analytic-guide-for-assessing-vaccination-coverage-using-an-iis/>.

⁵⁵ Ibid.



Limitations

All findings in this report describe vaccination coverage for New York State, exclusive of New York City. Readers should interpret the findings as representative of only the 57 counties outside of New York City.

A widely used data source for immunization rate surveillance is the National Immunization Surveys (NIS), which are telephone surveys conducted by the CDC's National Center for Immunization and Respiratory Diseases. However, NIS data are reported with a two-year lag, and confidence intervals for local estimates are often wide, limiting their usefulness for vaccination program design.⁵⁶

In this analysis, NYSIIS data were used to provide a timelier analysis of vaccination coverage trends. Rates calculated from NYSIIS data have been historically lower than rates calculated from annual NIS data, in part because of incomplete reporting.⁵⁷ It has also been shown that the denominator for measures based on immunization information systems may be overestimated because of movement out of state (i.e., adolescents who move into a state have records added to the immunization information system, whereas adolescents who move out of that state may not be immediately removed from the system) and duplicate records.⁵⁸ The total number of 13-year-olds in New York State (exclusive of New York City) calculated by NYSIIS is higher than the 2019 Census estimate; the 2019 NYSIIS estimate is 175,500, whereas the 2019 Census estimates is 131,384.⁵⁹ However, aside from being timelier, another key advantage of using the immunization information system data to analyze coverage rates is that the same data source can be used for the denominator and the numerator. Also, a national comparison of immunization information systems and NIS data found that immunization information systems are becoming more complete over time, and vaccination coverage estimates from immunization information systems are becoming increasingly close to NIS

⁵⁶ Centers for Disease Control and Prevention, "Validation of an Immunization Information System Against the National Immunization Survey and Improvement of Hepatitis B Birth Dose Coverage in New York City," <https://cdc.confex.com/cdc/nic2008/techprogram/P15344.HTM>.

⁵⁷ Dina Hoefer, New York State Department of Health, "Immunization Coverage in NYS: Impact of Programmatic Activities and Policies on 4:3:1:3:3:1:4 Rates," https://repository.immregistries.org/files/resources/5835ade1a117b/track_d_promoting_partnerships__assessing_outcomes_.pdf.

⁵⁸ American Immunization Registry Association. "Analytic Guide for Assessing Vaccination Coverage Using an IIS," https://repository.immregistries.org/files/resources/5835adc2ae282/analytic_guide_for_assessing_vaccination_coverage_using_an_iis_november_2015.pdf.

⁵⁹ The Census estimate is calculated by dividing the 10–14 age group estimate by 5. Data available from: <https://www2.census.gov/programs-surveys/popest/datasets/2010-2019/counties/>.



Limitations (continued)

estimates.⁶⁰

From 2018 to 2020, 34–35% of records in NYSIS were missing both a race and an ethnicity categorization; these gaps may have affected the vaccination rates in the race and ethnicity analyses. However, a nationwide study found similar disparities by race and ethnicity among adolescents ages 13–17 years.⁶¹

⁶⁰ Murthy et al., “Progress in Childhood Vaccination Data in Immunization Information Systems — United States, 2013–2016,” <https://www.cdc.gov/mmwr/volumes/66/wr/mm6643a4.htm>.

⁶¹ See Online Supplementary Table 1 within: Cassandra Pingali et al., “National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13–17 Years — United States, 2020,” Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report, vol. 70, no. 35 (2021): 8, <https://www.cdc.gov/mmwr/volumes/70/wr/pdfs/mm7035a1-H.pdf>.



Appendix

	2018		2019		2020	
	ADOLESCENTS BORN JULY 2, 2004-JULY 1, 2005		ADOLESCENTS BORN JULY 2, 2005-JULY 1, 2006		ADOLESCENTS BORN JULY 2, 2006-JULY 1, 2007	
	Total	Vaccination	Total	Vaccination	Total	Vaccination
OVERALL	178,332	20.1	175,500	22.6	177,961	24.5
Gender						
Female	86,276	21.8	84,855	24.1	86,418	25.9
Male	91,293	18.7	89,925	21.3	90,734	23.4
RACE/ ETHNICITY						
White	72,160	22.4	69,524	25.0	70,194	27.2
Hispanic or Latino	21,407	33.6	20,995	37.9	22,042	40.3
Black or African American	12,141	31.5	12,113	34.1	12,518	36.1
Asian	5,905	24.4	5,509	26.6	5,640	28.9
REGION						
Capital	20,603	22.2	20,435	23.6	20,499	25.7
Central	24,872	22.6	24,857	24.2	25,514	25.0
Finger Lakes	18,295	28.2	18,240	30.1	18,988	31.0
Long Island	48,083	15.6	47,123	18.7	46,637	20.9
Lower Hudson	42,261	16.6	41,210	18.6	41,642	20.5
Western	21,096	27.6	20,632	31.8	21,559	35.3
COUNTY						
Albany	4,321	24.3	4,525	26.2	4,412	29.4
Allegany	636	22.2	616	25.8	605	30.2
Broome	2,755	19.1	2,634	18.6	2,770	18.2
Cattaraugus	1,127	22.3	1,103	24.4	1,248	26.5
Cayuga	868	30.8	888	32.5	916	34.2
Chautauqua	1,800	30.4	1,848	35.0	1,932	37.0
Chemung	1,215	23.5	1,137	26.1	1,349	24.7
Chenango	651	27.6	640	26.1	683	29.7
Clinton	949	24.1	986	25.3	1,013	26.7
Columbia	751	21.0	751	23.8	745	21.7
Cortland	621	30.1	611	34.4	596	40.8



Appendix (continued)

COUNTY	2018 ADOLESCENTS BORN JULY 2, 2004-JULY 1, 2005		2019 ADOLESCENTS BORN JULY 2, 2005-JULY 1, 2006		2020 ADOLESCENTS BORN JULY 2, 2006-JULY 1, 2007	
	Total	Vaccination	Total	Vaccination	Total	Vaccination
Delaware	482	18.3	502	21.1	558	22.8
Dutchess	4,494	14.8	4,352	17.0	4,369	19.2
Erie	12,910	27.6	12,614	31.6	13,098	35.9
Essex	453	14.6	436	17.9	410	17.3
Franklin	596	18.8	631	16.3	627	14.0
Fulton	652	13.7	642	17.6	649	20.3
Genesee	781	29.8	763	33.6	789	31.8
Greene	616	25.8	601	23.5	572	27.1
Hamilton	56	14.3	46	17.4	43	14.0
Herkimer	798	20.9	792	24.2	801	20.3
Jefferson	2,391	8.4	2,575	8.9	2,700	9.9
Lewis	377	9.0	421	11.2	373	12.3
Livingston	796	27.8	803	31.8	762	33.5
Madison	919	21.2	864	23.3	927	28.0
Monroe	11,087	30.3	11,220	32.0	11,605	33.0
Montgomery	875	18.2	819	18.7	870	20.7
Nassau	22,517	15.3	22,367	18.0	22,174	20.1
Niagara	2,758	29.1	2,722	34.4	2,816	38.5
Oneida	3,273	21.3	3,295	25.9	3,360	26.4
Onondaga	7,142	29.0	7,086	30.4	7,180	30.1
Ontario	1,464	25.8	1,462	26.8	1,494	28.4
Orange	7,376	17.4	7,421	20.4	7,302	20.8
Orleans	564	22.3	519	29.7	539	29.9
Oswego	1,581	27.5	1,623	30.4	1,599	32.0
Otsego	723	21.7	693	26.8	700	34.3
Putnam	1,508	13.7	1,445	16.7	1,437	20.7
Rensselaer	2,239	22.6	2,072	24.1	2,154	26.5
Rockland	6,827	12.3	6,572	13.3	6,833	16.3
Saratoga	3,402	20.8	3,392	20.5	3,395	22.3



Appendix (continued)

COUNTY	2018 ADOLESCENTS BORN JULY 2, 2004-JULY 1, 2005		2019 ADOLESCENTS BORN JULY 2, 2005-JULY 1, 2006		2020 ADOLESCENTS BORN JULY 2, 2006-JULY 1, 2007	
	Total	Vaccination	Total	Vaccination	Total	Vaccination
Saint Lawrence	1,458	20.6	1,459	21.9	1,482	21.9
Schenectady	2,430	26.9	2,417	27.4	2,378	28.6
Schoharie	367	19.9	348	17.8	345	16.5
Schuyler	225	33.8	193	28.5	209	25.8
Seneca	448	19.2	441	21.8	434	22.8
Steuben	1,419	19.1	1,332	24.2	1,408	23.9
Suffolk	25,566	15.8	24,756	19.3	24,463	21.7
Sullivan	1,274	18.9	1,225	20.5	1,342	21.3
Tioga	713	14.0	669	17.0	758	22.6
Tompkins	1,325	19.2	1,300	19.9	1,369	23.3
Ulster	2,389	13.6	2,414	15.4	2,459	17.5
Warren	840	25.7	790	28.5	783	35.0
Washington	851	16.9	784	21.6	845	23.6
Wayne	1,325	30.9	1,311	31.3	1,389	34.5
Westchester	18,393	18.8	17,781	20.6	17,900	22.5
Wyoming	520	32.5	447	31.1	532	35.3
Yates	316	20.9	341	22.0	338	19.2



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