

HPV Vaccination at 9 Years Old, Washington State

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Key Points

- Statewide, the percentage of children aged 9-10 and 11-12 years old with one or more HPV doses has increased over the last decade.
 - For 9–10-year-olds, HPV coverage increased from 1% in 2014 to 11.1% in 2023.
 - For 11–12-year-olds, HPV coverage increased from 30.1% in 2014 to 36.5% in 2023.
- Similar trends in coverage exist by reported sex, with slightly higher coverage among females for both age groups.
- In 2023, HPV coverage by county ranged from:
 - 2.3% in Whitman County to 22.6% in Douglas County among 9–10-year-olds and
 - 4.1% in Asotin County to 53.2% in Adams County among 11–12-year-olds.



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Introduction

Human papillomavirus (HPV) is a complex but common virus that can cause numerous types of cancer and other health-related issues later in life. In the United States alone, there are currently around 43 million HPV infections and 13 million people, including teens, are newly infected each year. Additionally, the CDC reports approximately 37,000 new cases of HPV-caused cancer annually.¹ The prevalence of HPV is high enough that nearly everyone will become exposed to the virus at some point in their lives and HPV vaccination offers safe and effective protection against the HPV infections that commonly cause cancer.¹⁻³

Since 2011, the Advisory Committee on Immunization Practices (ACIP) has recommended the HPV vaccine for routine vaccination at age 11 or 12 years old, for both boys and girls, but allow vaccination as early as nine years old.⁴ For both sexes, on-time vaccination is important to ensure the highest level of protection against HPV prior to exposure. Despite widespread availability of HPV vaccines, coverage remains relatively low and timely HPV vaccination in preteens could prevent 90% of HPV-related cancers.⁵ Additionally, recent research shows that no cases of invasive cervical cancer were identified in women who received HPV vaccination at age 12 or 13.⁶

To improve HPV vaccination coverage, the Washington State Department of Health (DOH) has been implementing public health messaging surrounding HPV vaccination since 2017, with letters and guidance being sent to providers and advocates around the state.⁷ In 2022, the Washington State Vaccine Advisory Committee formally requested the Secretary of Health encourage providers to routinely start HPV vaccination at age nine and to track and publish state and county data on HPV vaccination coverage rates for children ages 9-10 years old. In response, in January 2023, DOH updated the forecast software in the Washington State Immunization Information System (WAIS) to show HPV vaccination as recommended at age nine instead of age 11. With this update, providers are recommended to initiate the vaccine once a child turns nine years old and allows more time for the child to complete the two-dose series before they turn 13.

With previous and ongoing public health promotional activities surrounding HPV vaccination, it is important to continually monitor HPV coverage over time to inform future interventions. In this report, we compare the percentage of children aged 9-10 and 11-12 years old that have received one or more doses of the HPV vaccine each year over the last decade and by county for 2023. We also compare the number of HPV initiations (first dose received in a series) at ages nine through twelve years old over time. Coverage rates give us an idea of the percentage of children in each group that have received an HPV dose, providing the status of a population at a particular point in time. Vaccine initiation frequencies by age describe the efforts of the health care system to vaccinate individuals and allows us to determine if the number of nine-year-olds beginning the HPV vaccine series has increased in recent years. Initiation data also allow for more granular analyses to visualize seasonal trends and can help identify the effect of interventions meant to increase vaccination rates.

Methods

The Washington State Immunization Information System (WAIS)

We utilized WAIS data to assess HPV coverage and initiations for 9-10- and 11–12-year-olds from 2014 through 2023. The WAIS is a lifetime, population-based registry that collects and stores immunization records for all residents in Washington state. It is a secure, web-based tool that is available for all licensed healthcare providers in the state and records are considered medically verified. While reporting from providers is voluntary, the WAIS collects a vast majority of the routine vaccinations administered in the state.

HPV 1+ Dose Coverage

HPV coverage from 2014 through 2023 is represented by the percentage of children in each age group, as of December 31st of each assessment year, that had received at least one dose of the HPV vaccine. We included all valid HPV vaccinations and limited the analysis to only include children with a Washington state address on file as of the assessment date. Additionally, for each assessment year, we only included patient records that were in the system prior to December 31st of each year, based on the date the record was created in the registry. As an example, for 2018, HPV coverage would represent the percentage of 9–10-year-olds as of December 31st, 2018, who have received one or more doses of the HPV vaccine, excluding client records that were created after December 31st, 2018, to best estimate who was present in the state at the time of assessment.

HPV Initiation Frequency by Age and Time

We pulled counts of weekly and monthly HPV vaccine initiations by age at initiation to assess the change in frequency over time. We used the patient's age at the time of vaccination to create a timeseries of initiations at ages nine through twelve, from 2014 through 2023.

Results

Demographic Profile

As of December 31st, 2023, there were 246,016 children aged 9-10 years old and 247,955 children aged 11-12 years old in the WAIS (TABLE 1). For comparison, 2022 Census population estimates for these age groups are 195,737 and 197,984, respectively. These elevated population counts are typical for mature, population-based registries and are discussed further in the 'limitations' below. For 9–10-year-olds, 119,492 (48.6%) were reported as female and for 11–12-year-olds, 120,892 (48.8%) were reported as female in the WAIS. For each individual age nine through twelve years old, there were slightly more males than females, which aligns with 2022 Census estimates for these ages.

Table 1. Reported sex by age group, WA state, 2023.

Age Group	Male n (%)	Female n (%)	Unknown n (%)	Total
9-10 Years Old	126,153 (51.3)	119,492 (48.6)	371 (0.2)	246,016
11-12 Years Old	126,636 (51.1)	120,892 (48.8)	427 (0.2)	247,955
Total	252,789	240,384	798	493,971

Statewide HPV 1+ Dose Coverage by Age Group

Statewide coverage estimates for one or more doses of HPV vaccine among 9-10- and 11-12-year-olds remain relatively low but have increased over the last decade for both age groups (FIGURE 1). Among 9-10-year-olds, coverage was very low at around 1%, but has steadily increased each year from 1.7% in 2017 to 11.1% in 2023. HPV coverage of one or more doses among 11-12-year-olds has overall increased over the last decade, from 30.1% in 2014 to 36.5% in 2023, after peaking at 44.2% in 2019.

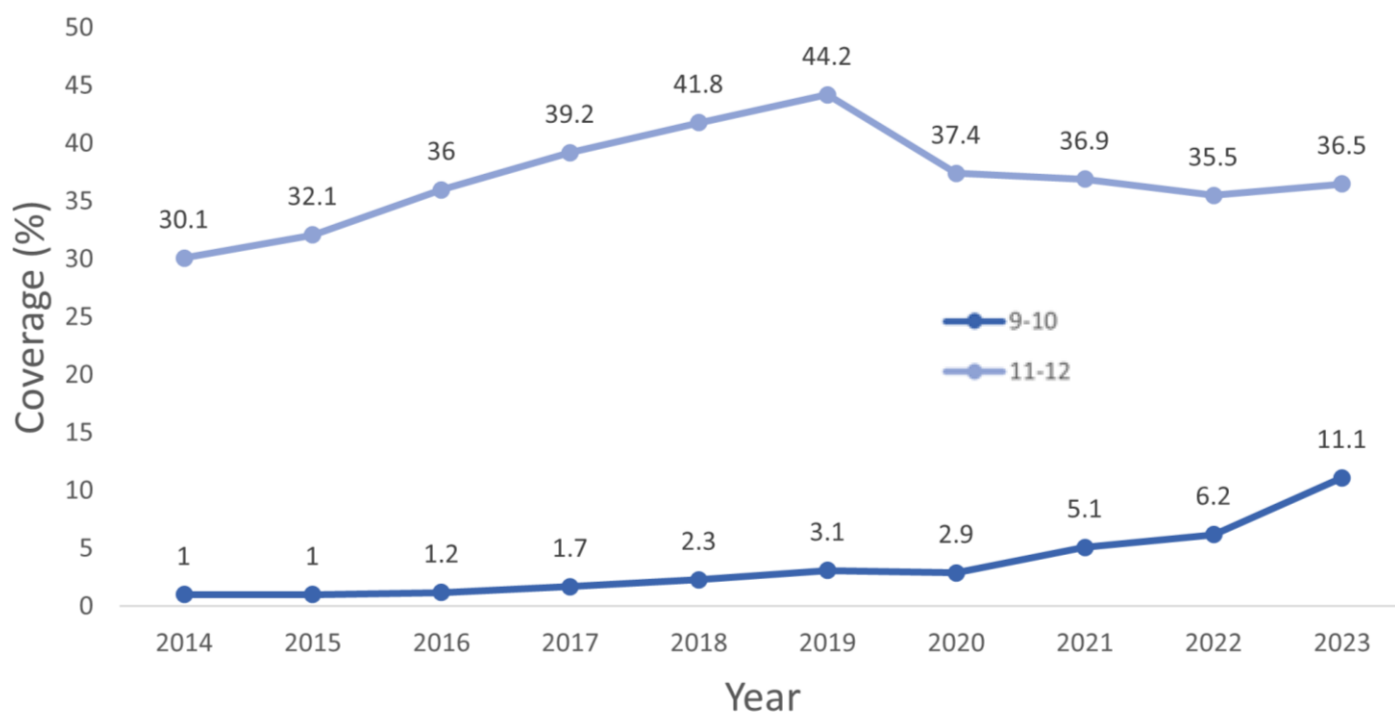


Figure 1. Statewide HPV 1+ dose coverage by age group, 2014-2023.

Statewide HPV 1+ Dose Coverage by Reported Sex

HPV coverage by reported sex reveals similar trends to statewide coverage, with a drop in coverage for 11–12-year-olds for both sexes from 2019 to 2020 (FIGURE 2). However, coverage for females was slightly higher than males in every year assessed and the coverage gap between male and females narrows in more recent years. Coverage among children aged 9-10 years old increased for both males and females, with almost no noticeable gap in coverage between sexes. It will be important to monitor this over time to determine if a coverage gap will emerge as more 9- 10-year-olds receive the HPV vaccine.

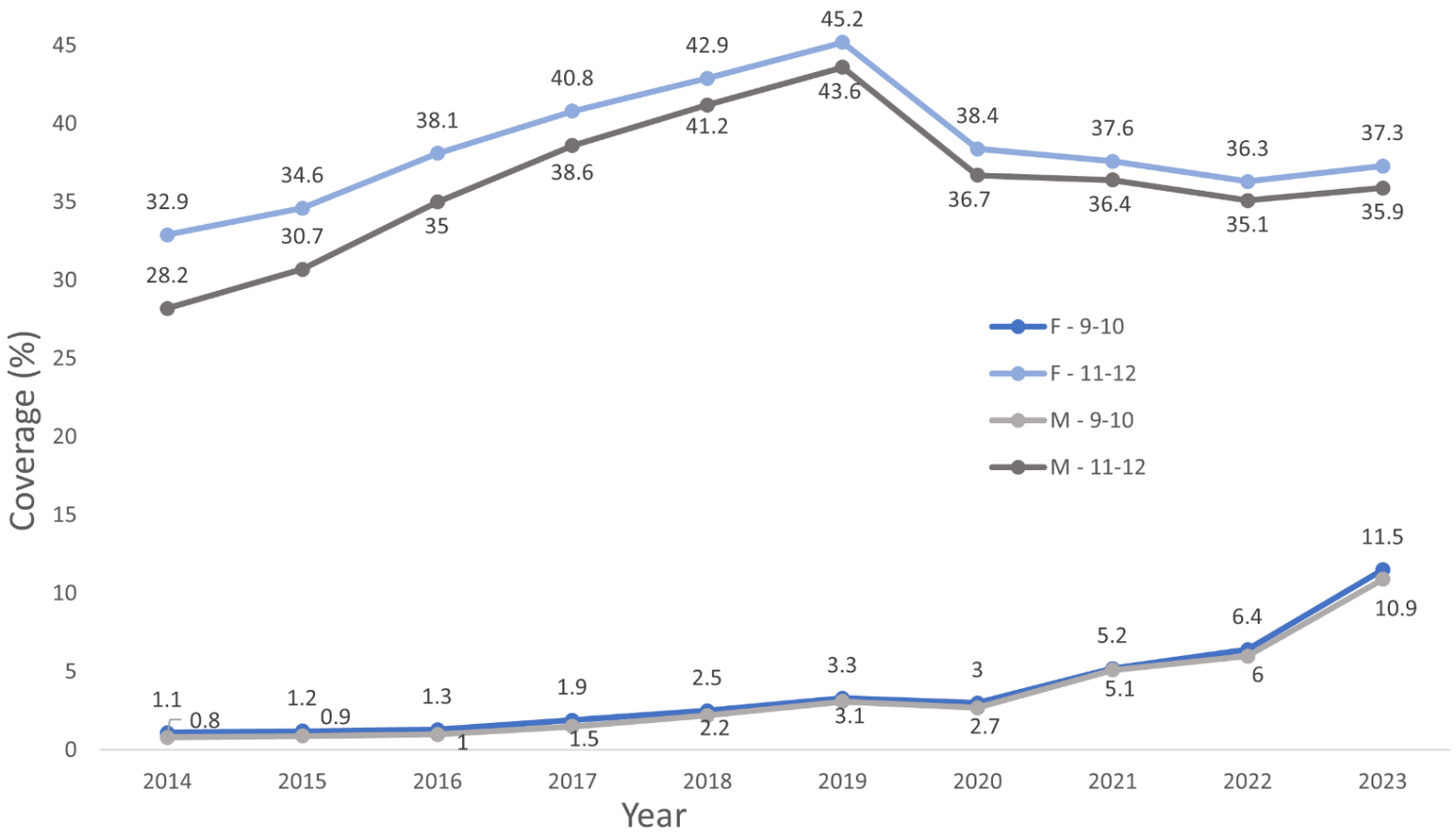


Figure 2. Statewide HPV 1+ dose coverage by age group and reported sex, 2014-2023.

HPV 1+ Dose Coverage 9-10- and 11-12 Year Olds by County in 2023

Statewide in 2023, 11.1% of 9–10-year-olds received one or more HPV doses, but coverage varied widely by county. Coverage ranged from 2.3% in Whitman County to 22.6% in Douglas County and higher rates of coverage were more prevalent in western and central Washington counties (FIGURE 3). Similar trends were identified for 11–12-year-olds, but with a greater degree of heterogeneity, with rates ranging from 4.1% in Asotin County to 53.2% in Adams County (FIGURE 4).

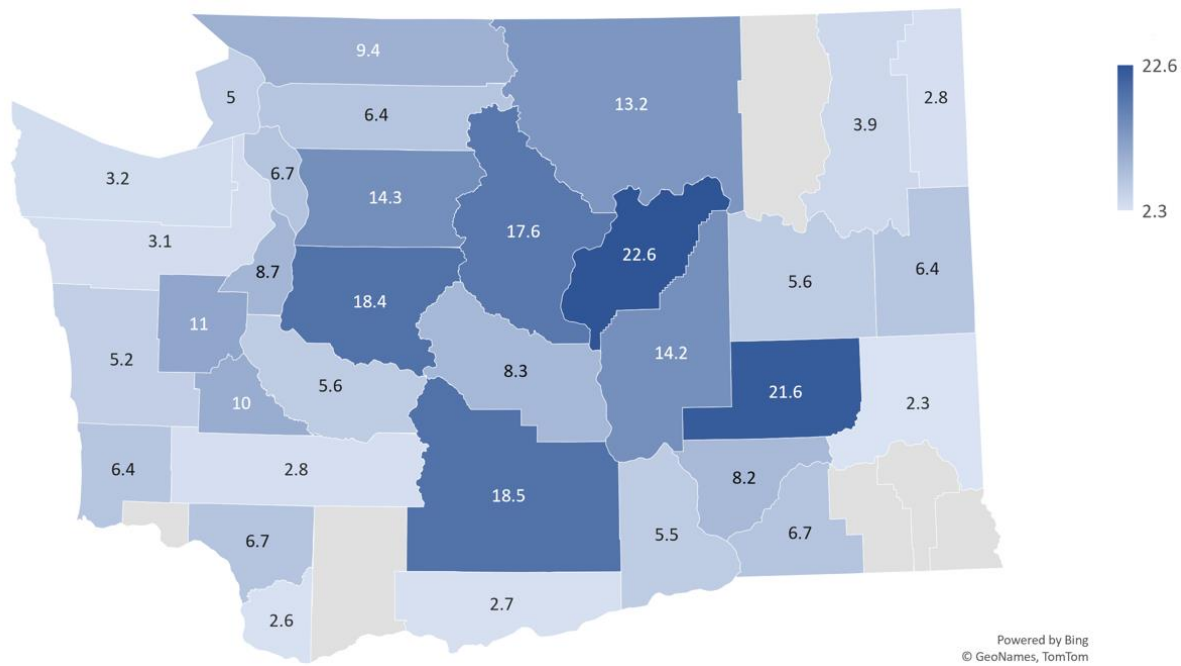


Figure 3. Percentage of 9–10-year-olds with one or more doses of HPV by county, 2023. Counties suppressed due to small numbers are represented in grey.

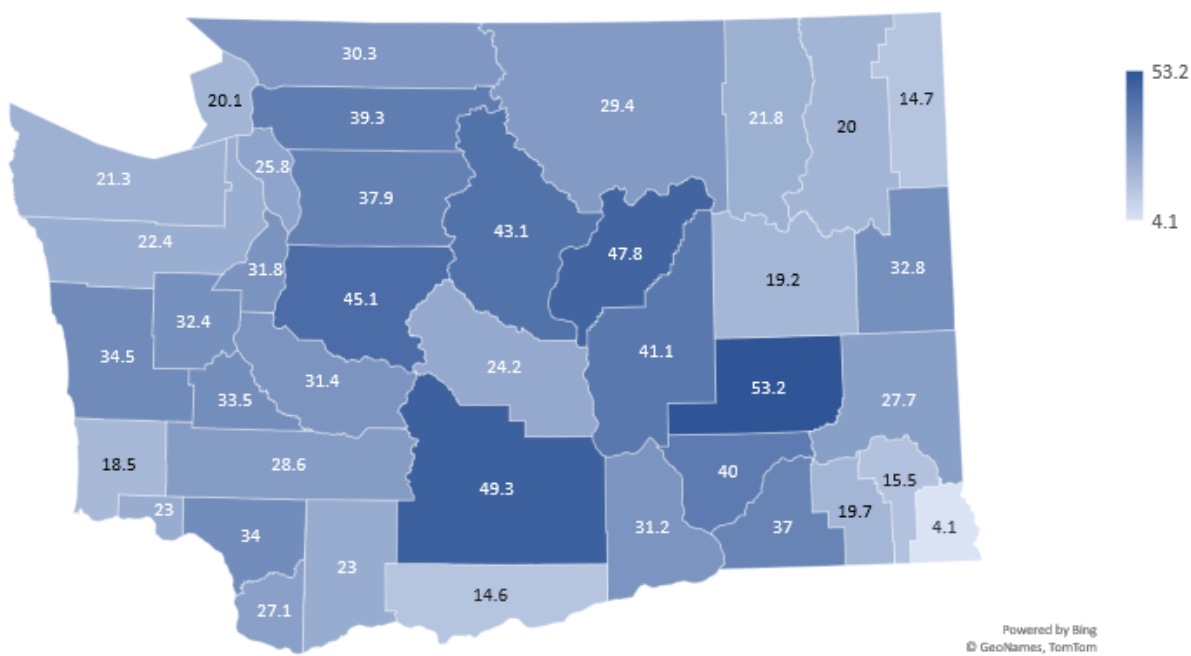


Figure 4. Percentage of 11–12-year-olds with one or more doses of HPV by county, 2023.

HPV Initiations at Nine through Twelve Years Old

Inspecting initiation of HPV doses over time at different ages reveals interesting fluctuations in the number of HPV dose administrations during any given week and through the years. The largest number of weekly HPV initiations is among eleven-year-olds, but this decreases after 2020 as HPV initiations at ages nine, ten, and twelve all increase.

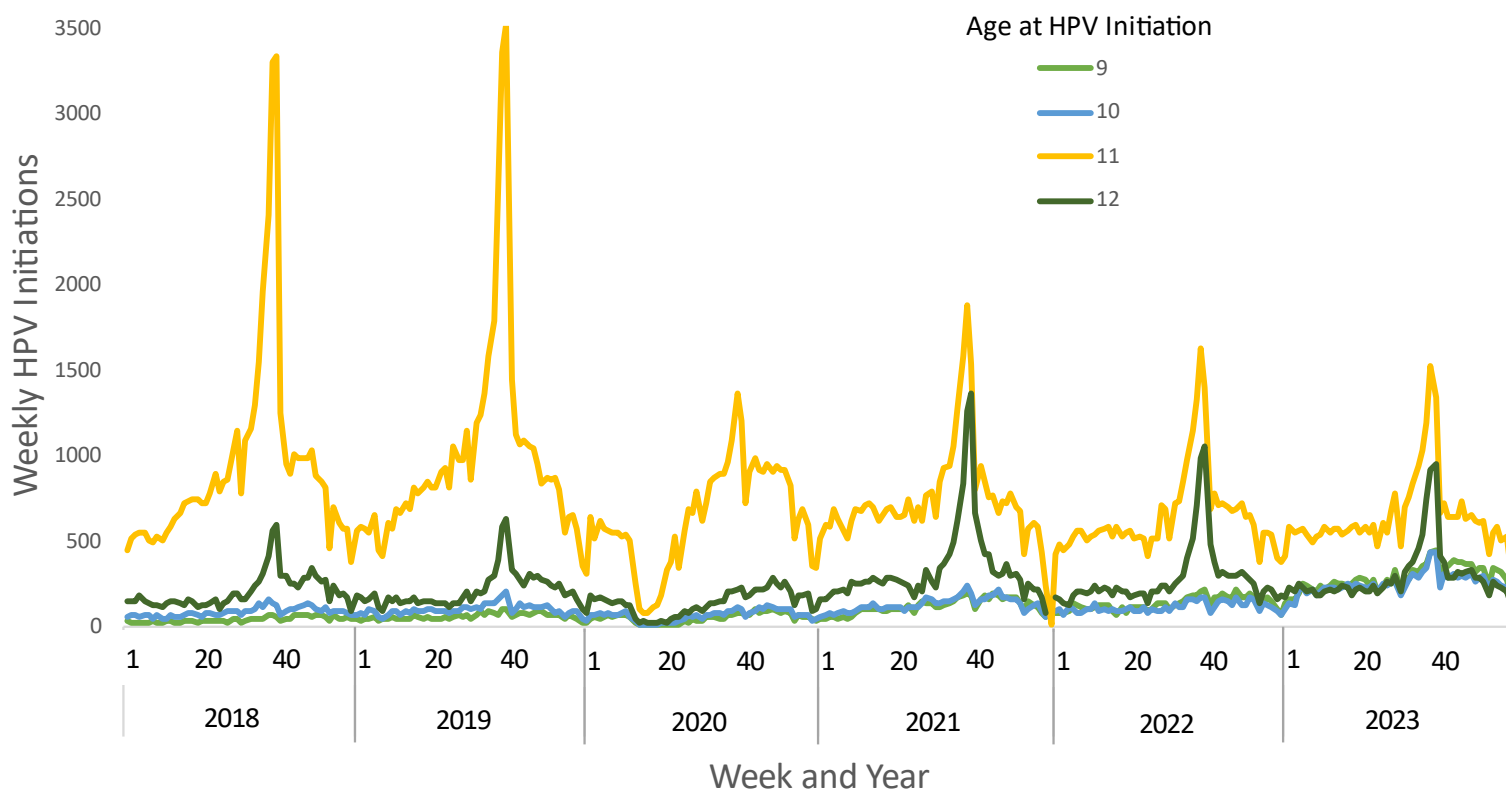


Figure 5. Weekly HPV initiations at ages nine through twelve, WA State, 2018-2023.

The largest relative increase in yearly HPV initiations since 2020 occurred among children aged nine years old, where annual initiations increased 485% from 2,506 to 14,644 (FIGURE 6). Initiations at this age have increased enough to catch up with the number of initiations at age 12 in 2023. Figure 7 shows a detailed view of weekly HPV initiations at age nine, with a steady increase in initiations from 2020 through 2023.

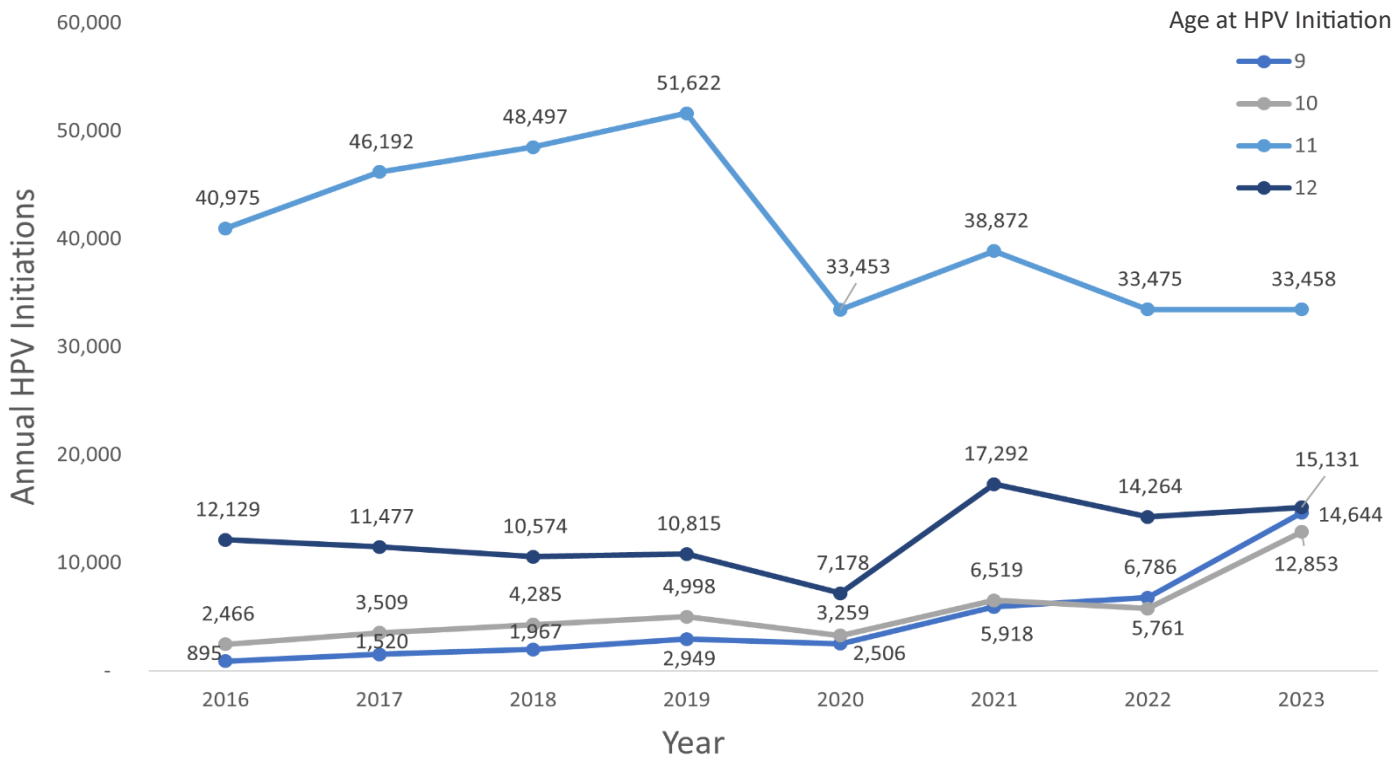


Figure 6. Annual HPV initiations at age nine through twelve, WA State, 2016-2023.

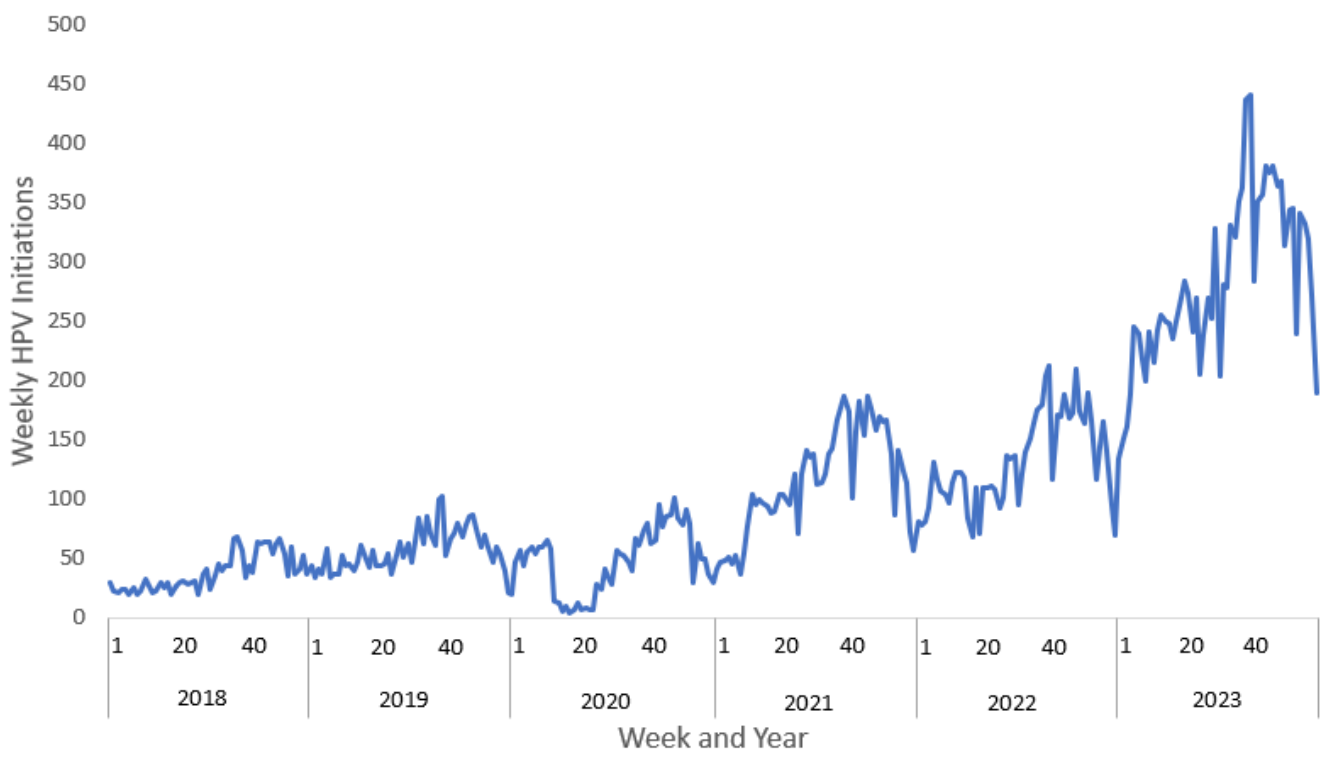


Figure 7. Weekly HPV initiations at age nine, WA State, 2018-2023.

Discussion

HPV coverage among nine- to ten-year-olds was relatively low prior to 2020, reflecting the ongoing ACIP recommendation for HPV vaccination to begin at age 11 or 12. However, since 2015, coverage among this age group has increased, with larger increases in more recent years. While HPV coverage among 11- to 12-year-olds has also increased, there is a noticeable decrease in coverage from 2019 to 2020. This drop in coverage from 2019 to 2020 may be associated with a revised rule change for the Tetanus, Diphtheria, and Pertussis (Tdap) school vaccine requirement. Prior to 2020 in Washington state, Tdap was required for sixth grade attendance (typically ages 11-12), but beginning in 2020, Tdap was required for seventh grade attendance (typically ages 12-13). Presumably, many 11-year-olds began the HPV vaccine series concurrently with the mandatory Tdap vaccine going into sixth grade, but with this rule change, parents may have aligned their child's HPV vaccination with the later Tdap requirement.

At the beginning of 2020, there was a substantial dip in HPV initiations related, most likely, to the COVID-19 pandemic, and then peak weekly initiations among 11-year-olds never returned to pre-pandemic levels. While the pandemic may be to blame for early 2020 drops in vaccine administrations, the peaks not reaching their former heights seemingly aligns with the revised rule change for Tdap. In 2021, we saw increases in HPV initiations at age 12, from a peak of 628 weekly initiations in 2019 to a peak of 1,365 initiations in 2021, providing evidence that some parents were most likely delaying their child's HPV vaccination to align with Tdap vaccination for seventh grade entry (typically 12-13 years old). While total yearly HPV initiations among 11-year-olds has decreased since 2020, total HPV initiations at ages nine, 10, and 12 have all increased.

The increase in coverage and initiations at age nine can likely be attributed to the WAIS update, clinic-based quality improvement initiatives, DOH provider messaging, centralized reminder/recall, and educational webinars to increase initiations at younger ages, with the idea that starting earlier would provide more time to become up-to-date on the vaccine series well before they might be exposed to the virus. While initiations at age nine have increased, further research and ongoing monitoring of HPV coverage is needed to understand whether encouraging initiation of the vaccine at an earlier age increases the number of adolescents who are up to date on the vaccine series.

Limitations

The data involved in this report is subject to a few limitations. Submission of immunization data to the WAIS by providers is voluntary, and while a majority report to DOH, not all do. There are likely HPV vaccine administration data not captured in this report. Additionally, the WAIS population may not be an accurate reflection of true population counts due to record fragmentation and an inability to capture out migration. Experienced by most mature immunization registries, these data quality issues have led to WAIS client record counts exceeding that of actual jurisdiction counts and a corresponding underestimation in IIS-derived coverage estimates.

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Appendix

Table 2. County population counts and number of children with one or more doses of HPV, by county and age group. Counties with numerator counts under ten have been suppressed to protect patient confidentiality.

County	Denominator	Numerator	Coverage (%)	Age Group
ADAMS	1017	220	21.6	9-10
ADAMS	1041	554	53.2	11-12
ASOTIN	685	-	-	9-10
ASOTIN	690	28	4.1	11-12
BENTON	7668	422	5.5	9-10
BENTON	7814	2439	31.2	11-12
CHELAN	2369	416	17.6	9-10
CHELAN	2450	1056	43.1	11-12
CLALLAM	1809	57	3.2	9-10
CLALLAM	1852	394	21.3	11-12
CLARK	16800	429	2.6	9-10
CLARK	17315	4700	27.1	11-12
COLUMBIA	80	-	-	9-10
COLUMBIA	76	15	19.7	11-12
COWLITZ	3634	242	6.7	9-10
COWLITZ	3591	1222	34	11-12
DOUGLAS	1250	282	22.6	9-10
DOUGLAS	1315	628	47.8	11-12
FERRY	192	-	-	9-10
FERRY	188	41	21.8	11-12
FRANKLIN	3967	326	8.2	9-10
FRANKLIN	4114	1644	40	11-12
GARFIELD	70	-	-	9-10
GARFIELD	71	11	15.5	11-12
GRANT	3875	551	14.2	9-10
GRANT	4132	1697	41.1	11-12
GRAYS HARBOR	1982	103	5.2	9-10
GRAYS HARBOR	2029	699	34.5	11-12
ISLAND	2927	196	6.7	9-10
ISLAND	2723	703	25.8	11-12
JEFFERSON	554	17	3.1	9-10
JEFFERSON	553	124	22.4	11-12
KING	65467	12040	18.4	9-10
KING	66089	29818	45.1	11-12
KITSAP	8723	762	8.7	9-10
KITSAP	8559	2725	31.8	11-12
KITTITAS	1088	90	8.3	9-10

KITTITAS	1127	273	24.2	11-12
KLICKITAT	626	17	2.7	9-10
KLICKITAT	651	95	14.6	11-12
LEWIS	2622	74	2.8	9-10
LEWIS	2626	751	28.6	11-12
LINCOLN	356	20	5.6	9-10
LINCOLN	364	70	19.2	11-12
MASON	1825	201	11	9-10
MASON	1834	594	32.4	11-12
OKANOGAN	1255	166	13.2	9-10
OKANOGAN	1383	407	29.4	11-12
PACIFIC	548	35	6.4	9-10
PACIFIC	556	103	18.5	11-12
PEND OREILLE	394	11	2.8	9-10
PEND OREILLE	407	60	14.7	11-12
PIERCE	32413	1830	5.6	9-10
PIERCE	32383	10165	31.4	11-12
SAN JUAN	341	17	5	9-10
SAN JUAN	323	65	20.1	11-12
SKAGIT	3786	244	6.4	9-10
SKAGIT	3832	1505	39.3	11-12
SKAMANIA	264	-	-	9-10
SKAMANIA	283	65	23	11-12
SNOHOMISH	26024	3717	14.3	9-10
SNOHOMISH	25739	9762	37.9	11-12
SPOKANE	16648	1058	6.4	9-10
SPOKANE	16371	5375	32.8	11-12
STEVENS	1246	49	3.9	9-10
STEVENS	1259	252	20	11-12
THURSTON	9715	969	10	9-10
THURSTON	9922	3321	33.5	11-12
WAHKIAKUM	118	-	-	9-10
WAHKIAKUM	100	23	23	11-12
WALLA WALLA	1797	121	6.7	9-10
WALLA WALLA	1764	653	37	11-12
WHATCOM	6114	575	9.4	9-10
WHATCOM	6200	1881	30.3	11-12
WHITMAN	1228	28	2.3	9-10
WHITMAN	1277	354	27.7	11-12
YAKIMA	9405	1743	18.5	9-10
YAKIMA	9735	4801	49.3	11-12