



CALIFORNIA HPV VACCINATION ROUNDTABLE

Working to prevent HPV cancers

**Assessment of Human Papillomavirus (HPV)
Vaccination Rates in California: Report of
Findings of the California HPV Vaccination
Roundtable**

2021 Addendum

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CAHPVRoundtable.org

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2021 Addendum for the Assessment of Human Papillomavirus (HPV) Vaccination Rates in California: Report of Findings of the California HPV Vaccination Roundtable

Introduction

Since the publication in May 2020 of the “Assessment of Human Papillomavirus (HPV) Attributable Cancers and Vaccination Rates in California: Report of Findings of the California HPV Vaccination Roundtable” the Data Workgroup has continued to track and measure the rate of HPV vaccination initiation and completion across California. The purpose of this addendum is to disseminate available data on HPV vaccination among 13 year olds residing in California for 2019. Our [original report](#) should still be referenced for a comprehensive review of methods, discussion, and recommendations for use of the data.

Since our last report, additional national data has been made available. According to the National Immunization Survey-Teen (2019), 72% of the nation’s adolescents (ages 13-17) have started the HPV vaccination series, and only 54% have completed it, compared to 90% for Tdap.[i] In California, NIS-Teen 2019 estimates that 78% of adolescents have started the series but only 56% have completed it. To make specific county comparisons for the recommended vaccination age range of 9-13-year-olds, California Immunization Registry (CAIR) data were queried and analyzed for 2019. Data showed 54% of adolescents vaccinated up to the age of 13 years have started the series with 30% completing the series. Across data sources, all county or regional estimates rose from 2018 to 2019 and in California rates for only three counties fell for series completion in 2019.

METHODS

HPV Vaccination Coverage

For this addendum, as with the original report, adolescent HPV vaccination coverage was assessed separately by each of the three regional immunization information systems (IIS). In the aggregate, the California Immunization Registry 2 (CAIR2), San Diego Immunization Registry (SDIR), Healthy Futures immunization registry (HF) comprise the California Immunization Registry (CAIR).

The same methodology was used across the three IIS. Individuals were included in the denominator if they met three criteria: born January 1, 2007 through December 31, 2007 (13-year-old cohort); had at least two doses of any vaccine in IIS; and were California residents.

HPV series initiation is defined as 13-year-olds who received at least one dose of any HPV vaccine before their 13th birthday and HPV series completion is defined as 13-year-olds who received at least two doses of any HPV vaccine before their 13th birthday. Adolescents who received at least two doses of HPV vaccine were considered to have completed the series, although it is possible that some may have received the doses at a shorter interval than recommended thereby requiring a third dose of HPV vaccine per ACIP recommendations.[ii] Data representing counties with small populations were combined to preserve patient confidentiality.

RESULTS

HPV vaccination coverage

In 2019, 54% (314,983/588,223) of 13-year-olds in California had initiated the HPV vaccine series [Table 2] and 30% (176,853/588,223) completed the series before their 13th birthday [Table 1, Table 2, Figure 3]. There is a wide range of HPV vaccine initiation (range 34-73%) and completion (range 13-48%) rates observed among 13-year old Californians. Initiation and completion rates are also displayed in map format by county [Figures 4, 5].

Table 1. HPV vaccine series completion, 2019

Region	United State [i]		California	
Data Source	NIS-Teen HPV (13-17-year-olds)*	NIS-Teen (13-year-olds)†	NIS-Teen‡ (13-17-year-olds)	CAIR 13-year-olds
Proportion Up to Date	54.2% (95%, CI 52.7-55.8)	45.3% (95%, CI 42.1-48.5)	56.4% (95%, 47.3-65)	30%

*Based upon 18,788 individuals randomly sampled in the national survey ages 13-17 at the time of the interview in 2019.

†Based on 3,927 individuals randomly sampled in the national survey who were 13 years of age at the time of the interview in 2019.

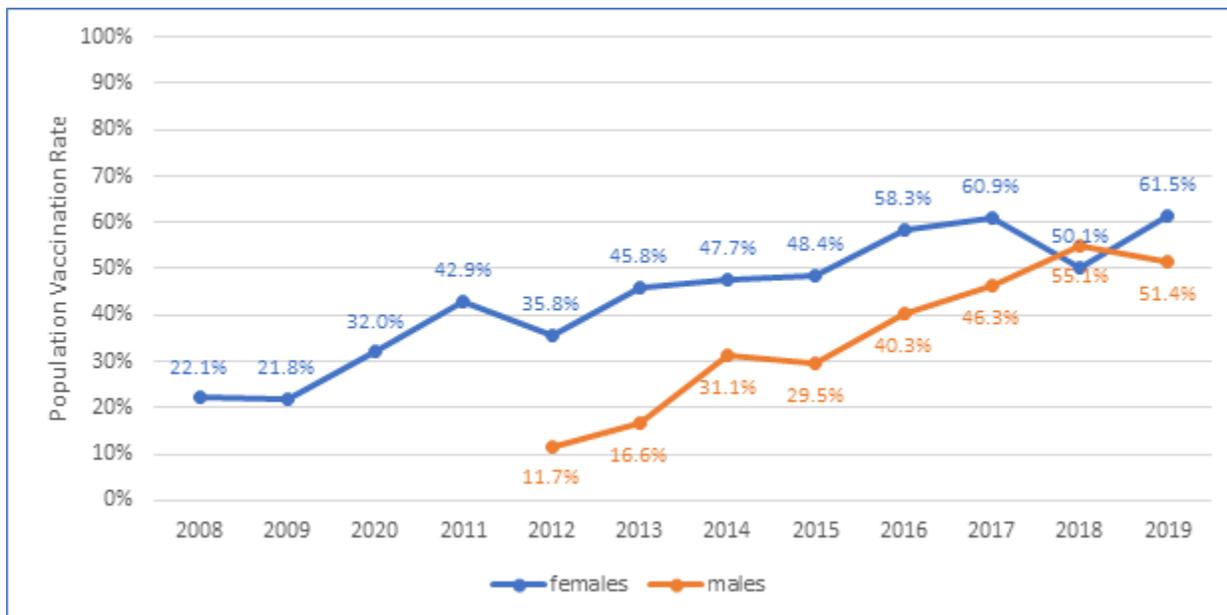
‡N=274

Statewide data using National Immunization Surveys (NIS)

NIS-Teen provides a population-based estimate of HPV vaccination over two time periods. HPV vaccine was added to the NIS-Teen survey in 2008 for females and in 2012 HPV vaccine was added for males. The graph below [Figure 1] shows HPV vaccine series completion among teens 13-17 years of age in California from 2008-2019. Series completion increased for females from 50.1% in 2018 to 61.5% in 2019 and for males it dropped from 55.1% to 51.4%.

For all 13-17-year-old females and males combined in 2019, 78% had started the HPV vaccine series, and 56% were up to date having received either two or three valid doses, depending on age at initiation (compared with 74% and 53%, respectively in 2018). Comparatively, California's rate is 6.5% higher than the national average for initiation and 4.9% higher than the national average for up-to-date vaccinations for both males and females combined.

Figure 1. Proportion with HPV vaccine series completion* among females and males 13-17 years, California, 2018-2019 (Source: NIS-Teen)



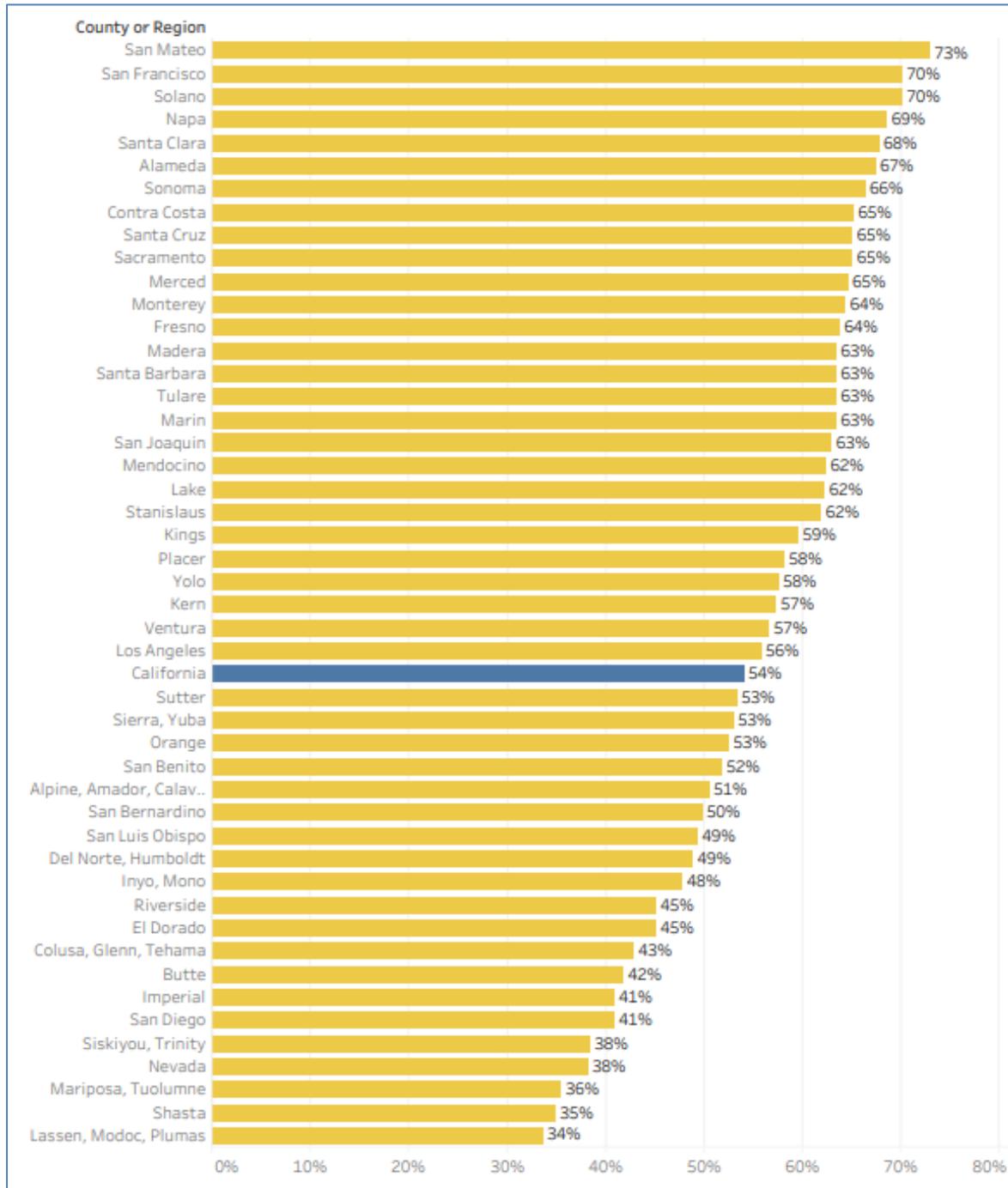
* Series completion includes those with ≥ 3 doses, and those with 2 doses when the first HPV vaccine dose was initiated before age 15 years and there was at least 5 months minus 4 days between the first and second dose.

California Immunization Registry (CAIR)

Table 2. HPV vaccine series initiation and completion for 13-year-olds by gender, California, 2018-2019 (Source: CAIR)

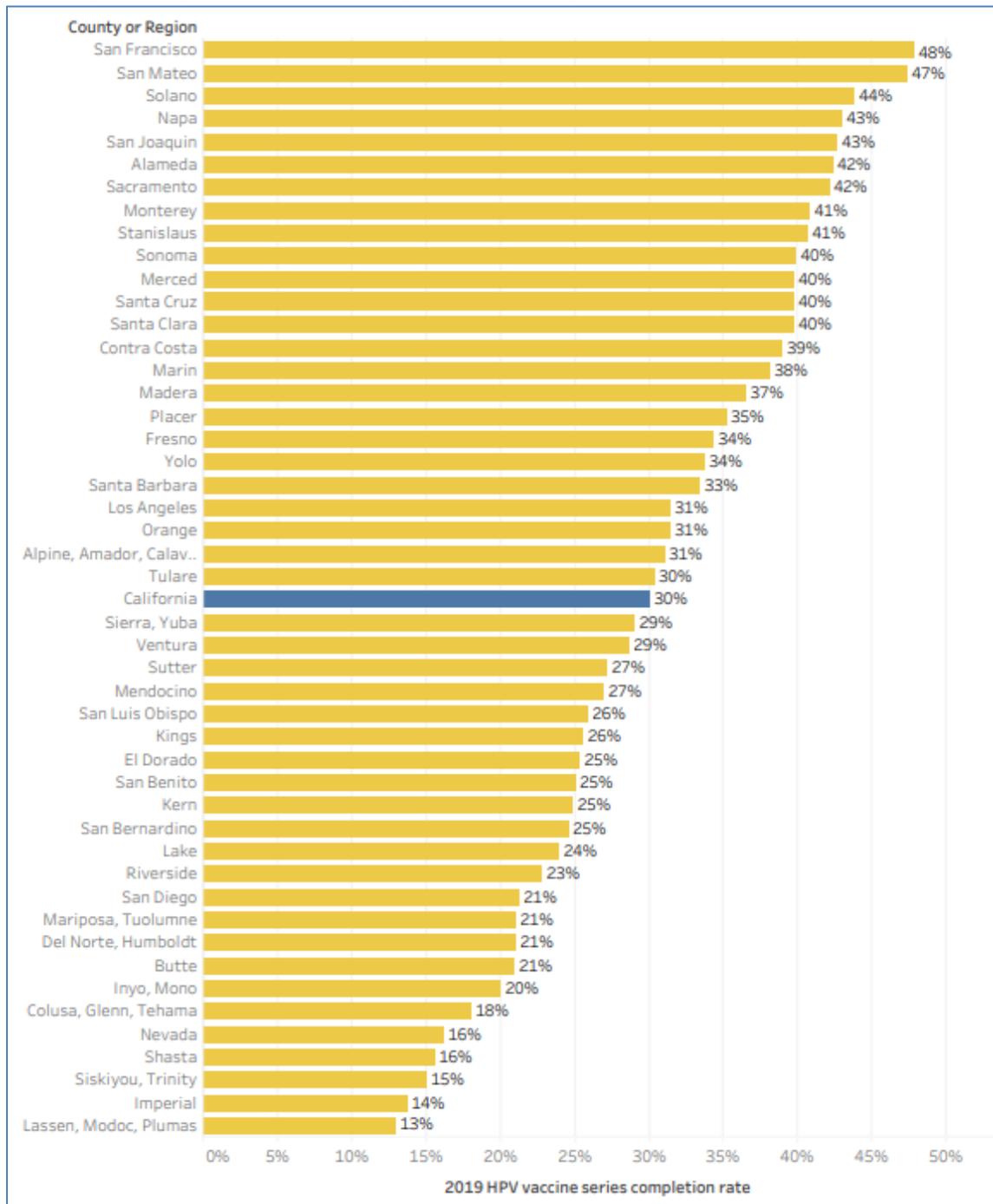
	2018		2019	
	Initiation	Completion	Initiation	Completion
Females	51%	29%	54%	31%
Males	50%	27%	54%	30%
California	50%	28%	54%	30%

Figure 2. Proportion of 13-year-olds with 1 dose of HPV vaccine recorded in CAIR by county, California, 2019 (Source: CAIR) *



* County rates are individual rates except in the cases of these following groupings: Alpine, Amador, and Calaveras; Del Norte and Humboldt; Lassen, Modoc and Plumas; Inyo and Mono; Sierra and Yuba; Siskiyou and Trinity; Colusa, Glenn, and Tehama; Mariposa and Tuolumne.

Figure 3. Proportion of 13-year-olds with HPV vaccine series completion recorded in CAIR by county, California, 2019 (Source: CAIR) *



*County rates are individual rates except in the cases of these following groupings: Alpine, Amador, and Calaveras; Del Norte and Humboldt; Lassen, Modoc and Plumas; Inyo and Mono; Sierra and Yuba; Siskiyou and Trinity; Colusa, Glenn, and Tehama; Mariposa and Tuolumne.

Figure 4. Rate of HPV vaccine series initiation among 13-year-olds by county, California, 2019 (Source: CAIR)

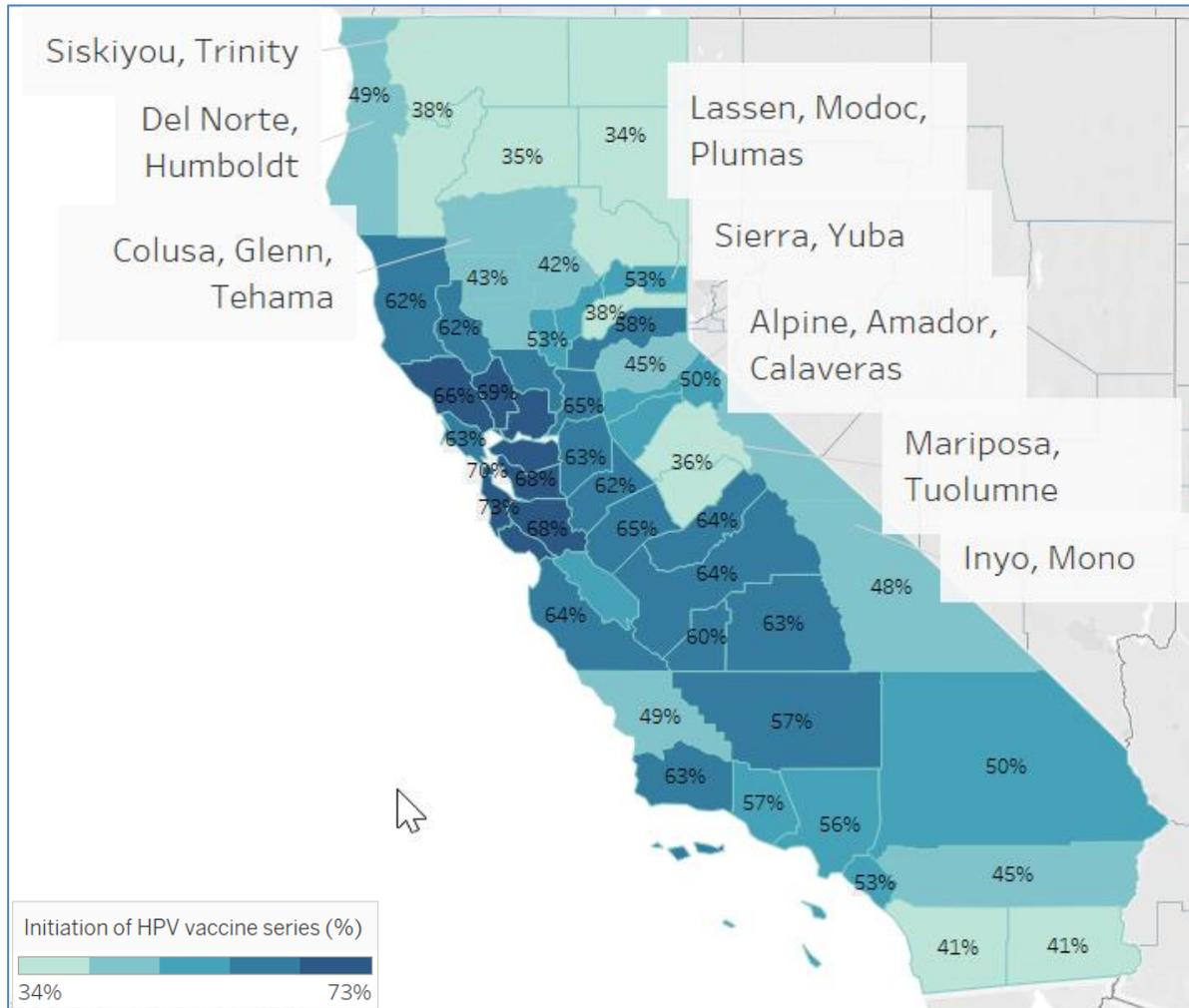


Figure 5. Rate of HPV vaccine series completion among 13-year-olds by county, California, 2019 (Source: CAIR)

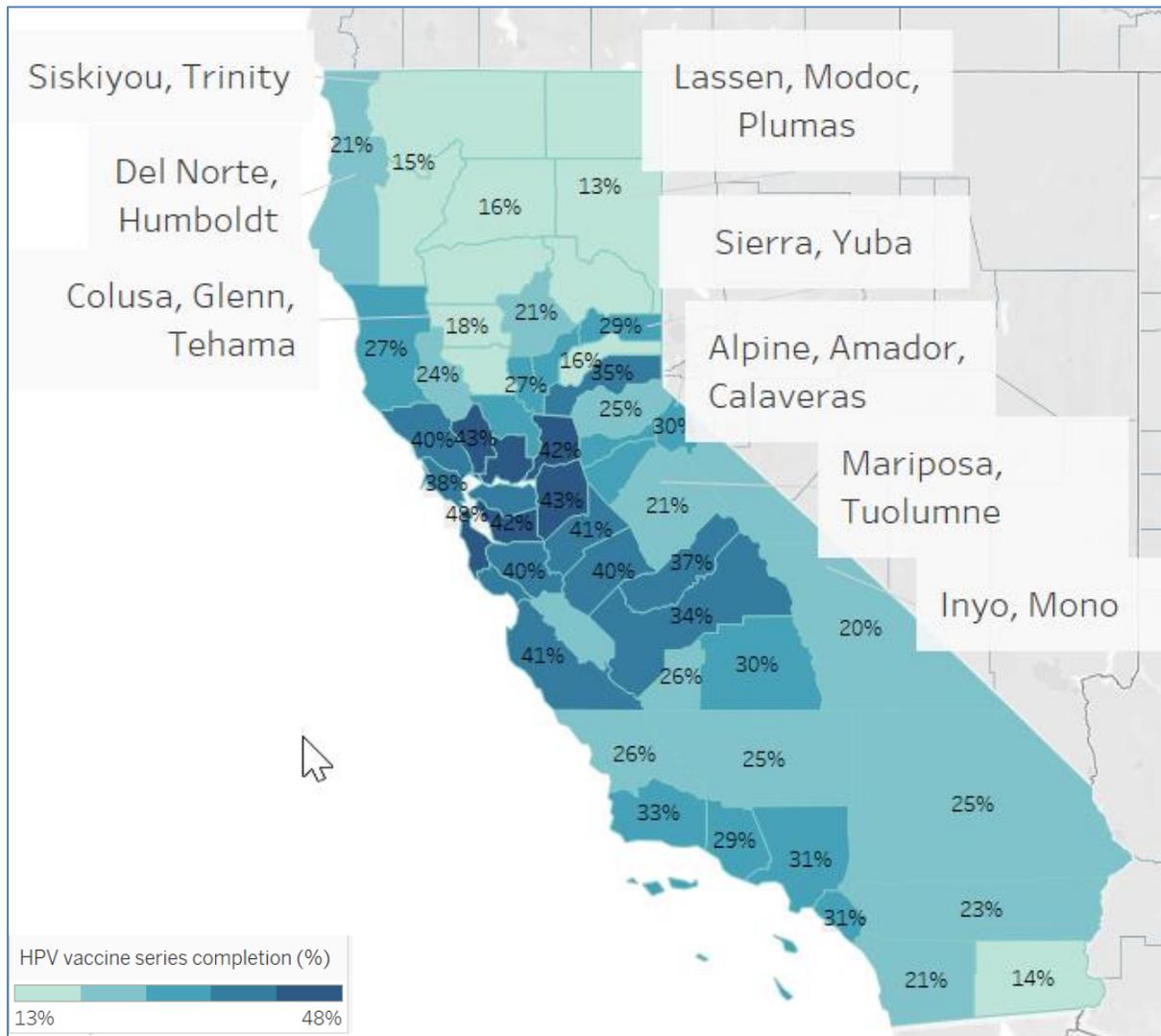


Table 3. Difference between 2018 and 2019 Initiation and Completion Rates by county, California, 2018-2019 (Source: CAIR)

County	2018-'19 Initiation difference	2018-'19 Completion Difference
Alameda	8%	6%
Butte	8%	4%
Contra Costa	8%	8%
El Dorado	8%	6%
Fresno	5%	2%
Imperial	2%	-2%
Kern	8%	2%
Kings	5%	1%
Lake	17%	11%
Los Angeles	4%	1%
Madera	11%	7%
Marin	5%	5%
Mendocino	13%	6%
Merced	19%	17%
Monterey	4%	3%
Napa	3%	4%
Nevada	7%	1%
Orange	5%	2%
Placer	9%	8%
Riverside	7%	2%
Sacramento	11%	9%
San Benito	5%	3%
San Bernardino	8%	3%
San Diego	0%	0%
San Francisco	8%	10%
San Joaquin	9%	12%
San Luis Obispo	1%	-1%
San Mateo	8%	5%
Santa Barbara	12%	7%
Santa Clara	7%	4%
Santa Cruz	6%	3%
Shasta	4%	4%
Solano	7%	10%
Sonoma	5%	2%
Stanislaus	20%	19%
Sutter	4%	1%
Tulare	5%	2%
Ventura	8%	3%
Yolo	11%	6%
Regions		
Alpine, Amador, Calaveras	16%	14%
Colusa, Glenn, Tehama	2%	2%
Del Norte, Humboldt	3%	1%
Inyo, Mono	12%	5%
Lassen, Modoc, Plumas	6%	1%
Mariposa, Tuolumne	11%	11%
Sierra, Yuba	8%	6%
Siskiyou, Trinity	6%	2%
California	4%	2%

Discussion

Strengths & Limitations of HPV vaccination data

Please see California HPV Vaccination Roundtable, *HPV Vaccination and Attributable-Cancer Report, 2020*, starting on page 22.

Findings

CAIR

Between 2018 and 2019, HPV vaccination rates reported in CAIR have increased across California. Since 2018, Stanislaus County followed by Merced and Lake Counties, made large increases in both their initiation and completion rates (17-20%). Conversely just three counties experienced a slightly lower completion rate: San Diego, Imperial and San Luis Obispo. No counties experienced a decrease in their initiation rates. On average, California counties experienced an 8% increase in initiation but only a 5% increase in completion. A significant spread between initiation and completion remains. On average, a 25% difference between initiation and completion rates was observed.

Geographic disparities that were highlighted in the 2018 data remain (Figures 4 and 5). Urban and western counties maintain higher rates of vaccination compared to more rural areas lying to the North, East, and South. However, of the three counties with the largest increase in vaccination rates, Lake county is classified as rural. All (three) counties that showed a slight decrease in initiation rates are classified as urban.

Small differences between vaccination initiation and completion were seen in the 2018 based on gender across the state and closed to an even more minute margin in 2019 in CAIR data. However, the gender gap widened based on NIS-Teen data from a 5% difference in 2018 to 10.1% in 2019.

NIS-Teen

The small sample size (n=274) used to assess coverage of adolescent vaccination in California results in wide confidence intervals and potentially unstable estimates for those teens starting the series ($\pm 7.3\%$, 95% CI) and for those with complete coverage ($\pm 9\%$, 95% CI). The sampling design does not permit coverage estimates at the county level.

It is also important to note that NIS-Teen estimates coverage for adolescents 13-17 years of age, which allows four additional years of life for teens to catch up on immunizations and therefore results in higher estimates. NIS-teen reports include a cohort assessed at the 13th birthday only at the national level (data not available at the state level). When surveyed in 2019, 45% of 13-year-olds nationwide were up to date for HPV, compared to 54% of adolescents aged 13-17 years (up from 40% and 51% respectively in 2018).

Further research

Analysis of sociodemographic and area-based measures would provide a deeper understanding of geographic disparities and specific interplay between individual, community, and area level factors on vaccination.[iv] This knowledge could further prompt action at the local level. Preliminary steps were taken to produce such an analysis for this addendum. In order to include such results, additional inquiries will need to be made of CAIR specifying regions at a more microlevel than county boundaries, and data will need to be of sound-quality for specific measures, such as address and race/ethnicity. During the COVID-19 pandemic, California set an example of committing to health equity by utilizing the Healthy Places Index to better understand health implications. Additionally, provider utilization of CAIR has been monitored closely. It is encouraged that analysis into HPV vaccination and provider utilization of reporting follows this lead.

Conclusion

It is appreciated that 2019 continues to show significant work around the state to increase vaccination coverage. These findings also set a reference point for 2020 data, which based on national trends is expected to show significant decreases due to interruption in care, telemedicine and hybrid appointment models, and well-child visit declines leading to fewer and missed vaccination opportunities.[v] The Roundtable encourages health care systems eager to improve rates in their communities to please refer to our [original report](#) pages 24-27) for next steps and recommendations.

Resources for increasing HPV vaccination rates:

- American Academy of Pediatrics: <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/immunizations/Pages/HPV-Resources.aspx>
- American Cancer Society: <https://www.cancer.org/health-care-professionals/hpv-vaccination-information-for-health-professionals/hpv-vaccination-resources-for-health-professionals.html>
- American College of Obstetricians and Gynecologists: <https://www.acog.org/Womens-Health/Human-Papillomavirus-HPV?IsMobileSet=false>
- Centers for Disease Control and Prevention: <https://www.cdc.gov/hpv/hcp/educational-materials.html>
- Immunization Action Coalition: <https://www.immunize.org/handouts/hpv-vaccines.asp>
- National Foundation for Infectious Diseases: <https://www.nfid.org/infectious-diseases/hpv-resource-center/>
- National HPV Roundtable: <https://hpvroundtable.org/resource-library/>

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Appendix A. HPV vaccine series initiation and completion for 13-year-olds by county or county groupings, California, 2019 (Source: CAIR)

County or Region Name	# of 13-year-olds with 2 or more doses (Total)	# initiating HPV vaccine series (1+ Doses)	HPV vaccine series initiation rate (%)	# completing HPV vaccine series (2+ Doses)	HPV vaccine series completion rate (%)
Alpine, Amador, Calaveras	467	233	50%	141	30%
Colusa, Glenn, Tehama	1,642	704	43%	291	18%
Del Norte, Humboldt	2,201	1,074	49%	464	21%
Inyo, Mono	496	237	48%	98	20%
Lassen, Modoc, Plumas	601	202	34%	77	13%
Mariposa, Tuolumne	676	240	36%	143	21%
Sierra, Yuba	1,381	732	53%	397	29%
Siskiyou, Trinity	667	256	38%	98	15%
Alameda	22,406	15,113	68%	9,492	42%
Butte	1,893	791	42%	396	21%
Contra Costa	16,768	10,926	65%	6,528	39%
El Dorado	2,278	1,026	45%	578	25%
Fresno	16,482	10,514	64%	5,666	34%
Imperial	4,048	1,656	41%	556	14%
Kern	17,680	10,139	57%	4,392	25%
Kings	2,567	1,527	60%	657	26%
Lake	780	485	62%	187	24%
Los Angeles	122,907	68,596	56%	38,652	31%
Madera	2,898	1,839	64%	1,059	37%
Marin	3,162	2,003	63%	1,206	38%
Mendocino	923	576	62%	249	27%

County or Region Name	# of 13-year-olds with 2 or more doses (Total)	# initiating HPV vaccine series (1+ Doses)	HPV vaccine series initiation rate (%)	# completing HPV vaccine series (2+ Doses)	HPV vaccine series completion rate (%)
Merced	4,351	2,809	65%	1,730	40%
Monterey	7,562	4,868	64%	3,088	41%
Napa	1,988	1,362	69%	854	43%
Nevada	971	370	38%	157	16%
Orange	42,609	22,379	53%	13,384	31%
Placer	4,783	2,779	58%	1,685	35%
Riverside	36,426	16,418	45%	8,300	23%
Sacramento	20,857	13,565	65%	8,791	42%
San Benito	988	512	52%	247	25%
San Bernardino	34,345	17,107	50%	8,449	25%
San Diego	70,266	28,712	41%	14,960	21%
San Francisco	5,788	4,060	70%	2,768	48%
San Joaquin	12,340	7,761	63%	5,267	43%
San Luis Obispo	3,390	1,670	49%	877	26%
San Mateo	8,929	6,510	73%	4,228	47%
Santa Barbara	5,477	3,471	63%	1,829	33%
Santa Clara	22,809	15,466	68%	9,055	40%
Santa Cruz	3,836	2,497	65%	1,523	40%
Shasta	2,211	770	35%	344	16%
Solano	5,499	3,854	70%	2,409	44%
Sonoma	6,265	4,157	66%	2,499	40%
Stanislaus	7,189	4,450	62%	2,922	41%
Sutter	1,777	947	53%	483	27%
Tulare	9,067	5,745	63%	2,755	30%

County or Region Name	# of 13-year-olds with 2 or more doses (Total)	# initiating HPV vaccine series (1+ Doses)	HPV vaccine series initiation rate (%)	# completing HPV vaccine series (2+ Doses)	HPV vaccine series completion rate (%)
Ventura	10,865	6,153	57%	3,109	29%
Yolo	2,759	1,588	58%	931	34%
California	588,223	314,983	54%	176,853	30%

Appendix B. HPV vaccine series initiation and completion for 13-year-olds by gender and county or county groupings, California, 2019 (Source: CAIR)

County and Gender*	# of 13-year-olds with 2 or more doses (Total)	# initiating HPV vaccine series (1+ Doses)	HPV vaccine series initiation rate	# completing HPV vaccine series (2+ Doses)	HPV vaccine series completion rate
Alameda	22,406	15,113	67%	9,492	42%
F	10,979	7,460	68%	4,751	43%
M	11,422	7,653	67%	4,741	42%
Butte	1,893	791	42%	396	21%
F	903	388	43%	211	23%
M	990	403	41%	185	19%
Contra Costa	16,768	10,926	65%	6,528	39%
F	8,236	5,465	66%	3,361	41%
M	8,524	5,460	64%	3,167	37%
El Dorado	2,278	1,026	45%	578	25%
F	1,082	498	46%	287	27%
M	1,188	528	44%	291	24%
Fresno	16,482	10,514	64%	5,666	34%
F	8,022	5,197	65%	2,858	36%
M	8,459	5,317	63%	2,808	33%
Imperial	4,048	1,656	41%	556	14%
F	2,037	864	42%	293	14%
M	2,011	792	39%	263	13%
Kern	17,680	10,139	57%	4,392	25%
F	8,872	5,100	57%	2,258	25%
M	8,805	5,039	57%	2,134	24%

County and Gender*	# of 13-year-olds with 2 or more doses (Total)	# initiating HPV vaccine series (1+ Doses)	HPV vaccine series initiation rate	# completing HPV vaccine series (2+ Doses)	HPV vaccine series completion rate
Kings	2,567	1,527	59%	657	26%
F	1,250	752	60%	334	27%
M	1,317	775	59%	323	25%
Lake	780	485	62%	187	24%
F	372	248	67%	94	25%
M	407	237	58%	93	23%
Los Angeles	122,907	68,596	56%	38,652	31%
F	59,951	33,793	56%	19,376	32%
M	62,925	34,784	55%	19,271	31%
U	31	19	61%	5	16%
Madera	2,898	1,839	63%	1,059	37%
F	1,442	937	65%	548	38%
M	1,456	902	62%	511	35%
Marin	3,162	2,003	63%	1,206	38%
F	1,522	962	63%	576	38%
M	1,640	1,041	63%	630	38%
Mendocino	923	576	62%	249	27%
F	448	285	64%	128	29%
M	475	291	61%	121	25%
Merced	4,351	2,809	65%	1,730	40%
F	2,107	1,371	65%	852	40%
M	2,239	1,438	64%	877	39%
Mono	210	86	41%	38	18%
F	103	45	44%	20	19%

County and Gender*	# of 13-year-olds with 2 or more doses (Total)	# initiating HPV vaccine series (1+ Doses)	HPV vaccine series initiation rate	# completing HPV vaccine series (2+ Doses)	HPV vaccine series completion rate
M	107	41	38%	18	17%
Monterey	7,562	4,868	64%	3,088	41%
F	3,683	2,399	65%	1,525	41%
M	3,876	2,468	64%	1,563	40%
Napa	1,988	1,362	69%	854	43%
F	963	670	70%	422	44%
M	1,025	692	68%	432	42%
Nevada	971	370	38%	157	16%
F	490	183	37%	73	15%
M	478	187	39%	84	18%
Orange	42,609	22,379	53%	13,384	31%
F	20,700	10,925	53%	6,614	32%
M	21,905	11,453	52%	6,770	31%
Placer	4,783	2,779	58%	1,685	35%
F	2,397	1,382	58%	840	35%
M	2,385	1,397	59%	845	35%
Riverside	36,426	16,418	45%	8,300	23%
F	17,960	8,145	45%	4,278	24%
M	18,462	8,271	45%	4,021	22%
Sacramento	20,857	13,565	65%	8,791	42%
F	10,229	6,662	65%	4,353	43%
M	10,618	6,899	65%	4,437	42%
San Benito	988	512	52%	247	25%
F	488	253	52%	122	25%

County and Gender*	# of 13-year-olds with 2 or more doses (Total)	# initiating HPV vaccine series (1+ Doses)	HPV vaccine series initiation rate	# completing HPV vaccine series (2+ Doses)	HPV vaccine series completion rate
M	499	259	52%	125	25%
San Bernardino	34,345	17,107	50%	8,449	25%
F	16,763	8,379	50%	4,236	25%
M	17,579	8,727	50%	4,213	24%
San Diego	70,266	28,712	41%	14,960	21%
F	31,954	13,955	44%	7,483	23%
M	33,337	14,426	43%	7,350	22%
U	4,975	331	7%	127	3%
San Francisco	5,788	4,060	70%	2,768	48%
F	2,831	2,002	71%	1,381	49%
M	2,957	2,058	70%	1,387	47%
San Joaquin	12,340	7,761	63%	5,267	43%
F	5,930	3,700	62%	2,534	43%
M	6,410	4,061	63%	2,733	43%
San Luis Obispo	3,390	1,670	49%	877	26%
F	1,631	820	50%	438	27%
M	1,759	850	48%	439	25%
San Mateo	8,929	6,510	73%	4,228	47%
F	4,369	3,197	73%	2,117	48%
M	4,558	3,312	73%	2,111	46%
Santa Barbara	5,477	3,471	63%	1,829	33%
F	2,700	1,749	65%	948	35%

County and Gender*	# of 13-year-olds with 2 or more doses (Total)	# initiating HPV vaccine series (1+ Doses)	HPV vaccine series initiation rate	# completing HPV vaccine series (2+ Doses)	HPV vaccine series completion rate
M	2,777	1,722	62%	881	32%
Santa Clara	22,809	15,466	68%	9,055	40%
F	11,172	7,619	68%	4,549	41%
M	11,632	7,843	67%	4,503	39%
Santa Cruz	3,836	2,497	65%	1,523	40%
F	1,847	1,218	66%	757	41%
M	1,987	1,277	64%	766	39%
Shasta	2,211	770	35%	344	16%
F	1,074	387	36%	171	16%
M	1,137	383	34%	173	15%
Solano	5,499	3,854	70%	2,409	44%
F	2,672	1,864	70%	1,181	44%
M	2,824	1,987	70%	1,226	43%
Sonoma	6,265	4,157	66%	2,499	40%
F	3,082	2,074	67%	1,264	41%
M	3,183	2,083	65%	1,235	39%
Stanislaus	7,189	4,450	62%	2,922	41%
F	3,529	2,183	62%	1,437	41%
M	3,649	2,265	62%	1,483	41%
U	11	2	18%	2	18%
Sutter	1,777	947	53%	483	27%
F	877	465	53%	243	28%
M	900	482	54%	240	27%
Tulare	9,067	5,745	63%	2,755	30%

County and Gender*	# of 13-year-olds with 2 or more doses (Total)	# initiating HPV vaccine series (1+ Doses)	HPV vaccine series initiation rate	# completing HPV vaccine series (2+ Doses)	HPV vaccine series completion rate
F	4,467	2,897	65%	1,427	32%
M	4,600	2,848	62%	1,328	29%
Ventura	10,865	6,153	57%	3,109	29%
F	5,374	3,082	57%	1,630	30%
M	5,490	3,071	56%	1,479	27%
Yolo	2,759	1,588	58%	931	34%
F	1,349	779	58%	477	35%
M	1,409	808	57%	453	32%
Regions					
Alpine, Amador, Calaveras					
F	244	119	49%	75	31%
M	215	114	53%	66	31%
Colusa, Glenn, Tehama					
F	785	351	45%	146	19%
M	856	353	41%	145	17%
Del Norte, Humboldt					
F	1,101	538	49%	250	23%
M	1,100	536	49%	214	19%
Inyo, Mono					
F	246	121	49%	51	21%
M	250	116	46%	47	19%

County and Gender*	# of 13-year-olds with 2 or more doses (Total)	# initiating HPV vaccine series (1+ Doses)	HPV vaccine series initiation rate	# completing HPV vaccine series (2+ Doses)	HPV vaccine series completion rate
Lassen, Modoc, Plumas					
F	279	107	38%	43	15%
M	322	95	30%	34	11%
Mariposa, Tuolumne					
F	342	134	39%	77	23%
M	334	106	32%	66	20%
Sierra, Yuba					
F	673	371	55%	209	31%
M	708	361	51%	188	27%
Siskiyou, Trinity					
F	314	121	39%	48	15%
M	353	135	38%	50	14%
Grand Total	588,223	314,983	54%	176,853	30%

*Counts for gender by count or rate are excluded if the count is less than 10.

Appendix C. HPV vaccine series initiation and completion for 13-year-olds by gender, California, 2019 (Source: CAIR)

Sex*	# of 13-year-olds with 2 or more doses (Total)	# initiation HPV vaccine series (1+ Doses)	HPV vaccine series initiation rate	# completing HPV vaccine series (2+ Doses)	HPV vaccine series completion rate
Female	285,031	155,153	54.43%	88,768	31.14%
Male	297,776	159,403	53.53%	87,921	29.53%
Unknown	5,408	423	7.82%	162	3.00%
California	588,215	314,979	53.55%	176,851	30.07%

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