

Missed opportunities in HPV vaccine administration in a pediatric primary care clinic

Stephanie Trekner MD¹, Courtney McNeely BS², Jenny Raman BS², Serena Rodriguez PhD, MA, MPH³, Sonia Allouch MD⁴, Jenny Francis MD, MPH^{4, 5}

New Castle Family & Internal Medicine Northfield Park¹, School of Medicine, University of Texas Southwestern Medical Center², Department of Population and Data Sciences, UT Southwestern Medical Center³, Department of Pediatrics, Children's Medical Center Dallas⁴, Department of Pediatrics, UT Southwestern Medical Center⁵

Background

- The human papilloma virus (HPV) is known to cause genital warts and cancers such as cervical, anal, vaginal, vulva, oropharyngeal, and penile cancers which are potentially preventable with the HPV vaccine
- Missed opportunities in vaccine administration could result in preventable medical conditions and complications
- CDC recommends administration of HPV, tetanus, diphtheria, and pertussis (Tdap), and meningococcal (MCV4) vaccines at ages 11 to 12 years old
- Vaccine delivery services on a local, clinical level should constantly be assessed to minimize missed opportunities in vaccine administration

Objectives

- To develop a process map to describe adolescent clinical vaccination processes
- To identify gaps in the delivery of adolescent vaccines
- To track adolescent vaccination opportunity rates over time
- To identify and compare trends in adolescent vaccination delivery of HPV, Tdap, and meningococcal vaccines
- To compare HPV vaccine opportunity rates between genders and across age groups, provider types, and visit types

Hypothesis

We hypothesized that there would be lower rates of opportunities taken in administration of the HPV vaccine compared to the opportunity rates for Tdap and meningococcal vaccine administration. We anticipated that females would have a higher HPV vaccine opportunity rate than males. We did not expect any difference in age, provider type, or visit type.

Methods

Process Map

- Design:** key-informant interviews
- Setting:** pediatric primary care outpatient clinic (Children's Health Private Group, Dallas, TX)
- Participants:** providers, nurses, medical assistants, front desk staff
- Data:** interview topics included participants' roles within the clinic, HPV vaccination processes, vaccination documentation, and patient hand-offs between clinical team members

Opportunity Rates

- Design:** retrospective cohort study
- Setting:** pediatric primary care outpatient clinic
- Time:** 1/1/2019 to 12/31/19
- Data Source:** quality improvement reports extracted from the electronic health record (EHR) documenting HPV, MCV4, and Tdap vaccine administration
- Inclusion criteria:** all non-sick visits were included for children 11 to 19 years old who were eligible to receive the vaccine
- Statistical Analysis:** Descriptive elements were analyzed using frequencies and percentages. Comparisons were made using chi squared testing and odds ratios. All analyses were conducted using SAS Studio.

Results

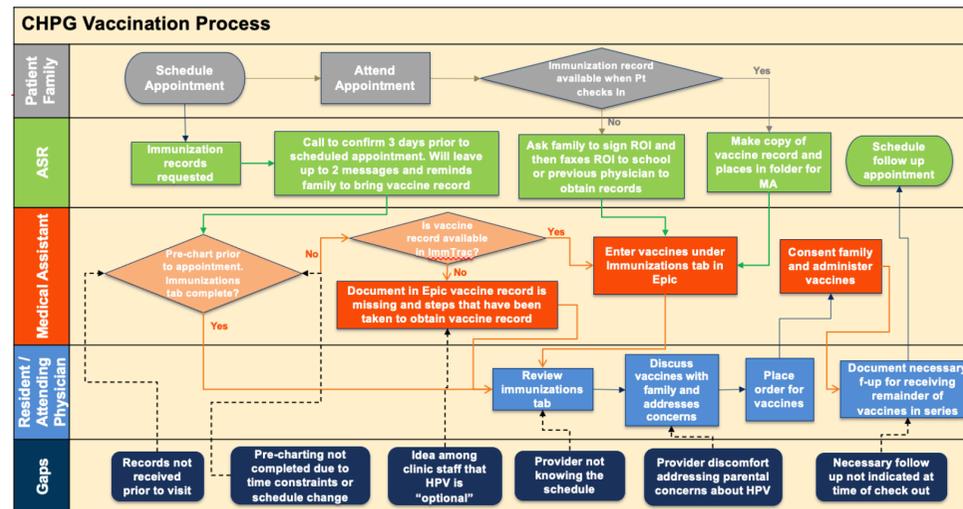


Figure 1. Process map describes adolescent clinical vaccination processes centered around four domains: patient and family education, electronic health record, medical assistant responsibilities, and resident/physician communication. Gaps were identified in clinical flow at each of the four domains.

Opportunity taken	Patient was eligible for vaccine at visit, and vaccine was administered.
Missed opportunity	Patient was eligible for vaccine at visit, but vaccine was not administered.
Ineligible visit	Patient was not eligible for vaccine at visit due to either completing the vaccine series prior to visit or having insufficient time passed since receiving the previous dose in the vaccine series

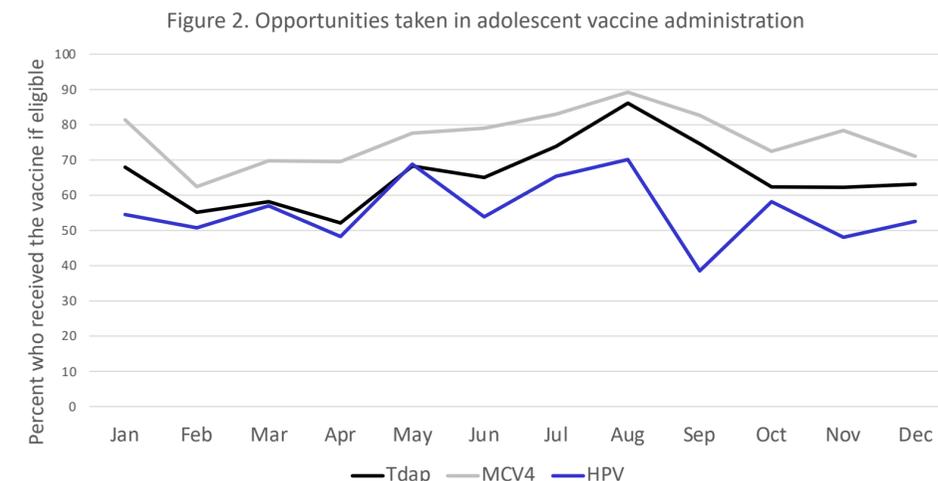
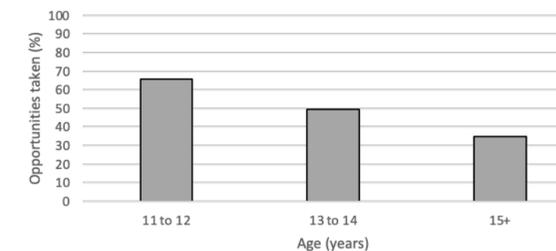


Figure 2. Line graph depicts the monthly changes in the percentage of opportunities taken for three adolescent vaccines (HPV, Tdap, and MCV4). Opportunity taken rate is defined as the percentage of monthly non-urgent discrete encounters where eligible patients received a vaccine

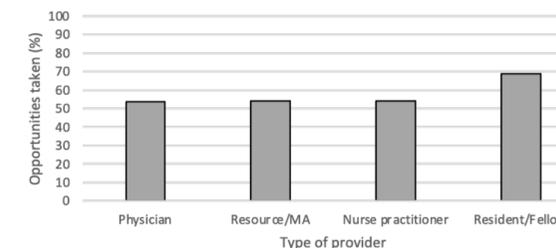
Table 2. Opportunities taken in HPV vaccine administration by gender, age, provider type, and visit type

		Opp taken (N=2656)	Eligible visits (N=2174)	Opp taken (%)
Gender	Female	579	1013	57.2
	Male	639	1161	55.0
Age (years)	11 to 12	841	1283	65.6
	13 to 14	224	452	49.6
	15 +	153	439	34.9
Provider type	Physician	656	1225	53.6
	Medical assistant/resource	178	329	54.1
	Nurse practitioner	153	283	54.1
	Resident/Fellow	231	337	68.5
	New well	135	253	53.4

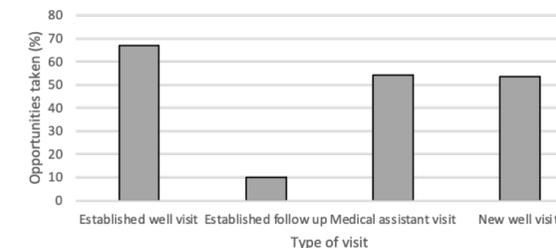
Opportunities taken in HPV vaccine administration by age



Opportunities taken in HPV vaccine administration by provider type



Opportunities taken in HPV vaccine administration by visit type



Limitations

- Additional confounders could be considered in the future that are not available in our current quality improvement data set. Because of this, it is difficult to explain the differences seen in HPV vaccine administration across age groups, provider types, and visit types.
- Since this is a single center study, generalizability may be limited.
- The immunization records are stored in ImmTrac (Texas Immunization Registry) but must be manually inputted into the EHR. Data set relies on the patient's immunization records as documented in the EHR to determine patient's vaccine eligibility
- Relying on the EHR to determine vaccine eligibility may not accurately depict eligibility

Conclusions

- Gaps were identified in the vaccine process that could explain missed opportunities in vaccine administration
- In a pediatric primary care outpatient clinic, we demonstrated that eligible children were receiving the HPV vaccine at a lower rate (66%) annually than receiving Tdap (67%) or MCV4 (77%) vaccines. There was variability from month to month.
- One possible conclusion is that this establishes a baseline for HPV vaccine trends compared to Tdap and MCV4 trends.
- The following subgroups had the highest rates of opportunities taken in HPV vaccine administration in each respective category:
 - Age: 11-12 years old
 - Provider type: resident/fellow
 - Visit type: established well visit
- There was no statistically significant gender difference noted in HPV vaccine opportunities taken.

Future Directions

- Implement interventions to address the gaps identified in the process map
- Host Maintenance of Certification (MOC) meetings for providers and staff to increase provider education about HPV vaccine schedule, address misconceptions, and inquire about personal provider/staff attitudes
- Quantify changes in vaccine knowledge and confidence in offering the vaccine after attending MOC meetings by having providers and staff complete pre- and post-surveys
- Identify clinical champions at clinic sites and maintain regular follow up meetings to discuss gaps in the vaccine process and appropriate interventions
- Improve communication between ImmTrac (Texas State Immunization Registry) and the EHR
- Continue to track adolescent vaccination opportunity rates
- Expand inclusion criteria to include patients 9 and 10 years old given American Cancer Society new recommendations and initiatives to promote early HPV vaccine administration
- Expand analysis to include possible confounders such as race, socioeconomic status, insurance type, parental primary language spoken, and religion
- Collection information on reason the vaccine was not administered when patient was eligible