

5-2019

# HPV immunization rates in student athletes depending on venue of pre-participation evaluation: a pilot study

Andrew Cunningham

Meaghan Rourke

James Moeller

Melissa Nayak

# HPV immunization rates in student athletes depending on venue of pre-participation evaluation: a pilot study

Andrew Cunningham MD, Meaghan Rourke AT ATC, James Moeller MD,  
and Melissa Nayak MD

# HPV Vaccine Background

Human Papilloma Virus (HPV) vaccine recommended by Advisory Committee on Immunization Practices (ACIP) for boys and girls age 9-26 years<sub>(1)</sub>

- 2 dose series given 6-12 months apart
- If not completed by age 15, 3<sup>rd</sup> dose required
- NOT required for school participation
- Low overall rates compared to required vaccines<sub>(2)</sub>
  - 65.5% current on first dose of vaccine
  - 48.6% completed series

# PPE Background

- Pre-Participation Physical Evaluation (PPE) required for high school sports participation in 49 of 50 states<sub>(3)</sub>
  - Goal to maximize health of athletes and their safe participation in sports<sub>(5)</sub>
- In Michigan, Michigan High School Athletic Association (MHSAA) requires yearly physical prior to participation<sub>(4)</sub>
  - Completed by MD, DO, PA, NP
  - Primary care physician (PCP) is listed on form
- Commonly performed in office setting or mass participation group event “station based” approach
  - HF Sports Medicine routinely performs “physical nights” for affiliated high schools

# PPE Location



Group/station-based Setting



Office setting



PCP or Partner



Urgent care

# Research Question

Is there any difference in HPV vaccination rates depending on location of PPE, specifically those done at mass participation group event vs office?

Hypothesis: Athletes who had their exams performed in an office setting will have higher immunization rates than those who had their PPE done in a group setting at a mass participation event.

# Study Design

- Retrospective cohort
- Single High School
- Reviewed MHSAA PPE forms for all athletes participating in Fall and Winter sports
  - Name, Date-of-birth, gender
  - Location of exam
    - Mass event, Office, Urgent Care
  - Examiner
    - PCP vs Other (includes unknown)
  - HPV immunization status (identified through Michigan Care Improvement Registry (MCIR) records)
    - 0,  $\geq 1$ , Complete
- Statistics
  - Chi-squared tests with two sided alpha of 0.05
  - 80% power to detect a difference in vaccination rates of 15%
    - Estimated HPV rates of 60% in-office
    - Estimated sample size of 508: 406 in office, 102 in mass-event

# Descriptive statistics

- 488 total athletes
  - Average age 15.6
  - 59% male, 41% female
- Venue
  - 64 (13%) group setting
  - 424 (87%) in office setting
    - 169 (35%) PCP
    - 147 (30%) UC
    - 108 (22%) “other”
- HPV Vaccination rates
  - 51% received  $\geq 1$  dose
  - 39% completed series

Variable	Response	Result
Age	Mean (SD)	15.6 (1.2)
	Median (Q25, Q75)	15.0 (15, 16)
Gender	Male	286 (58.6%)
	Female	202 (41.4%)
HPV $\geq 1$	Yes	250 (51.2%)
	No	238 (48.8%)
HPV series complete	Yes	190 (38.9%)
	No	298 (61.1%)
PPE Location	Group	64 (13.1%)
	Office	424 (86.9%)
Physician	PCP	169 (34.6%)
	Non PCP	272 (55.7%)
	Unknown	47 (9.6%)
Urgent care	Yes	147 (30.1%)
	No	322 (66.0%)
	Unknown	19 (3.9%)

Table 1: Descriptive statistics



# Results

## HPV $\geq 1$ vs 0

- **No statistically significant difference**
  - Gender
    - Male vs Female
  - Location
    - Office vs Group
    - Urgent care vs non-UC office
  - Provider
    - PCP vs Non-PCP
- **Statistically significant difference**
  - Urgent care vs all others
    - 44.2% vs 54.7% (p=0.036)
    - ***No difference when exclude group setting***

Variable	Response	HPV $\geq 1$	HPV=0	P-Value
Age	Mean (SD)	15.6 (1.2)	15.5 (1.2)	0.235
	Median (Q25, Q75)	15.5 (15, 17)	15 (15, 16)	
Gender	Male (N=286)	153 (53.5%)	133 (46.5%)	0.270
	Female (N=202)	97 (48.0%)	105 (52.0%)	
PPE Location	Group (N=64)	32 (50.0%)	32 (50.0%)	0.833
	Office (N=424)	218 (51.4%)	206 (48.6%)	
PCP	PCP (N=169)	95 (56.2%)	74 (43.8%)	0.062
	Non-PCP (N=272)	128 (47.1%)	144 (52.9%)	
Urgent Care	Yes (N=147)	65 (44.2%)	82 (55.8%)	<b>0.036</b>
	No (N=322)	176 (54.7%)	146 (45.3%)	
Office Location	UC (N=147)	65 (44.2%)	82 (55.8%)	0.095
	Non-UC (N=277)	153 (55.2%)	124 (44.8%)	

Table 2: HPV vaccine  $\geq 1$  vs 0

# Results cont.

## Series completion

- **No statistically significant difference**
  - Gender
  - Age
  - Group vs Office
- **Statistically significant**
  - PCP vs Non-PCP
    - 45.6% vs 33.8%, (p=0.014)
  - Urgent care vs non-UC office
    - 29.3% vs 44.8% (p=0.007)

Variable	Response	Vaccine Series Complete= Yes	HPV series Complete = No	P-Value
Age	Mean (SD)	15.6 (1.2)	15.5 (1.2)	0.632
	Median (Q25, Q75)	15 (15, 16)	15 (15, 16)	
Gender	Male (N=286)	116 (40.6%)	170 (59.4%)	0.381
	Female (N=202)	74 (36.6%)	128 (63.4%)	
Location	Group (N=64)	23 (35.9%)	41 (64.1%)	0.598
	Office (N=424)	167 (39.4%)	257 (60.6%)	
PCP	PCP (N=169)	77 (45.6%)	92 (54.4%)	<b>0.014</b>
	Non-PCP (N=272)	92 (33.8%)	180 (66.2%)	
Urgent Care	Yes (N=147)	43 (29.3%)	104 (70.8%)	<b>0.004</b>
	No (N=322)	139 (43.2%)	183 (56.8%)	
Office Location	UC (N=147)	43 (29.3%)	104 (70.8%)	<b>0.007</b>
	Non-UC,(N=277)	124 (44.8%)	153 (55.2%)	

**Table 3:** HPV vaccine series completion

# Results Summary

- Low rates of HPV vaccine series initiation and completion compared to national data
- High proportion (30%) of athletes have PPE done at urgent care facilities
  - Urgent Care associated with Lowest vaccine series initiation/completion rates
- No statistically significant difference in HPV series initiation or completion between mass event and office based physicals.
- Highest vaccine series completion rates when PPE completed by PCP

# Conclusions/Future Directions

- Overall low rates of HPV vaccination in student athletes
  - Is this true of student-athletes in general?
    - More schools/locations need to be studied
- Mass event PPE is a reasonable convenience with similar vaccination rates
- Providers should use PPE as an opportunity to vaccinate.
- Should mass participation group physicals offer vaccinations?

# Bibliography

1. CDC and prevention. Vaccines and preventable disease. HPV vaccine recommendations. <https://www.cdc.gov/vaccines/vpd/hpv/hcp/recommendations.html>. Accessed 8/8/18
2. Walker TY et al. National, Regional, State, and selected Local Area vaccination coverage among adolescents aged 13-17 Years-United States, 2017. *Weekly* / August 24, 2018 / 67(33);909–917 (67.3, 54.3)
3. Casswell SV, Cortes N, Chabolla N, Ambegaonkar JP, Caswell AM, Brenner JS. S. State-Specific Differences in School Sports Preparticipation Physical Evaluation Policies. *Pediatrics*. 2015. 135(1). 26-32.
4. Michigan High School Athletic Association: Handbook for 2018-2019 School Year. [https://www.mhsaa.com/LinkClick.aspx?fileticket=9uI3Q5Kh\\_9I%3D](https://www.mhsaa.com/LinkClick.aspx?fileticket=9uI3Q5Kh_9I%3D)
5. American Academy of Family Physicians, American Academy of Pediatrics, American College of Sports Me. Preparticipation Physical Evaluation, 4th ed, Bernhardt D, Roberts W (Eds), American Academy of Pediatrics, Elk Grove Village, IL 2010