Reimbursement for HPV Vaccine Cost in the Private Sector: A Comparison Across Specialties

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ABSTRACT

The human papillomavirus (HPV) vaccine is the most expensive of all routinely recommended pediatric vaccines. Adequate cost reimbursement by 3rd-party payers is a critical enabling factor for clinicians to continue offering vaccines. This study found that net returns from HPV vaccine cost reimbursements are lowest for family physicians ($0.34/dose) and highest for pediatricians ($5.08/dose). Furthermore, a $1 increment in return was associated with an increase in HPV vaccine doses administered (highest for family physicians; 0.08% per dollar). Reimbursement for HPV vaccine costs by private payers is adequate; however, return margins are small for non-pediatric specialties.

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Human papillomavirus (HPV) vaccination coverage has improved in recent years in the United States. However, initiation and completion rates are lower among privately insured adolescents (4.6%- and 2.0%-points lower, respectively, in 2021) compared with adolescents covered under public insurance programs.[1] The HPV vaccine is the most expensive of all routinely recommended adolescent vaccines. Vaccine-related products are costly, therefore, adequate reimbursement for vaccine costs by 3rd-party payers is a critical enabling factor for clinicians to offer and continue providing vaccines. In the United States, the Centers for Disease Control and Prevention (CDC) vaccine list price is used as a benchmark by the private sector for vaccine cost reimbursement; however, reimbursement for vaccine cost varies.[2] The objective of this study is to compare HPV vaccine cost reimbursement by the private sector across provider specialties. Additionally, we examine whether the return from reimbursement correlates with the number of HPV vaccine doses administered by clinicians.

METHODS

We identified a nationwide sample of HPV vaccine-eligible adolescents (ie, adolescents aged 9 to 14 years) enrolled in a large private health insurance plan during 2017-2018. Data from states with a universal or universal select vaccine purchase program (ie, Alaska, Hawaii, Idaho, Maine, Massachusetts, South Dakota, New Hampshire, New Mexico, Rhode Island, Vermont, Washington, Wisconsin, and Wyoming) were excluded. The specialty of the clinician (pediatrician, family physician, internal medicine specialist, nurse practitioner, and other) who administered the HPV vaccine was identified using the unique encrypted provider ID that crosswalks the clinician information file and medical claims data. We determined the number of HPV vaccine doses administered by each clinician during 2017-2018. Reimbursement for the HPV vaccine was calculated as the dollar amount paid by the insurer to clinicians to cover the cost of purchasing the vaccine. We also calculated the net return per HPV vaccine dose (ie, payer reimbursement minus the CDC list price).

Average reimbursements for HPV vaccine purchase costs were estimated for the 5 specialties and were compared (pediatricians as a reference group) using the Kruskal-Wallis test. Multivariable linear regression models were constructed to understand the sensitivity of each specialty to administering more (or fewer) HPV vaccine doses relative to return from vaccine cost reimbursement. The independent variable was the return margin per dose (ie, payer reimbursement minus the CDC list price) for each clinician and the dependent variable was the clinician's HPV

Table 1. HPV Vaccine Reimbursement by Private Payer Across Clinician Specialties, 2017-2018

Measure	Clinician Specialty				
	Pediatrician n = 20,484	Family Physician n = 9,342	Internal Medicine Specialist n = 852	Nurse Practitioner n = 2,339	Other n = 1,230
HPV vaccine reimbursement, mean (SD)[a]	$216.07 ($8.53)	$211.33[c] ($16.80)	$212.97[c] ($14.70)	$212.91[c] ($14.74)	$213.29[c] ($14.17)
Net return per dose, mean (SD)[b]	$5.08 ($8.53)	$0.34 ($16.80)	$1.98 ($14.70)	$1.92 ($14.74)	$2.30 ($14.17)

AAP = American Academy of Pediatrics; CDC = Centers for Disease Control and Prevention; HPV = human papillomavirus vaccine.

[a]HPV vaccine reimbursement was calculated as the dollar amount paid for the HPV vaccine cost to the clinician by the insurer.
[b]In 2017-2018, the CDC recommended pricing per HPV vaccine dose for the private sector was $210.99. Recommended vaccine purchase reimbursement and immunization incentive by the AAP is 125% ($263.74) of the CDC vaccine price list for the private sector.
[c] $P < 0.05$ for the Kruskal-Wallis post hoc test compared with pediatricians.

vaccine administration rate (ie, the total number of visits during which an HPV vaccine was administered divided by the total number of preventive care visits times 100). Models were adjusted for the proportion of visits by female and urban adolescents. All analyses were conducted using SAS/SQL (SAS Institute Inc). Significance was tested for $P < 0.05$.

RESULTS

The final sample included 34,247 unique clinicians (Table 1). Overall, HPV vaccine cost reimbursement by private payers was at or above the CDC list price (ie, $210.99) but below the American Academy of Pediatrics (AAP) recommendations (ie, $263.74). On average, pediatricians received higher reimbursement ($216.07) for HPV vaccine cost compared with family physicians ($211.33; $P < .001$), internists ($212.97; $P < .001$), nurse practitioners ($212.91; $P < .001$), and "other" clinicians ($213.29; $P < .001$). The net return from vaccine cost reimbursements was lowest for family physicians ($0.34 per HPV vaccine dose administered) and highest for pediatricians ($5.08 per HPV vaccine dose administered). The predicted change in HPV vaccine administration rate per one-dollar increase in return margin was significant for family physicians (0.08% [0.06% to 0.09%]), "other" specialties (0.06% [0.002% to 0.11%]), and pediatricians (0.05% [0.04% to 0.07%]) (Table 2).

DISCUSSION

Concerns regarding HPV vaccine reimbursement are frequently reported in clinician surveys.[3-5] In our study, HPV vaccine cost reimbursements were at or above the CDC list price but varied by specialty. The variation in reimbursements across specialties might be tied to the ability to negotiate reimbursements for adolescent vaccines. For instance, pediatricians may be able to negotiate higher cost reimbursement compared with non-pediatric specialties given that adolescents constitute a large fraction of their patient volume. It is noteworthy that HPV vaccine cost reimbursement to family practitioners was considerably less in our study, barely breaking even, despite the second highest volume of HPV vaccination encounters (after pediatricians). The financial and operational challenges of stocking vaccines by family physicians documented in the literature corroborate these findings.[6-8]

We also report that the return margin is positively correlated with the number of HPV vaccine doses administered by practitioners. For instance, changing HPV vaccine reimbursement to the AAP-recommended level ($263.74, ie, a net return of +$40), could translate to an estimated 18,643 additional HPV vaccine doses administrated by pediatricians, 4,041 additional doses by family physicians, and 433 doses by "other" specialty in 2017-2018. The change at the population level will depend upon the magnitude of the increase in vaccine cost reimbursement and the volume of adolescent visits (ie, opportunities for HPV vaccination). While it may not be possible to increase reimbursement to the AAP-recommended

Table 2. Association Between Net Return Per Dose and HPV Vaccine Doses Administered, 2017-2018

Clinician Specialty	No. of Visits of Adolescents		HPV Vaccination	
	Total Office Visits	HPV Vaccine Administered	% Change	95% CI
Pediatrician	782,172	127,116	0.05[b]	0.04-0.07
Family physician	96,384	18,875	0.08[b]	0.06-0.09
Internist	11,932	2,235	0.03	−0.04-0.09
Nurse practitioner	25,049	4,502	0.03	−0.02-0.07
Other	14,307	2,541	0.06[b]	0.002-0.11

CDC = Centers for Disease Control and Prevention; HPV = human papillomavirus vaccine.

[a]Independent variable was net incentives earned per dose, calculated as the difference between HPV vaccine cost reimbursement and the CDC list price. The dependent variable was the proportion of HPV vaccine visits (ie, the number of visits the HPV vaccine was administered divided by the total number of preventive care visits times 100). Linear regression models were constructed for each specialty adjusting for the proportion of visits by female and urban adolescents and weighted for the number of preventive care visits.
[b]Statistically significant at $P < 0.05$.

level, a reasonable increase that can cover direct and indirect expenses (acquisition cost, storage cost, personnel cost for monitoring inventory, insurance, waste, and lost opportunity costs) will reduce the financial strain on non-pediatric clinicians, encouraging them to stock and offer the HPV vaccine at their clinics.

Our study should be interpreted within the context of its limitations. Our models did not account for factors related to clinicians (vaccination bundling, knowledge of vaccination schedule, or recommendation style), clinic (reminder prompts in electronic medical records or overhead costs of vaccines), and/or parents of the adolescents (knowledge or vaccine hesitancy) that might contribute to variation in HPV vaccination. We used data from a single private payer which limits the generalizability of our findings.

In conclusion, HPV vaccine cost reimbursement in the private sector meets the CDC list price threshold. Specialties that have very small return margins are most secnsitive to changes in cost reimbursement. A consideration toward increasing reimbursement for HPV vaccine cost is warranted.

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Key words: primary health care; family medicine; human papillomavirus; vaccination; vaccine; HPV

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