BACKGROUND

Human Papillomaviruses (HPV) is the most common sexually-transmitted infection in the United States affecting over 79 million Americans. HPVs are a group of more than 150 viruses, most commonly affecting adults and those in their late teens. HPV causes genital warts and certain cancers (cervical, vulvar, vaginal, penile, anal, and oropharyngeal). It is estimated that 79% of HPV-associated cancers can be attributed to the virus. The incidence rate of HPV-associated cancers in Mississippi was estimated as 14.3 per 100,000 persons, which is higher than the United States national average of 11.7 per 100,000 persons.

Three vaccines, Gardasil® (4vHPV), Cervarix® (2vHPV) and Gardasil®9 (9vHPV) were licensed by the Food and Drug Administration (FDA) for immunization against HPV. As of 2017, Gardasil®9 is the only vaccine available in the United States. The American Council on Immunization Practices (ACIP) recommends initiation of the HPV vaccination series in both males and females at ages 11 to 12 years. Vaccine initiation can occur, though, as early as 9 years of age. Multiple updates to the recommended HPV vaccination schedule have occurred over time. A timeline summary of substantial changes recommended by ACIP for HPV vaccination schedule is provided below:

- **Prior to 2016** - a 3-dose vaccination schedule within a period of 12 months was recommended irrespective of age at initiation.
- **December 2016** - two doses are recommended for children who initiate vaccination before age 15 years and three doses are recommended if initiated 15 years or later for completion of the HPV vaccine series.
- **June 2019** – To further expand recommendations, catch-up vaccinations are recommended for all persons through age 26 years. For adults aged 27 through 45 years, ACIP did not recommend catch-up vaccination for all, although they did recognize that some persons

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who are inadequately vaccinated may benefit from vaccination due to at risk status for new HPV infection. For these persons, ACIP recommends shared clinical decision-making for HPV vaccination.8

According to the CDC’s TeenVaxView, HPV vaccination rates are increasing as more children are up to date on HPV vaccination. Approximately 49% of adolescents ages 13-17 years were up to date on HPV vaccination series in the United States in 2017.9 (Figure 1) In Mississippi, the percent of adolescents up to date on HPV vaccine was only 28.8%.10

Figure 1: HPV Vaccination Coverage Rates9

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Recent literature suggests that various factors such as age at initiation, gender, race, insurance coverage, provider specialty and geographic location are associated with HPV vaccination rates.\textsuperscript{11, 12, 13}

This report will assess HPV vaccine series completion rates in a sample of Mississippi Medicaid beneficiaries for the 2017 calendar year.

METHODS

A retrospective analysis was conducted using Mississippi Medicaid fee-for-service (FFS) and coordinated care organizations [CCOs: UnitedHealthcare (UHC) and Magnolia Health (Mag)] medical and pharmacy claims for the period of January 1, 2017 to December 31, 2017. Molina Healthcare was not included in the analysis due to the fact that the study period occurred prior to Molina’s start date in Mississippi Medicaid. HPV related claims for beneficiaries aged 9 to 26 years during the study period were extracted for analysis. The first identified claim was recorded as the index event and the corresponding date as the index date. Beneficiaries who had a claim for an HPV vaccine in 2016 within a year of their index date in 2017 were excluded from the study to ensure that only true initiators in the study period were included. Beneficiaries were excluded if they did not have continuous enrollment during the study period or if they had been pregnant in the 12-month post-index period. This sample of beneficiaries was identified as “initiators”. Beneficiaries were followed for 12 months in the post-index period to assess receipt of the remaining of the recommended doses of the vaccine.

\textsuperscript{12} Widdice LE, Bernstein DI, Leonard AC, Marsolo KA, Kahn JA. Adherence to the HPV Vaccine Dosing Intervals and Factors Associated With Completion of 3 Doses. \textit{Pediatrics}. 2011;127(1):77-84. doi:10.1542/peds.2010-0812
RESULTS

Table 1 displays HPV completion rates among Medicaid beneficiaries:

- Total of 13,656 beneficiaries initiated therapy during this time period;
- Overall completion rate was 28.8% (3,928 of 13,656 beneficiaries);
- Completion rates were higher among beneficiaries age 12 years and younger;
- Beneficiaries in both UHC and Mag had higher completion rates compared to beneficiaries in FFS;
- Hispanic beneficiaries had higher completion rates compared to other races across all plans.

* Detailed analysis of provider type data (not included in Table 1) indicated completion rates were highest among pediatricians.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Vaccine-eligible (N = 28813)</th>
<th>Initiated (N = 1046)</th>
<th>Completed (N = 244)</th>
<th>Completion rate (23.3%) a</th>
<th>Vaccine-eligible (N = 84748)</th>
<th>Initiated (N = 5693)</th>
<th>Completed (N = 1759)</th>
<th>Completion rate (29.6%) a</th>
<th>Vaccine-eligible (N = 87344)</th>
<th>Initiated (N = 6667)</th>
<th>Completed (N = 1925)</th>
<th>Completion rate (28.9%) a</th>
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<td>363</td>
<td>156</td>
<td>43.0%</td>
<td>16686</td>
<td>2552</td>
<td>1165</td>
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<td>1428</td>
<td>57</td>
<td>13</td>
<td>22.8%</td>
</tr>
</tbody>
</table>

Note:

a Completion was defined as per ACIP guidelines, 2016. Completion rate was calculated as the proportion of completers among initiators within each category. Overall completion rate was 28.8% (3,928 of 13,656 beneficiaries).

b For beneficiaries who either initiated or completed, age and plan information was calculated as of their HPV vaccine initiation date. Since vaccine-eligible beneficiaries might not have an initiation date, age and plan information was calculated as of January 1, 2017. The 'Vaccine-eligible' numbers include benes who may have initiated and/or completed HPV vaccine series in the past.
CONCLUSIONS

Despite HPV vaccination completion rates rising across the nation, Mississippi continues to rank among the bottom of all states with a reported “up to date” rate of 28.8% in 2017. Effective strategies need to be implemented to improve HPV vaccination rates among Medicaid beneficiaries. A coordinated effort among providers and pharmacists targeting beneficiaries initiating the HPV vaccination series to increase completion rates is optimal. As the most easily accessible healthcare professionals, pharmacists can play a vital role in increasing HPV completion rates. All vaccines administered to individuals < 19 years are required to be submitted to the Mississippi Immunization Information eXchange (MIIX). Pharmacists can register to have access to the MIIX system and report vaccines administered in the pharmacy setting.

RECOMMENDATIONS

1. MS-DUR, along with DOM, will develop provider education emphasizing the importance of timely follow-up for beneficiaries initiating HPV vaccination series.

2. DUR should work with DOM to develop an initiative to encourage pharmacists to become more involved in both initiating and completing HPV vaccinations.

3. DOM will collaborate with the Mississippi State Department of Health in developing strategies to increase HPV vaccination completion rates in Mississippi.