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Background

- Human papillomavirus (HPV) infections are linked to at least six different cancer types. The Medical University of South Carolina (MUSC) Hollings Cancer Center (HCC), MUSC Department of Pediatrics, and Healthy Me/Healthy SC Program leaders identified less-than-optimal HPV vaccination rates in rural, medically underserved counties in South Carolina (SC).
- To address this major public health problem in SC, the MUSC HCC was granted funding from the Healthy Me/Healthy SC (HMHC) program and the MUSC HCC to create a statewide community engagement-focused HPV Vaccination Mobile Unit Program, which launched in October of 2021. The HPV Vaccination Mobile Unit Program provides HPV and other childhood vaccinations primarily in SC school districts.

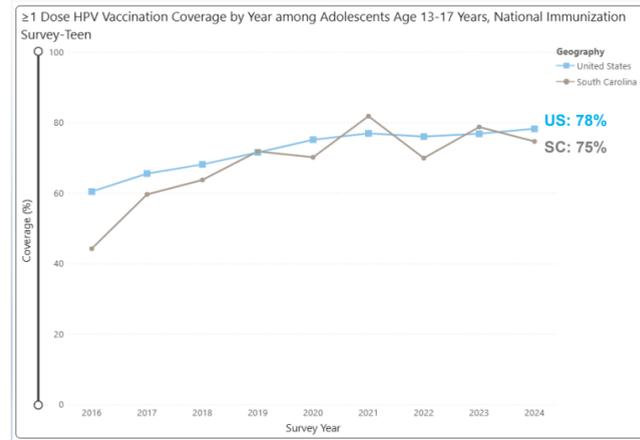


Figure 1. HPV Vaccination Coverage (≥1 dose) by Year among Adolescents 13-17 Years, NIS-Teen 2016-2024

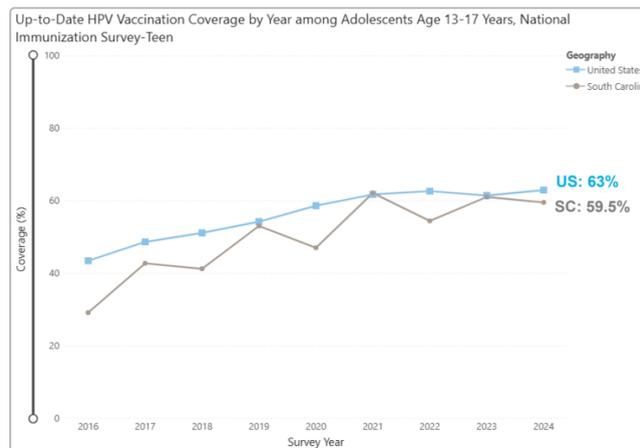


Figure 2. Up-to-Date HPV Vaccination Coverage by Year among Adolescents 13-17 Years, NIS-Teen 2016-2024

Methods

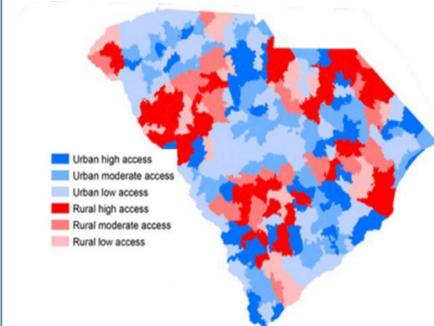


Figure 3. Urban and Rural Areas of South Carolina with high, low, and moderate levels of access to the HPV vaccine.



Figure 4. The Program has provided HPV vaccinations in 30 of 46 South Carolina counties.

- The investigators employed a pre/post survey design to evaluate changes in parental knowledge after an HPV vaccine educational intervention.
- Pre-post program changes in knowledge, attitudes, and beliefs related to cervical cancer, HPV, HPV vaccination, and receipt of the HPV vaccination were evaluated.
- The HPV parental educational module and its accompanying pre/post educational intervention survey were developed by the National Cancer Institute's National Outreach Network Community Health Educator (NON CHE) program in collaboration with the Comprehensive Partnerships to Advance Cancer Health Equity (CPACHE) programs.
- Administrators from the South Carolina Department of Public Health (SC DPH) and the South Carolina Immunization Coalition (SCIC) linked the Program staff with the nurses at each of the schools in the participating counties of SC.
- Regular meetings are held between the HPV Vaccination Van Program staff, school districts, and community leaders to make introductions and to plan the HPV vaccination event in the leaders' community settings.

The Team was selected by the SC Department of Public Health and the SC Immunization Coalition as the Association of Immunization Managers 2024 South Carolina Immunization Champion Award Winner.



Methods (continued)

Table 1. Sociodemographic Characteristics of Parents of Vaccine Age-eligible Children (9-18 years old) Participating in the HPV Vaccination Mobile Unit Program.

| Characteristic | Total (n=492), n (%) | Characteristic | Total (n=492), n (%) |
|---------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Age, mean ± SD | 39.2 ± 7.0 | Coverage through the military (e.g., CHAMPUS, Tricare) | 2 (0.4) |
| Biological sex at birth* | | Coverage through the Indian Health Services | 0 (0) |
| Female | 429 (87.2) | Coverage through Medicare | 4 (0.8) |
| Male | 61 (12.4) | Coverage through Medicaid (including CHIP) | 365 (74.2) |
| Current gender identity* | | Other | 1 (0.2) |
| Woman | 430 (87.4) | Coverage through Medicare & Medicaid | 1 (0.2) |
| Man | 60 (12.2) | Do you have any female children between the ages of 9 and 26?* | |
| Hispanic or Latino origin* | | No | 166 (33.7) |
| No | 371 (75.4) | Yes | 302 (61.4) |
| Yes | 112 (22.8) | Do you have any male children between the ages of 9 and 21?* | |
| Race | | No | 205 (41.7) |
| American Indian/Alaska Native | 2 (0.4) | Yes | 271 (55.1) |
| Asian | 95 (19.3) | Note: HPV=human papillomavirus; GED=general educational development; SD, standard deviation. | |
| Black/African American | 181 (36.8) | *Missing values include age (n=7), biological sex at birth (n=2), current gender identity (n=2), Hispanic or Latino origin (n=9), race (n=6), preferred language (n=18), education (n=11), Have you ever heard of Human Papillomavirus (or HPV)? (n=3), insurance (n=2), Do you have any female children between the ages of 9 and 26? (n=24), and Do you have any male children between the ages of 9 and 21? (n=6). | |
| Native Hawaiian or Other Pacific Islander | 19 (3.9) | **For race and health insurance, respondents could choose all the categories that applied. | |
| White | 180 (36.6) | | |
| Black/African American & White | 7 (1.4) | | |
| Asian & White | 2 (0.4) | | |
| Preferred language* | | | |
| English | 371 (75.4) | | |
| Spanish | 103 (20.9) | | |
| Education* | | | |
| 8 th grade or less | 10 (2.0) | | |
| Some high school, no diploma | 66 (13.4) | | |
| High school diploma or GED | 251 (51.0) | | |
| Some college, no diploma | 127 (25.8) | | |
| College graduate | 27 (5.5) | | |
| Have you ever heard of Human Papillomavirus (or HPV)?* | | | |
| No | 49 (10.0) | | |
| Yes | 440 (89.4) | | |
| Current health insurance or health care coverage* | | | |
| None, no insurance and without coverage at the present time | 103 (20.9) | | |
| Coverage provided through current or former employer or labor union (excluding military coverage) | 12 (2.4) | | |
| Coverage through an individual plan | 2 (0.4) | | |



The HPV mobile vaccination unit staff and Cherokee County School District nurses.

Table 2. Pre-intervention and Post-intervention Survey Results of Self-reported HPV Knowledge Among Parents of Vaccine Age-eligible Children (9-18 years old) Participating in the HPV Vaccination Mobile Unit Program.

| HPV Knowledge Survey Questions | Percent Correct (Pre) | Percent Correct (Post) | Absolute Percent Improvement (Post-Pre) |
|--------------------------------------------------------------------------------|-----------------------|------------------------|-----------------------------------------|
| HPV is common. | 85.7% | 89.4% | 3.7% ** |
| HPV always has visible signs or symptoms. | 21.4% | 17.3% | -4.1% * |
| HPV can cause cervical cancer (and other kinds of cancer). | 94.3% | 94.9% | 0.6% * |
| HPV can be passed on by intimate skin-to-skin contact. | 94.1% | 95.1% | 1.0% * |
| There are many types of HPV. | 87.0% | 90.0% | 3.0% ** |
| HPV can be passed on during sexual intercourse. | 96.7% | 97.0% | 0.3% * |
| HPV can cause genital warts. | 91.9% | 95.9% | 4.0% ** |
| Men cannot get HPV. | 91.1% | 94.5% | 3.4% ** |
| HPV can be cured with antibiotics. | 91.9% | 94.5% | 2.6% ** |
| HPV usually doesn't need any treatment. | 6.9% | 6.7% | -0.2% |
| Most sexually active people will get HPV at some point in their lives. | 90.0% | 93.7% | 3.7% ** |
| A person could have HPV for many years without knowing it. | 95.5% | 97.4% | 1.9% ** |
| The HPV vaccine usually requires two doses. | 93.9% | 96.3% | 2.4% |
| The HPV vaccine offers protection against all sexually transmitted infections. | 87.0% | 91.5% | 4.5% ** |
| The HPV vaccine works best if given to people who have never had sex. | 7.3% | 4.3% | -3.0% * |
| Someone who has had HPV vaccine cannot develop cervical cancer. | 91.3% | 94.1% | 2.8% ** |
| The optimal age for getting the HPV vaccine is 11-12 years of age. | 93.3% | 95.9% | 2.6% ** |
| The HPV vaccine is recommended for both boys and girls. | 99.4% | 99.4% | 0.0% * |
| An HPV test can be done at the same time as a Pap test. | 98.2% | 98.2% | 0.0% * |
| Overall combined score | 79.8% | 81.4% | 1.6% ** |

Note: HPV=human papillomavirus. *Exact McNemar's test was used due to one or more of the cells having a small sample size (5). **P<0.05 by McNemar's test for paired binary responses. ***P<0.001 by McNemar's test for paired binary responses; the Wilcoxon signed rank test was used for the Overall combined score.



Ethan Cody receives his first HPV vaccination dose at Cherokee Middle School.

Results

Table 3. Self-reported HPV Vaccine Intention Among Parents of Vaccine Age-eligible Children (9-18 years old) Participating in the HPV Vaccination Mobile Unit Program.

| HPV Vaccine Intention Items | Pre-intervention | | | | Post-intervention | | | | p-value* | |
|-----------------------------------------------------------------------|------------------|-------|--------|----------|-------------------|----------------|-------|--------|----------|----------|
| | Strongly Agree | Agree | Unsure | Disagree | Strongly Disagree | Strongly Agree | Agree | Unsure | | Disagree |
| I am likely to have my children vaccinated against HPV. | 95.3 | 4.1 | 0.0 | 0.0 | 0.0 | 96.1 | 3.0 | 0.0 | 0.0 | 0.025 |
| I am likely to speak with my children's doctor about the HPV vaccine. | 93.7 | 5.7 | 0.0 | 0.0 | 0.0 | 94.9 | 4.3 | 0.0 | 0.0 | 0.035 |
| I will talk to family members and friends about the HPV vaccine. | 91.5 | 7.9 | 0.0 | 0.0 | 0.0 | 92.9 | 6.5 | 0.0 | 0.0 | 0.033 |
| I am likely to talk to my doctor about the HPV vaccine. | 66.9 | 13.0 | 13.6 | 5.1 | 0.8 | 67.7 | 15.0 | 11.4 | 4.5 | 0.001 |
| I am likely to get the HPV vaccine. | 64.6 | 14.4 | 15.0 | 4.5 | 1.0 | 64.6 | 16.5 | 12.4 | 4.1 | 0.005 |

Note: HPV=human papillomavirus. *The Wilcoxon signed rank test was used.

A total of 649 parents participated in the HPV Vaccination Mobile Unit Program. Four hundred ninety-two (75.8%) parents completed the study survey. The surveyed parents were largely women (87.2%) who had heard of HPV (89.4%).

Their HPV knowledge scores increased significantly (79.8%) vs. (81.4%) correct, p<0.001.

Engaging parents in HPV vaccine education may lead to higher vaccination rates.

Conclusions

- The participating parents' knowledge scores increased post-program, and most consented to having their children vaccinated. While the Program provided an important educational opportunity for the parents, the Program faced some missed opportunities.
- For example, the Program was only funded to provide vaccines for VFC-eligible children, severely limiting the pool of potential school-aged participants. Additionally, Program staff were unable to provide HPV vaccinations for adults aged 19-45 years.
- As a next step in the continuing Program, the investigators are seeking new sources of funding that will allow them to reach a greater proportion of the South Carolina population in need of HPV vaccinations. The Program staff are also working with legislators to highlight the importance of the HPV vaccine as an effective and safe cancer prevention tool.

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