Advancing Human Papillomavirus Vaccine Delivery: 12 Priority Research Gaps

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Human papillomavirus (HPV) vaccine has been available in the United States for a decade, yet vaccination coverage remains modest. A recent review identified numerous interventions for increasing HPV vaccination,[1] but effects were small and evidence was often insufficient to identify best practices. The National HPV Vaccination Roundtable sponsored a 1-day national meeting in 2016 on best and promising practices in HPV vaccine delivery, in part to identify important research gaps.

Meeting attendees were HPV vaccine delivery experts including scientists, clinicians, and other stakeholders. Approximately 100 people attended in-person and approximately 400 additional people streamed the meeting online (livestream.com/ACS/events/5892004). Throughout the meeting, the meeting facilitators encouraged attendees to identify gaps that future research should address and write them on display boards (or send via e-mail or Twitter). Facilitators did not provide attendees with a predefined list of gaps. Attendees identified a total of 33 gaps (Table). In-person attendees voted for up to 5 gaps they believed were top priorities. We categorized the gaps into themes. The 12 gaps that received the most votes generally fit into these themes: 1) social media and vaccine confidence, 2) health care provider interventions, or 3) system-level approaches. Two gaps in the top 12 that did not fit these themes were determining what interventions work in rural areas (gap 7) and the impact of survivor testimonials (gap 9).

Social Media and Vaccine Confidence

Many attendees prioritized the gaps of how to increase HPV vaccine confidence by intervening in social media (gap 1) and how to address rumors about HPV vaccine spread via social media (gap 4). HPV vaccination has generated broad support as well as some controversy since its introduction. Although not substantiated by evidence, stories about vaccine side effects and other misinformation have proliferated through antivaccination groups on social media.[2] Even if unfounded, this negative publicity can confuse and frighten parents, lead health care providers to incorrectly assume that parents might not value HPV vaccination, and create the perception among providers that conversations about HPV vaccination will be difficult. It is important to understand how best to leverage social media to counter the negative publicity and promote HPV vaccination. This includes determining which negative stories require a response, when and how the response should take place, and which organizations should issue the response.

Attendees prioritized the gap of how to address parents' concerns and hesitancy about HPV vaccine (gap 8). Working groups at the World Health Organization and the US National Vaccine Advisory Committee have also identified this as a priority. However, relatively few interventions have been explicitly designed to address vaccine hesitancy and there is limited evidence on the effectiveness of such interventions.[3]

Health Care Provider Interventions

Attendees prioritized several gaps involving health care providers, whose recommendations to vaccinate are central to increasing HPV vaccination. This included how to encourage providers to attend in-clinic quality improvement interventions (gap 2), such as Assessment, Feedback, Incentives, and eXchange visits recommended by the Centers for Disease Control and Prevention. Assessment, Feedback, Incentives, and eXchange visits for adolescent vaccination are already in use nationally, but research is needed to optimize the delivery (including encouraging provider participation), effect, and sustainability of these programs.[4]

Consistent with the broader trend of team approaches to health care, attendees prioritized how to intervene with the entire medical team (gap 6) as a research gap. Such interventions would engage the whole office, including physicians, mid-level providers, nurses, and front office staff, to create a culture supportive of HPV vaccination. Finally, attendees prioritized the gap of how to increase HPV vaccination during acute care visits (gap 10). Relatively few providers discuss HPV vaccination at visits that are not for preventive care (eg, sick visits for patients with mild complaints).[5] Medical visits for follow-up and nonserious acute illness or injury are missed opportunities for providers to recommend and administer HPV vaccine.

System-Level Approaches

Attendees prioritized several gaps concerning system-level approaches, which can have a broad effect and might require less time, effort, and costs than provider training. One system-level gap was identifying best practices for health insurers and plans (gap 3). Health insurance plans can implement benchmark measures, making financial incentives and reimbursement contingent on meeting HPV vaccination goals. One widely used set of

measures is the Healthcare Effectiveness Data and Information Set (HE-DIS). Starting in 2017, HEDIS will have a single measure for adolescent vaccination: male and female adolescents receive all doses of HPV vaccine, the first dose of meningococcal vaccine, and tetanus booster vaccine by age 13 years.[6] Assessing the impact of quality standards (gap 12), such as HEDIS, will be important to future vaccination efforts.

Attendees prioritized determining effective system-level changes in large health systems and hospitals (gap 11). These organizations have several promising tools at their disposal, including system-wide adoption of standing orders for HPV vaccination. Electronic health record (EHR) systems can automate reminder-recalls for patients due for HPV vaccination, generate reminder prompts for providers to administer the vaccine, and help facilitate nurse-only immunization visits and walk-in immunization hours that can make completion of the HPV vaccine series easier. Strategies such as reminder-recalls for patients and reminder prompts for providers have often, but not always, been successful at increasing rates of vaccination,[7,8] but implementation of these strategies is inconsistent. In addition, EHRs can generate reports to track the effect of strategies to increase HPV vaccination and potential procedural challenges during implementation (eg, vaccine supply, parents refusing or delaying vaccination, etc).

Attendees prioritized the impact of connecting immunization information systems to EHRs and exchanging data bidirectionally (gap 5) as a research gap. Immunization information systems are population-based clinical information systems for specified geographic regions, typically states. Data exchange between immunization information systems and other clinical information systems, such as EHRs, can support the integration of scattered vaccination records. Bidirectional exchange can save providers time while increasing their confidence in the data informing patient care and quality improvement efforts. Any implementation of bidirectional exchange processes will have to be accomplished within the context of state policies, which might not require providers to use the registry, might require its use only for some doses (eg, publicly funded doses), or might include data only for children of parents who opt in.[9]

Conclusions

National experts identified and prioritized research gaps that have promise for increasing HPV vaccination. Most of the prioritized gaps involved social media and vaccine confidence (eg, increasing vaccine confidence by intervening in social media), health care provider interventions (eg, encouraging providers to attend in-clinic quality improvement interventions), or system-level approaches (eg, best practices for health insurers and plans). It is critical to develop and evaluate interventions in each of these areas to close existing gaps and identify best practices for increasing HPV vaccination.

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Table

Gaps in HPV Vaccination Delivery Research

Gap	Attendees Who Endorsed Gap as a Top Priority, n	Theme
1. How to increase HPV vaccine confidence by intervening in social media	38	Social media and confidence
2. How to encourage providers to attend in-clinic quality improvement interventions (eg, AFIX)	36	Health care providers
3. What are best practices for health insurers and plans	27	System-level
4. How to address rumors about HPV vaccine spread via social media	25	Social media and confidence
5. What is the impact of connecting immunization information systems to electronic health records and exchanging data bidirectionally	24	System-level
6. How to intervene with the entire medical team (eg, physicians, midlevel providers, nurses, and front office staff)	22	Health care providers
7. What interventions work in rural areas	18	Diverse populations
8. How to address parents' concerns and hesitancy about HPV vaccine	16	Social media and confidence
9. What is the impact of survivor testimonials	14	Communication
10. How to increase HPV vaccination during acute care visits	10	Health care providers
11. What are effective system-level changes in large health systems and hospitals	10	System-level
12. What is the impact of quality standards (eg, HEDIS)	9	System-level
13. How to make tailored education interventions for parents sustainable and affordable	7	Communication
14. How to optimize peer comparison interventions with providers (ie, should comparisons be between providers, clinics, geographic regions, other recommended vaccines)	7	Health care providers
15. How to conduct larger, multisite randomized trials	5	Intervention design
16. What interventions work in non-FQHC settings and nonminority groups	5	Diverse populations
17. What interventions are feasible in primary care settings	5	Health care providers
18. What is the effect of financial incentives on HPV vaccination	5	Other
19. What works in the United States versus in global settings	5	Diverse populations
20. How to improve entry of HPV vaccine doses administered into immunization information systems (eg, use of incentives vs penalties)	4	System-level
21. How to make HPV vaccination urgent	4	Communication
22. How to create a better definition of vaccine hesitancy and determine if there are different types	3	Social media and confidence
23. What longer-term follow-up data will reveal about lasting effects of interventions	2	Intervention design
24. Why HPV vaccination coverage is currently higher for many underserved and minority populations	2	Diverse populations
25. Which education messages work for parents with children age 13 and older	2	Diverse populations
26. How to optimize use of announcements as part of provider recommendations (eg, when to use and for which patients)	2	Health care providers
27. What is the effect of saying HPV vaccine prevents cancer	1	Communication
28. How to intervene with younger versus older providers	1	Health care providers
29. What is the effect of Vaccine Information Statements	1	Communication
30. Which interventions work best for which populations	0	Diverse populations
31. What is the cost of doing interventions	0	Intervention design
32. What is the effect of food on attendance at provider education sessions	0	Health care providers
33. Where do providers look for information about HPV vaccine	0	Health care providers

AFIX indicates Assessment, Feedback, Incentives, and eXchange; FQHC, Federally Qualified Health Center; HEDIS, Healthcare Effectiveness Data and Information Set; and HPV, human papillomavirus.

Meeting attendees endorsed up to 5 gaps they believed were the top priorities.