Examining Health Care Professionals' Views on Using Electronic Health Records and Immunization Information Systems to Increase HPV Vaccination

A Project of the National HPV Vaccination Roundtable

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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

BACKGROUND AND METHODS

In 2016, the National HPV Vaccination Roundtable (the Roundtable) engaged Cardea Services (Cardea) to develop a white paper that explores the technological and behavioral barriers that prevent health care providers from effectively using Electronic Health Record (EHR) and Immunization Information Systems (IIS) to support on-time, complete HPV vaccination.

The primary objectives of the project are to:

1. Gather feedback from medical practitioners, administrators, and technical staff about how current EHR/IIS do or do not support HPV vaccination

2. Identify and prioritize ways to modify EHR/IIS to enhance delivery, documentation, tracking, and coordination of HPV vaccination

3. Reveal practice operation (e.g., workflow) successes and challenges with regard to how EHR systems are integrated into office practices

Between May and July 2016, Cardea interviewed medical practitioners, administrators, and technical staff who currently deliver HPV vaccines and have an EHR system in place and/or experience using IIS. This report summarizes findings based on views expressed during semi-structured, in-depth, key informant interviews with 44 respondents from 29 different agencies across the U.S. Respondents used 14 different types of EHRs and 20 different IIS/registry systems.

> For purposes of this report, we use the term "agency" to refer to the organization, clinical practice, hospital system, pharmacy or health center to which the respondent is affiliated.

FINDINGS

Vaccination coverage varies widely, and series completion is low

Providers reported that they often initiate the HPV vaccine with patients at age 11 or 12; however, vaccination coverage varied widely from less than 20% to 92% of patients receiving the first dose of the vaccine. Reported series completion rates were considerably lower than initiation rates, and coverage – for both series initiation and completion – was frequently reported to be higher among girls than boys and among younger adolescents.

EHRs and IIS pose challenges to maintaining complete and accurate vaccination histories

Most EHRs have a unidirectional interface to upload vaccination history into state IIS; few offer bidirectional communication. Often agencies check their IIS for vaccination histories or rely on patient report. Neither of these approaches are ideal, and providers have concerns about the completeness and accuracy of both approaches.

Diverse clinical decision supports exist, but they are not universally available

Most respondents reported built-in, EHR clinical decision supports to notify providers when patients are due for the HPV vaccine, but the structure and utility of these tools varied widely. Several agencies lacked any formal practice for tracking vaccine administration and/or progress toward series completion. Even if clinical decision tools are available through EHRs, providers may need to manually activate those features.

Agencies have implemented many strategies to improve vaccination rates

Respondents discussed several common strategies to improve vaccination rates, often applied in combination. These strategies included using data for quality

improvement, educating providers, using patient recalls and reminders, and implementing patient education. Some respondents reported that federal and local grants, as well as research partnerships, can facilitate opportunities to implement quality improvement initiatives.

Several factors facilitate vaccine initiation and series completion

Interviews revealed that technological solutions may not be the only or best approach to improve HPV coverage rates. Respondents identified workflows involving teams and "no missed opportunity" strategies as critical to success. Communication with external agencies using the same EHR enables better vaccination history capture. While dedicated IT support can be helpful, it is not always financially feasible. Having simple, built-in features (e.g., alerts and forecasting) helps providers monitor patient progress toward series completion.

Diverse challenges including data systems, policies, and community attitudes impede HPV vaccine initiation and series completion

Respondents described EHR and IIS limitations (e.g., mismatched records, unsupportive reminder tools, data upload lag times, etc.) that make it challenging to identify patients eligible for vaccination and produce meaningful coverage reports. Parental vaccine hesitancy and community associations between the vaccine and perceived promiscuity prevent youth from initiating the series. Cost was also cited as a barrier for some youth and young adults.

Professionals suggest provider training, reminder systems, streamlined workflow, and data monitoring to improve vaccination coverage

Respondents discussed several ways to improve vaccination rates. Their suggestions included strategies to standardize provider language around vaccine promotion, institute better patient reminder systems, streamline workflow and increase flexibility for providers and patients, and engage providers in quality improvement efforts through report cards.

The Roundtable can support HPV vaccine coverage through engagement with vendors and states, provider and community education campaigns, and policy change efforts

Respondents recommended several approaches for the Roundtable to advance vaccination coverage. They suggested that the Roundtable could explore systems improvements with EHR vendors and state IIS, organize professional development opportunities for providers to learn best practices for promoting vaccine uptake, and support public awareness campaigns. In addition, respondents called for support with reducing out-of-pocket costs for patients to make the vaccine more accessible.

RECOMMENDATIONS

Data systems change

Encourage vendors to improve EHR usability

As much as possible, EHRs should be capable of bidirectional interface with IIS and be equipped with clinical decision aids (e.g., pop-up boxes, highlighted fields) to notify providers when patients are due for initial or follow-up doses. By default, EHRs ideally should also generate accurate and useful coverage reports to monitor vaccine uptake and series completion and to assist agencies with quality improvement. Standardized templates and modules to track vaccination histories and monitor coverage should be available by default.

Support bidirectional, universal, real-time, and interstate IIS

State IIS should bidirectionally interface with EHRs to coordinate care for patients who receive services at multiple sites. Funding at the state and federal levels is critical to support this technology infrastructure. State IIS should also encourage *all* providers to report HPV vaccinations to achieve complete and accurate IIS data. Stakeholders can explore ways to: 1) reduce IIS lag times to allow immediate access to patient vaccination history information and 2)

support interstate data exchange via a hub or national registry or otherwise allow for inter-IIS coordination because patients often move or cross state lines to receive care.

Agency and provider practice change

Promote prioritization of vaccination coverage

Stakeholders should promote vaccination coverage as a priority among clinical leadership to foster expansions of quality improvement efforts. With buy-in from clinical and administrative leaders, agencies can implement multi-pronged quality improvement strategies, seek funding and partnership opportunities to support and enhance these efforts, and integrate sufficient IT staff into clinical settings to further meaningful use of EHR features.

Advance quality improvement strategies in clinical settings

To improve vaccination coverage, agencies should consider establishing clinic and provider benchmarks for vaccine initiation and series completion, monitoring disaggregated coverage rates through EHR or IIS reports, and generating routine reports of patients due for initial and follow-up vaccination.

Encourage adoption of diverse communication strategies in clinical settings

Diversifying communication strategies has the potential to improve coverage. For example, launching patient reminder protocols for scheduling initial and/or follow-up doses and using more accessible communication methods to contact families and young people (i.e., text messages, emails, phone calls and/or postcards) could promote uptake.

Support new strategies and streamlined workflow in clinical settings

Adopting a "no missed opportunity" approach to ensure that patients receive the vaccine regardless of their primary reason for a visit, implementing standing orders so nurses, medical assistants, or pharmacists may administer

follow-up doses, and establishing walk-in appointments for follow-up doses to encourage series completion would all support improved coverage rates.

Increase provider and staff understanding of how to improve vaccination coverage

Developing and providing accessible professional development opportunities related to motivational interviewing, stronger recommendations for the HPV vaccine, team-based approaches to achieving higher vaccination coverage rates, and EHR and IIS capabilities could increase understanding of how to improve vaccination coverage.

Systemic policies and community attitude change

Explore opportunities for improved access to the HPV vaccine

Reducing financial barriers has the potential to increase vaccination rates. Access is still an issue for some patients, due to the high cost of the vaccine, particularly those individuals who are not eligible for Vaccines for Children (VFC).

Continue efforts to reframe the HPV vaccine through innovative marketing and patient education

Support for the continuation of national marketing campaigns aimed at increasing public awareness of the benefits of HPV vaccine should be continued. Efforts to "desexualize" language around the HPV vaccine and shift the focus to cancer prevention should be reinforced.

Convene EHR vendors and IIS vendors and administrators to enhance data systems coordination

The Roundtable should consider facilitating conversations among prominent EHR vendors and IIS vendors and administrators to bolster coordination among these stakeholders. A convening could focus on developing functional standards for EHR vaccination records and a roadmap for enhancing data systems interoperability.

BACKGROUND AND OBJECTIVES

The 2014 Annual Report from the President's Cancer Panel identified the underuse of HPV vaccines as "a serious but correctible threat to progress against cancer." Established that same year, the National HPV Vaccination Roundtable (the Roundtable) is a coalition of individuals and public, private, and voluntary organizations dedicated to reducing the incidence of and mortality from HPV-associated cancer in the U.S. The Roundtable is managed by the American Cancer Society with funding from the Centers for Disease and Prevention. Around 70 organizations participate in activities of the Roundtable, which include a national meeting and smaller task groups to develop and implement pilot projects.

In 2016, the Electronic Health Records & Immunization Information Systems (EHR-IIS) Task Group of the Roundtable engaged Cardea Services (Cardea) to develop a white paper that explores the technological and behavioral barriers that prevent health care providers from effectively using Electronic Health Record (EHR) and Immunization Information System (IIS) to support on-time, complete HPV vaccination. The findings from this pilot project will inform future activities to address technology and behavior supporting EHR and IIS to improve HPV vaccination rates.

The primary objectives of the project were to:

1. Gather feedback from medical practitioners, administrators, and technical staff about how current EHR/IIS do or do not support HPV vaccination

2. Identify and prioritize ways to modify EHR/IIS to enhance delivery, documentation, tracking, and coordination of HPV vaccination

3. Reveal practice operation (i.e., workflow) successes and challenges with regard to how EHR systems are integrated into office practices

Between May and July 2016, Cardea interviewed medical practitioners, administrators, and technical staff who currently deliver HPV vaccines and have an EHR system in place and/or experience using IIS. This report summarizes findings based on views expressed during semi-structured, in-depth, key informant interviews with 44 participants from 29 different agencies across the U.S.

Findings from this report serve to complement an additional Roundtable report, focused on a literature review of best practices related to using EHR/IIS to increase HPV vaccination rates.

METHODS

Overview

- Cardea conducted key informant interviews with 44 medical practitioners, administrators, technical staff, and field experts.
- Cardea recruited respondents through outreach to personal contacts, general recruitment through professional associations, referrals from task group members, and snowball sampling.
- The interview guide captured respondents' experiences with EHR/IIS systems to support HPV vaccination and solicited recommendations to improve delivery, documentation, tracking, and coordination of the HPV vaccine.
- Cardea staff collaboratively developed a coding schema and used QSR International's NVivo software to analyze interview transcripts.
- De-identified, verbatim quotes are included in this report to support findings.

Between May and July 2016, Cardea conducted semi-structured key informant interviews with 44 participants from 29 different agencies across the U.S. Cardea recruited medical practitioners, administrators, and technical staff who work in agencies that deliver HPV vaccines and have an EHR system in place and/or experience using IIS. Cardea's three-pronged strategy for participant recruitment involved outreach through personal contacts, general recruitment through professional associations, referrals from task group members, and snowball sampling. When possible, colleagues representing different staff roles were recruited from the same agency to further explore technical capacity and clinical experience.

In this report, the term "agency" refers to the organization, clinical practice, hospital system, pharmacy or health center with which the respondent is affiliated.

Cardea developed a semi-structured interview guide with guidance from the EHR-IIS Task Group. Interviews aimed to: 1) gather feedback about how current EHR/IIS do or do not support HPV vaccination; 2) identify and prioritize ways to modify EHR/IIS to enhance delivery, documentation, tracking, and coordination of HPV vaccination; and 3) reveal practice operation (i.e., workflow) successes and challenges with regard to how EHR systems are integrated into office practices. All interviews were conducted in English. The interview guide is included in **Appendix A**.

IntegReview, an Institutional Review Board (IRB), approved key informant interview protocols and instruments in May 2016.

INTERVIEWS

Cardea generally recruited key informants via e-mail, and interested individuals completed an online screening form on SurveyGizmo to determine eligibility and collect background information on their role, setting, population served, and EHR and IIS systems. The electronic screening form is included in **Appendix B.**

Based on responses to the screening form, Cardea invited individuals who met the eligibility criteria to participate in a 30-60 minute interview by phone. Interview participation was voluntary and confidential, and all key informants provided written consent to participate. The written consent form is included as **Appendix C**.

Interviewers took notes and audio recorded all interviews. Audio recordings were transcribed through an online transcription service, Rev.com. Cardea analyzed transcripts in QSR International's *NVivo*, version 11, using thematic content analysis to identify key themes across agencies and key informants. After analysis, Cardea destroyed the audio recordings and interview notes to protect respondent confidentiality. Cardea removed all identifying information (e.g., respondent names, agency names, EHR and IIS names) from interview transcripts and shared the de-identified versions with the EHR-IIS Task Group.

ANALYSIS AND REPORTING

To manage and analyze the qualitative data from transcripts, Cardea imported transcripts into *NVivo* for in-depth, thematic content analysis. Staff developed an *a priori* coding schema, based on the interview guide, to document how respondents currently use EHR and IIS to schedule, document, coordinate, and track HPV vaccinations. The coding schema also incorporated ideas on how to improve the functionality of EHR/IIS to help increase the number of patients vaccinated. Staff developed a hierarchical coding schema and codebook in *NVivo* after reviewing notes and transcripts to determine initial themes and sub-themes. Interviews were coded iteratively to ensure timeliness and incorporation of emerging themes.

This report describes the themes that emerged from the analysis. Verbatim quotations are included, with the respondent's role, agency type, and geographic area noted. However, Cardea removed any potentially identifying information in those quotations to protect respondent confidentiality. The report uses descriptive terms such as "most," "many," and "some" to indicate the magnitude of respondents who expressed similar opinions or experiences. As appropriate, the report text describes viewpoint differences and response patterns by respondent characteristics, including geographic region and agency type.

RESPONDENT PROFILE

Overview

- Respondents represented diverse agencies, roles, and U.S. Public Health Service Regions.
- Almost half of respondents had more than one role within their agency (i.e., medical practitioner, administrator, technical staff, or field expert).
- Respondents used 14 different types of EHRs and 20 different IIS/registry systems.
- More than 80% of respondents' identified their agency as specializing in serving low-income clients, racial and ethnic minorities, and children under age 18.

Respondents represented diverse agencies, including Federally Qualified Health Centers (FQHCs), public health immunization programs, private practices, university health centers and hospitals, pharmacies, school-based health centers (SBHCs), tribal clinics, and non-FQHC community health centers (**Table 1**). Five field experts representing a large health plan, a health center-controlled network, a pharmacy, and a large teaching hospital also participated in interviews. Field experts were administrators, EHR super users or technical staff viewed within their institutions or communities as leaders in using EHR/IIS to improve the delivery of HPV vaccination. Cardea spoke with key informants in all 10 U.S. Public Health Service Regions. The 10 respondents from FQHCs represented five different Health Service Regions across the US (e.g. Regions I, III, VI, VIII, IX). The ten respondents from public health immunization programs represented four different Health Service Regions (e.g. Regions VII, VIII, IX, X). Respondents also represented a mix of urban, suburban, and rural communities.

Table 1. Respondent profiles (N=44)*

Agency Type	#	%
FQHC	10	23
Public health immunization program	10	23
Private practice	6	14
University health center or hospital	5	11
Pharmacy	3	7
School-based health center	2	5
Tribal clinic	2	5
Community health center, non-FQHC	1	2
Field expert	5	11
Health Service Region	**#**	**%**
I	2	5
II	1	2
III	7	16
IV	8	18
V	4	9
VI	1	2
VII	2	5
VIII	5	11
IX	6	14
X	8	18
Geographic Area	**#**	**%**
Urban	28	64
Suburban	7	16
Rural	8	18
Not applicable	1	2

*Total exceeds 100% due to rounding

Respondents most commonly represented Regions IV and X, followed by Region III (**Figure 1**).

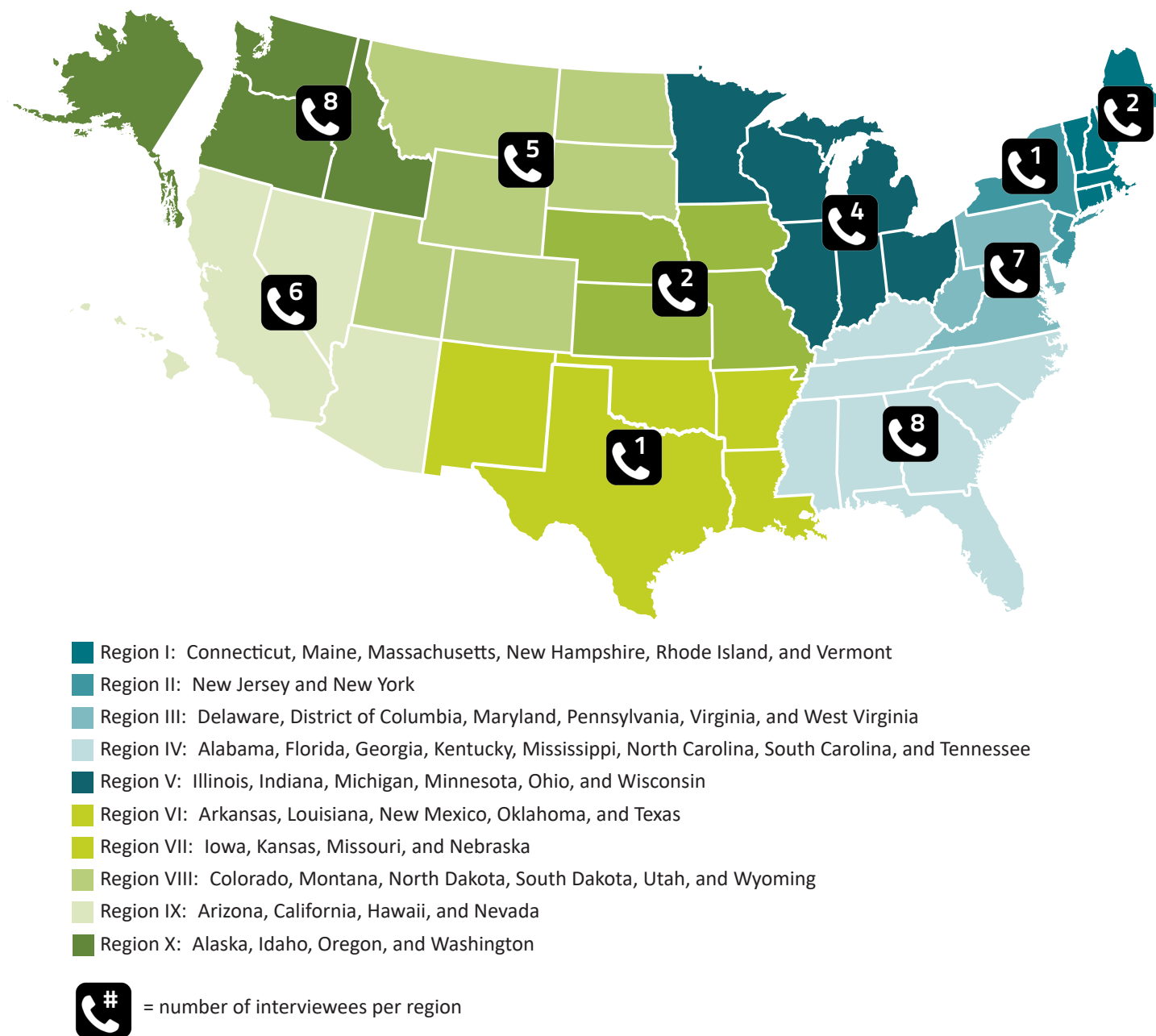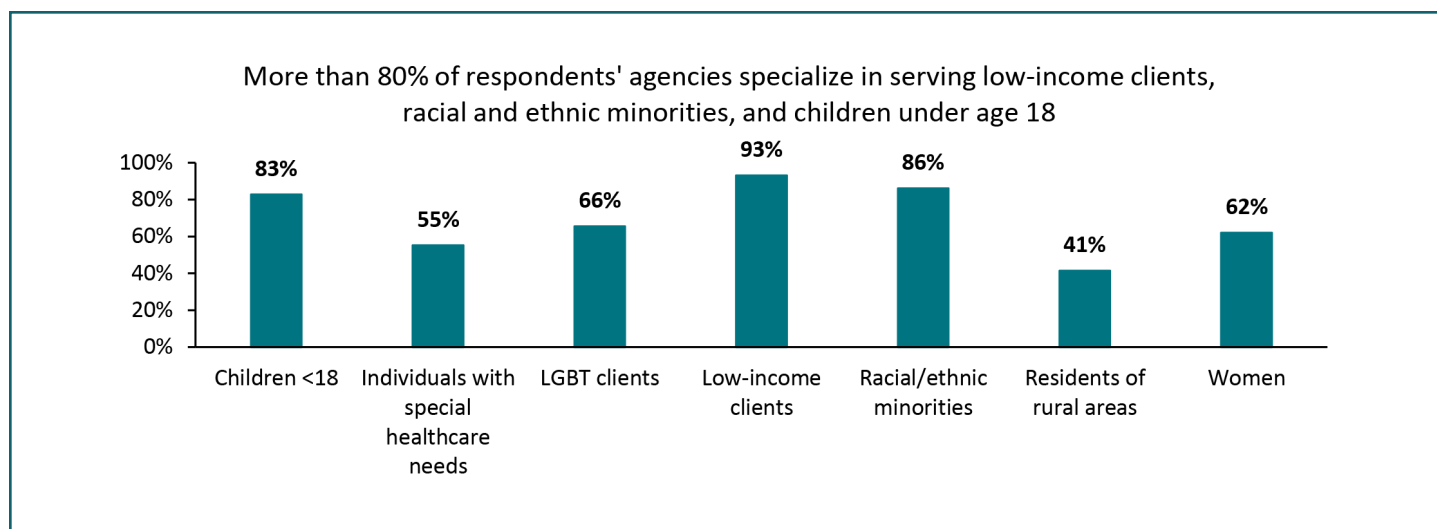**Figure 1. Phone interviews with respondents by Health Service Region (N=44)**

■ Region I: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont
■ Region II: New Jersey and New York
■ Region III: Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia
■ Region IV: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee
■ Region V: Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin
■ Region VI: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas
■ Region VII: Iowa, Kansas, Missouri, and Nebraska
■ Region VIII: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming
■ Region IX: Arizona, California, Hawaii, and Nevada
■ Region X: Alaska, Idaho, Oregon, and Washington

📞# = number of interviewees per region

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Figure 2. Patient demographics served by respondents' agencies (N=44)

More than 80% of respondents' agencies specialize in serving low-income clients, racial and ethnic minorities, and children under age 18

- Children <18: 83%
- Individuals with special healthcare needs: 55%
- LGBT clients: 66%
- Low-income clients: 93%
- Racial/ethnic minorities: 86%
- Residents of rural areas: 41%
- Women: 62%

According to the online screening form, respondents' reported that their agencies reach diverse patient populations. Ninety-three percent (93%) of respondents identified their agency as specializing in services for low-income clients, 86% in services for racial or ethnic minorities, and 83% in services for children under 18 years of age (**Figure 2**).

Respondents included medical practitioners, administrators, technical staff, and field experts (**Table 2**). Among the medical practitioners, about half of respondents were nurses, with the remaining practitioners serving as physicians, nurse practitioners, and pharmacists. Nearly half of respondents (48%) had multiple roles within their respective agency (e.g., medical practitioner and administrator).

Table 2. Professional role of respondents (N=44)*

Role	#	%
Medical practitioner	31	70
Administrator	25	58
Technical staff	6	14
Field expert	5	12

* Total exceeds 100% because respondents had multiple roles.

Respondents reported using 14 different EHR systems within their agencies, with Epic being the most common (23%) (**Table 3**). No clear patterns emerged in terms of EHR vendor usage by Health Service Region: the most common EHRs (e.g. Epic and eClinical Works) were used in Regions I, III, IV, V, VIII, and IX. Respondents also reporting using 20 unique IIS.

Table 3. EHR vendor used (N=44)*

EHR name	#	%
Epic	10	23
eClinicalWorks	7	16
AllScripts	5	11
NextGen	4	9
Insight	3	7
RPMS (IHS)	3	7
SuccessEHS	2	5
Powerchart (Cerner)	2	5
Practice Fusion	2	5
Athena	1	2
Cattails	1	2
Centricity	1	2
Other: Homegrown EHR	2	5
Other: Multiple systems	1	2

* Total exceeds 100% due to rounding.

VACCINATION COVERAGE PERFORMANCE LEVEL

Overview

- Cardea assessed agencies' HPV vaccination performance level by reviewing self-reported vaccine initiation and/or coverage rate and quality improvement (QI) strategies.
- Most agencies were considered 'moderate performers," with either low coverage (<40-50% initiation) and multiple QI strategies or moderate-to-high coverage with minimal QI efforts.
- School-based health clinics, health departments, and pharmacies tended to have lower performance levels.
- There was no relationship between performance level and EHR vendor type.

Cardea assessed each agency's HPV vaccination performance level by reviewing self-reported vaccine initiation and/or coverage rate and the types of quality improvement tools and strategies implemented in interview transcripts.

Agencies considered "low performers" had low initiation and/or coverage rates (generally less than an estimated 40-50% of eligible patients initiating the series) or did not have the capability to report on coverage rates at all. These low performing agencies also described gaps in quality improvement initiatives or strategies aimed at improving vaccination coverage. Of the seven agencies considered low performers, two were health departments, two were school-based health clinics, two were pharmacies, and one was a private practice.
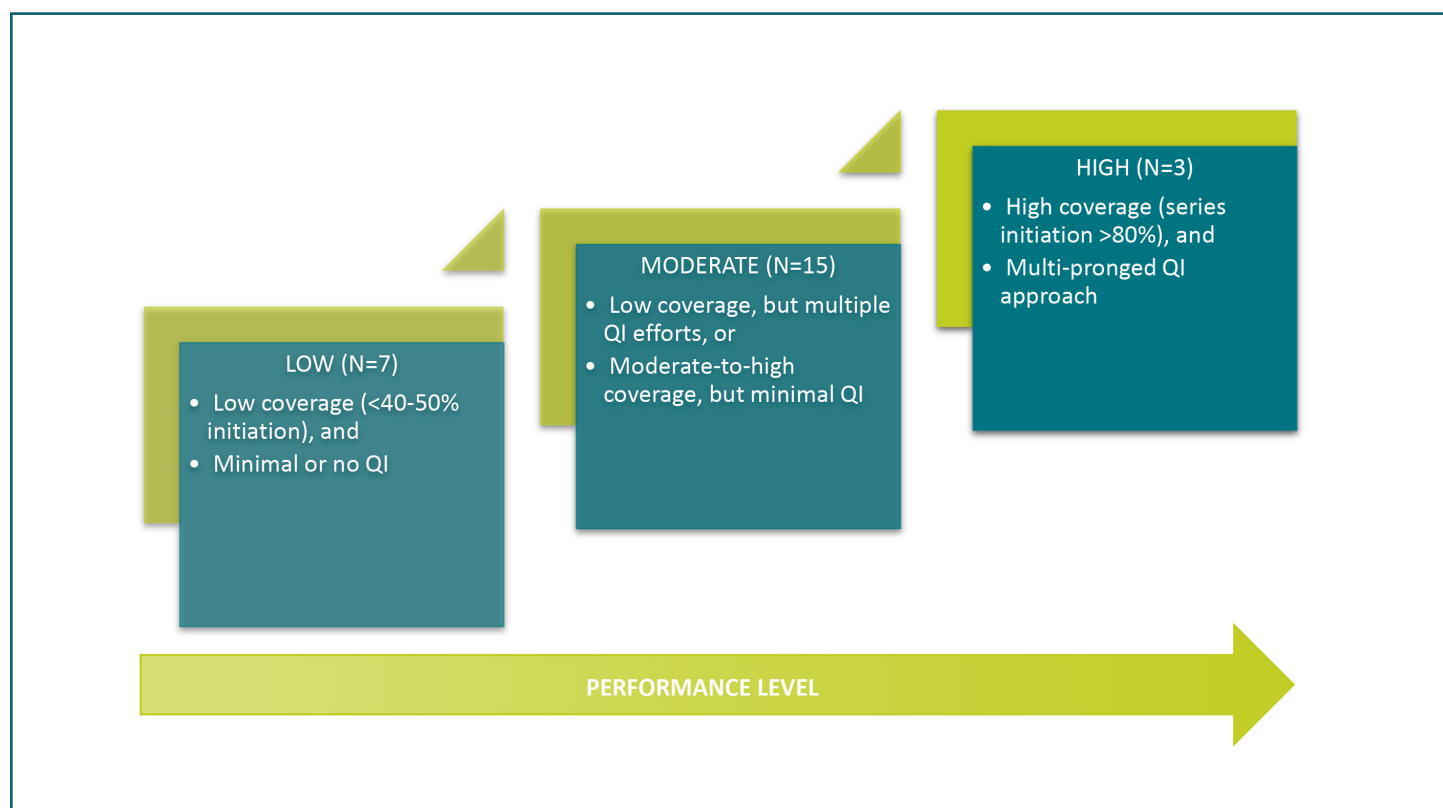
The majority of agencies interviewed, 15 in total, were considered "moderate performers." These agencies had relatively high coverage rates, but no specific strategies or processes in place aimed at monitoring or improving vaccination coverage. Alternatively, some of these moderate performers had low vaccination coverage, yet were engaged in quality improvement efforts.

Agencies that were considered "high performers" reported high vaccine initiation and coverage rates among their eligible patient population (80% or more of eligible patients received at least the first dose of HPV vaccination and greater than 50% series completion). In addition, these high performing agencies also described multi-pronged approaches to improving vaccination coverage, including but not limited to, use of EHR clinical decision tools, developing coverage reports to identify and follow-up with patients due for the vaccine, patient reminders, provider education and establishing "no missed opportunity" policies. Three agencies were considered high performers: one FQHC, one private practice, and one tribal clinic.

Four agencies were not assessed by performance level, because either the respondent represented multiple sites and/or was a topic area expert.

There was no clear relationship between EHR vendor and performance level. For example, all three performance levels were represented by the ten respondents who used Epic.

Figure 3. Vaccination coverage performance level.

LOW (N=7)
- Low coverage (<40-50% initiation), and
- Minimal or no QI

MODERATE (N=15)
- Low coverage, but multiple QI efforts, or
- Moderate-to-high coverage, but minimal QI

HIGH (N=3)
- High coverage (series initiation >80%), and
- Multi-pronged QI approach

PERFORMANCE LEVEL

FINDINGS

VACCINATION COVERAGE VARIES WIDELY, AND SERIES COMPLETION IS LOW

Overview
- Providers often initiate the HPV vaccine with patients at age 11 or 12.
- Vaccination coverage varied widely from less than 20% to 92% of patients receiving an initial vaccine.
- Reported series completion rates were considerably lower than initiation rates.
- Reported coverage was frequently higher among girls than boys and among younger adolescents.

The overwhelming majority of respondents shared that HPV vaccination is routinely offered to youth at age 11 or 12, at the time they come in for an annual visit, or when they are due for other adolescent vaccines. Most respondents acknowledged that the vaccine is available as early as age 9, but, unless a provider feels there is a particular reason to vaccinate earlier, it is typically not offered on a routine basis until age 11 or 12. While most respondents offer the HPV vaccine to patients into their early- to mid-20s, some acknowledged, "It's really hard to get those 26-year olds."

Respondents reported a wide range of vaccination coverage rates, with initiation as high as 92% of eligible patients at an urban FQHC to less than 20% at other agencies. Series completion rates were substantially lower, ranging from an estimated 75% at an urban hospital-based clinic to less than 8% at a suburban health department. Many respondents provided estimated vaccination initiation and/or completion rates and some were unable to provide updated rates.

Respondents consistently reported challenges with series completion.

> *We have a huge percentage of patients with 1 [dose] that we're having a horrible time getting back for 2 and 3.*
>
> —Provider/administrator at a suburban SBHC

While some respondents indicated that vaccine initiation and series completion are comparable for girls and boys, many reported that rates for both series initiation and completion are higher among girls than boys. Some respondents speculated that this disparity relates to the earlier introduction of the vaccine to females. Others reflected that, in general, they see girls more frequently in the clinics, contributing to better coverage among girls.

> *"The boys are definitely worse than the girls, for sure. I think there's like a 20- point gap in the coverage rate of boys versus girls. I'm thinking that the coverage there is mostly for girls because we've been at it longer and they come in more frequently too."*
>
> —Provider/technical staff at an urban hospital-based clinic

> *"I honestly don't think a lot of parents take their children in for adolescent visits, like annual visits, as much as you do when they're smaller. Unless they're planning a sports physical where they have to go get a physical, they may or may not take them in as much."*
>
> —Administrator at a state public health department

Many respondents reported that younger patients are also more likely to complete the series. However, two observed that older patients, particularly women over 18, were more likely to return to the clinic and complete the series because they could more easily avoid parental consent issues.

Respondents identified a wide range of patient characteristics associated with vaccination coverage (e.g., urban patients, women over 18, patients with private insurance, LGBT youth); however, there was little consistency in characteristics identified.

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EHRs AND IIS POSE CHALLENGES TO MAINTAINING COMPLETE AND ACCURATE VACCINATION HISTORIES

Overview

- Most EHRs have structured fields for each dose in the HPV vaccination series.
- Most EHRs have a unidirectional interface to upload vaccination history into state IISs; few offer bidirectional communication (interoperability).
- Often agencies check their IIS for vaccination histories or rely on patient report; however, there are concerns about the accuracy and completeness of both approaches.
- For visits denoted "confidential" in the EHR, the vaccination record usually carries over to the IIS, although this was not regarded as a common concern.

Most respondents described using structured fields within their EHR and IIS to collect and update patients' vaccination history and the number of doses received. The majority reported unidirectional communication between their EHR and state registry, whereby a patient's immunization history is uploaded from the EHR to the state registry, but a patient's vaccination history cannot be downloaded from the registry into the agency's EHR. For some EHR systems, the upload is automatic. For others, it requires a staff member to manually submit the upload. In most cases, the upload is not instantaneous, and there is a delay between when the vaccination data is sent and when it is visible in the registry. Although most agencies, limited by unidirectional communication, are not able to load vaccination histories from the registry directly into their EHR, most do have access to the registry data and may review it prior to a visit. Respondents also may simply rely on patient report of their vaccination status.

> " The way that we would get [vaccination history] is…we have direct access to the registry, so we look at the registry and print out the records. That's how we can see if somebody received the vaccines elsewhere that were entered into the registry. Otherwise, we just rely on patients bringing in their medical records. "
>
> —Provider/administrator at an urban FQHC

Bidirectional communication, or interoperability, between EHR and IIS occurs in only a couple of the agencies highlighted in this report, although several respondents indicated that a bidirectional interface may be forthcoming. A few agencies reported no electronic communication or interface between EHR and IIS to share or update vaccine history. In one health center, bidirectional communication was possible in the past year, only after a third-party vendor developed an interface called ImmsLink to allow two-way data sharing and communication.

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> *A vendor… created that interface that would allow us to observe the [registry] data. There was a piece of software that needed to be developed and then tested… The practices were engaged in the testing to confirm that it was working the way that they want it to. So it required development.*
>
> —Technical staff at an urban community health center

When asked whether HPV vaccination could be marked as confidential within their EHR and that demarcation carried over to the IIS, respondents most commonly shared that the patient *visit* could be marked as confidential in the EHR. However, most reported that the HPV vaccination alone could not be marked as confidential and, upon upload confidential vaccines are still visible to others in the IIS. There was a fair amount of uncertainty about this process among a number of respondents, with several reporting, as one respondent said, "I don't think it's something that's really come up."

DIVERSE CLINICAL DECISION SUPPORTS EXIST BUT THEY ARE NOT UNIVERSALLY AVAILABLE

Overview

- Most respondents reported clinical decision supports to notify providers when patients are due for the HPV vaccine, but the structure and utility of these tools varied widely.
- Several agencies lacked any formal practice for tracking vaccine administration and/or progress toward series completion.
- Even if clinical decision tools are available through the EHR, providers may need to manually activate those features.

During interviews, respondents described supportive tools or processes that they use within their agencies to help remind providers when patients are due for HPV vaccination. Several respondents—including those from school-based health clinics and several from public health immunization programs—shared that their agencies do not have any formal practices in place to track patients' vaccination histories or remind providers when patients are due for an HPV vaccine.

Most providers shared that their EHRs include clinical support tools to remind them when patients are due for an HPV vaccine, as well as other recommended vaccinations. Respondents most commonly described pop-ups or other alerts that appear in the patient's record and are reviewed during visits, sometimes termed a "best practice alert" or "health maintenance alert."

> " *Our system looks at each patient when they're checked in for the day... [and] our system updates regularly what a patient's requirements might need to be, in this case for HPV, but we do the same thing for MMR, Tdap, IPV, pneumococcal vaccine. Our system looks to see if they're of the right age, if they had it, and if not, our 'decision aid' alerts the provider that an immunization is needed. For instance, yesterday, I saw a 17-year-old, and the system told me he needed his meningococcal and the next HPV vaccine, so they were given. He was in for an acne follow-up. He got his two immunizations updated.* "
>
> —Provider at an urban FQHC

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Reminder locations vary from patient dashboards to pop-up boxes and notices within specific EHR modules. Formats are also diverse, from highly visible "giant yellow boxes that take up most of the screen," to reminders that are far less visible or prominent. A few respondents described how their EHR pre-populates HPV vaccination orders, if patients are due:

> *Every time a well visit… [has] begun*
> *and someone opens up an order set*
> *for all the orders in that visit,*
> *vaccines that are due automatically go into that*
> *order set and are pre-populated there,*
> *just to kind of default it.*
> *That's the primary system.*

—Provider at an urban hospital-based clinic

Some respondents noted that while EHR alerts or settings are available, individual providers may need to personally apply the particular setting or adopt a pre-formatted template.

AGENCIES HAVE IMPLEMENTED MANY STRATEGIES TO IMPROVE VACCINATION RATES

Overview

- Respondents highlighted four common strategies to improve vaccination rates, often applied in combination.
- Federal and local grants, as well as research partnerships, can facilitate opportunities to implement quality improvement initiatives.

Respondents discussed four common strategies to improve HPV vaccination rates: 1) using data for quality improvement, 2) educating providers, 3) using patient recalls and reminders, and 4) implementing patient education. Frequently, they reported that these strategies are employed simultaneously as a multi-pronged approach. Often quality improvement initiatives were implemented as part of a federal or local grant or through a research partnership. A few participants shared that their agencies had not undertaken any quality improvement efforts or strategic attempts to improve vaccination coverage.

Using data for quality improvement

Most respondents reported that their agencies are able to generate HPV vaccine coverage rate reports for their patient population, either from their EHR or state registry. A couple of respondents utilize CDC's Comprehensive Clinic Assessment Software Application (CoCASA) to generate these reports. Among agencies generating vaccination coverage reports, these reports are generated on a monthly, quarterly, or annual basis. A few agencies reported having less systematic schedules for running reports and only reviewed reports as needed. Respondents described diverse uses of coverage reports. Several agencies share reports regularly at staff meetings or develop tools like provider report cards. A few reported setting clinic and provider benchmarks and using coverage data to monitor those benchmarks. Sample reports are included in **Appendix D**.

> *We actually have that NACCHO [National Association of County and City Health Officials] grant now for HPV vaccinations... one of our five strategic priority areas is to do a QI through data analysis. [We will] analyze and maintain current data and trends and analyze specific clinic rates for HPV vaccination. We're planning to pull information from the state registry system every quarter by sex and age to monitor group progress. Then, we're hoping to use that to increase completion rates by 20%.*
>
> —Provider at public health department

Educating providers

Respondents commonly described professional development and training opportunities for providers as a key approach to improving vaccination rates. Opportunities included webinars, "lunch and learns," team meetings, presentations from pharmaceutical representatives, continuing education, staff huddles, and professional conferences. Respondents reported that a particular focus for many provider trainings has been standardizing language and discourse used when providers offer the vaccine, emphasizing that providers make strong recommendations that *all* patients receive the HPV vaccine.

> *We did an initial email to every provider that saw adolescents… and then we went in person to the clinics that have the lower series completion rates… We were talking to the providers, the nurses, the medical assistants and just gave them some background on HPV… where they as a clinic stood, what their numbers were and talked about refusals, talked about best practices including things such as the strong provider recommendation… that we are to give HPV the same weight as Tdap and MCV4… We give all three the same weight.*
>
> —Provider/administrator from an urban FQHC

Using patient recalls and reminders

Respondents at most of the high and moderate performing agencies generate reports from their EHRs or registries to identify patients who are due for an HPV vaccine and systematically contact those patients to schedule them for either initial or follow-up doses.

> *[The] pharmacy documentation system… would bring up the patient's name and contact information when there were a few days prior to when they needed their next injection, and it would either cause a fax, an email, a text, or a postcard to be printed out that would be sent… as a reminder. The pharmacies that used that system had great success.*
>
> —Pharmacist/field expert in rural setting

In addition to formalized recall processes, many agencies detailed other processes to systematically remind patients to return for their second and third doses. They commonly reported using tools and materials provided by the vaccine manufacturer (e.g., refrigerator magnets, stickers, appointment reminder cards that indicate when patients are due for the follow-up doses). A few agencies reported success with their patients opting-in to receive text messages from pharmaceutical companies to remind them to return to their providers for second and third doses.

> *Something newer that I think will be utilized more is the text messaging service that [the pharmaceutical company] provides so that you can text that four- or five-digit code from your phone and then it'll send you six reminders total. One, when it's time to get your second dose… 'Did you get your second dose?'*
>
> —Administrator at an urban health department

Implementing patient education

Some respondents described patient and family outreach and education efforts to improve HPV vaccination. While some reported little or no resistance from patients' families (parents, in particular) to the HPV vaccine, several other providers indicated that this resistance is a very real challenge to vaccine uptake. Patient and family education is described as one approach to increase uptake:

> *We worked a lot on our persuasion talk because we found a lot of families don't want the HPV because it's either connected to sex or they don't want to think about it, it's new, etc. At age 11, they need all of their other adolescent vaccines, and so we use persuasion techniques that we've all learned to give them all three of those vaccines.*
>
> —Provider/field expert at a large health plan

SEVERAL FACTORS FACILITATE VACCINE INITIATION AND SERIES COMPLETION

Overview

- Workplace teams and "no missed opportunity" strategies are critical to success.
- Communication with external agencies using the same EHR enables better vaccination history capture.
- Dedicated IT support can be helpful, but is often cost-prohibitive.
- Easy-to-use, built-in features (e.g. alerts and forecasting) help clinicians monitor patient progression toward series completion.

When asked to reflect on aspects of their EHR and IIS systems, policies, and practices that facilitate vaccinate initiation and series completion, several respondents simply stated that having an EHR in place was "better than paper" and that having access to electronic record systems saved them time and decreased confusion.

You can easily identify when an immunization is needed as opposed to looking over a handwritten immunization card, which they are just sometimes a mess. It's just being electronic. It's clear. It's concise. It's easy to read. It's rapid and then the decision aid makes it very efficient for us.

—Provider at an urban FQHC

Overwhelmingly, respondents mentioned the value of working in teams to vaccinate and educate patients. Whether teamwork involved chart reviews by medical assistants, vaccine administration by nurses, or staff training around consistent messaging about the importance of the HPV vaccine at multiple points throughout encounters, they attributed efficiency, decreased rates of refusal, and increased vaccination rates to this team approach.

Our providers have had training to speak with patients. We have our health promotions team that can also help to speak with patients and talk to them about HPV. I think that as an organization we're pretty comfortable with that and our patients are pretty comfortable with the vaccine.

—Provider/administrator at an urban FQHC

We do also offer a nurse visit, which, if a patient comes in for an HPV [vaccine], they can come back for their second one on a nurse visit. They don't have to see the doctor. They see a nurse or medical assistant, and we encourage them to schedule that before they leave the office. So, they get their second one and they can come back for the third on their next well-check visit.

—Provider at a suburban private practice

Respondents across multiple settings also frequently mentioned the "no missed opportunity" strategy as a mechanism to vaccinate more youth. By capturing youth when they come to the doctor's office for unrelated services, like a sprained ankle or sports physical, providers are able to administer the next dose in the series.

> " *I can't reiterate enough that a 'no missed opportunity' is the reason we are so successful, and we've tried lots of things. But, the only thing that generally improves our rate is that, regardless of why [the] patient is here, if they're well enough to receive it, we offer the vaccine.* "
>
> —Provider/administrator at an urban hospital

> " *I really think the nurses, in general, vaccinate at every opportunity, so I don't have to track kids down as much because they're getting the vaccines when they're due to get them.* "
>
> —Provider/administrator at a tribal clinic

Large health care systems and hospitals highlighted the value of being able to access data from satellite sites and external agencies using the same EHR vendor. Respondents credited this cross-system access with saving time and making it easier to understand where a patient was in their progression toward series completion, because providers were able to verify patient vaccination histories and, even update patient records, without having to interface with the state IIS.

> " *The other thing we do have with [our EHR system] now is this thing called Care Everywhere where you can easily look into any other [EHR record that is using the same system]. So, if a patient was seen at the Hospital… I can actually see the patient's full immunization records, [system to system]. I can even bring in their full immunization record from the Hospital and add it to my record… it's pretty easy to pull in external data, so I have done that a few times.* "
>
> —Provider/technical expert at an urban hospital

A few respondents from urban FQHCs, hospitals, and health departments, credited their IT support with being able to take full advantage of the features within their EHR, while acknowledging that this same asset can be a barrier to smaller practices that do not have the budget for dedicated IT staff.

About one-third of respondents reported their robust EHR as a strength for increasing patient vaccination. Often, they described a system with built-in features for detecting when a patient was due for a vaccine and accurately forecasting the dates of follow up doses, when talking about the ways in which the EHR served as a facilitator. Respondents also credited the patient reminder tools within their EHRs as essential components for success.

> " *For example, that version of [EHR] allowed both vaccine counts and vaccine spacing and patient age to be taken into account. You do not have to sit in the med room looking at that chart from the CDC, running your finger down it to decide if it was two days too early or not to be giving the HPV vaccine.* "
>
> —Provider/administrator at an urban FQHC

DIVERSE CHALLENGES INCLUDING DATA SYSTEMS, POLICIES, AND COMMUNITY ATTITUDES IMPEDE HPV VACCINE INITIATION AND SERIES COMPLETION

Overview

- EHRs with limited features make it challenging to identify patients eligible for vaccination and produce meaningful reports.
- IIS errors and limited IIS and EHR communication necessitates additional record updates and verification.
- Vaccine cost is a barrier for patients with high deductibles and those over age 18.
- Providers perceive that parental vaccine hesitancy and community associations between the vaccine and promiscuity prevent young people from initiating the series.

Numerous factors impede HPV vaccine initiation and series completion. Respondents identified a mix of challenges to HPV vaccination related to data systems and training, policies and programs that impact access and affordability, and community attitudes that lead to vaccine hesitancy.

Data systems and training

Several respondents discussed challenges with the sophistication of their EHR and IIS systems, including no/limited ability to produce detailed coverage rate reports, integrate provider alerts and forecasting software, and develop communication mechanisms between EHR systems and patients.

> "Neither [system] really alarms or alerts or notifies [me] that, hey, this vaccine is due. You know? When I log into either your [IIS] account or your [EHR] patient chart here, there's nothing to indicate that as a reminder, 'Oh, don't forget. This patient is due for HPV today.' Or any other vaccine today. There are none of those reminders. That would be nice to have in either system."
>
> —Provider/administrator at a suburban public health department

Most respondents mentioned a wide range of challenges with their state immunization registry. For some, IIS lag times and the absence of reporting mandates for all providers to upload their immunizations fostered concern about the accuracy of the IIS.

> *Not every healthcare organization enters information into [IIS]. We have, quite often, a new patient and we look up [IIS] and there is nothing in there, so it's not 100%.*
>
> —Provider/expert at an urban private practice

> *If other providers are not using that registry system, I don't always have accurate data. It gives me a snapshot, but it's not going to be 100% because the system is not a required system. Providers don't have to put vaccinations into the state registry system.*
>
> —Provider at an urban public health department

Others cited concerns that their IIS produced incorrect coverage rate information (i.e., denominators do not reflect accurate number of active patients) and complicated efforts to match patient records from IIS to EHR. Widespread challenges included the inability at present time for the IIS to communicate bidirectionally with EHRs and to access out-of-state immunization registries.

> *A lot of it is just a technical thing where the systems: a) don't talk to each other, b) they don't have ownership, c) it's proprietary, and my frustration is, at the end of the day, it should be about the patients.*
>
> —Provider/administrator at an urban FQHC

Several respondents explained that the degree of effort required to become proficient in their EHR and IIS was a barrier to using those systems as tools for initiating and completing the HPV vaccination series. They viewed managing alerts and running reports as too labor intensive and time-consuming for the tools to be well-integrated into their practice.

> *Some limitations with our electronic health record is just getting data out of it. It requires queries be written to get reports out. It's easy to get number of HPV vaccines given, but it doesn't really help us with are those first, second or third doses of HPV. It just gives us a number of HPV doses. We can get out of it, dose number 1, 2, and 3, but it takes a little bit of work with our informatics team to get that data.*
>
> —Provider/administrator at an urban public health department

> *You can do pop-ups, but what we've found is, if you decide to do a pop-up, it pops up at every single screen, so it becomes more of a hindrance and annoyance that you click it out every single time… You're more concentrating on getting rid of the notification than you are of actually doing it.*
>
> —Provider/administrator at an urban public health department

Policies and programs that impact access and affordability

In addition to barriers presented by data systems, respondents often cited financial and cultural challenges to vaccination. For example, several respondents explained that the HPV vaccine is expensive and that the Vaccines for Children Program (VFC) limits coverage to youth 18 and younger, making it difficult to provide the vaccine to older youth and young adults who require financial assistance. Despite assistance programs through the manufacturer, some respondents indicated that those approval processes were cumbersome, particularly for walk-in appointments.

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A few providers from health departments and SBHCs also discussed negative impacts of the Affordable Care Act on their ability to provide vaccinations because of patient cost-sharing and the hindrance of negotiating multiple contracts with private insurers. As a result, these providers faced the prospect of budget deficits or patients declining services because the vaccine was not affordable.

> *The Affordable Care Act is wonderful, and I love it, and I'm a supporter… however, we now have a plethora of patients with Bronze plans with $5,000 deductibles or pay-downs... who are insured now, and they are no longer eligible for patient assistance programs.*
>
> —Provider/administrator at a suburban SBHC

Community attitudes

Respondents frequently stressed perceived vaccine hesitancy as a barrier to initiation of the HPV vaccine. Many respondents discussed their perceptions of parental associations between the vaccine and sex, leading to concerns that vaccination would lead to "promiscuity" thus preventing vaccine initiation.

> *Some parents are just vaccine hesitant and then some, frankly, flatly refuse because they're suspicious. That remains a challenge, and it's more challenging with HPV and flu vaccine than it is with anything else.*
>
> —Provider/administrator at a suburban SBHC

> *They wanted the whole clinic to be working on HPV and that didn't end up happening because people said, 'That's tied into people's personal beliefs and I'm not going to be able to have any real influence on that.' That is really true, that's what I'm finding… People just don't see that their child needs to receive a vaccine for something that is sexually spread in the future.*
>
> —Provider at a rural private practice

Providers perceived that these concerns about the HPV vaccine were more common among parents of girls than boys. A few respondents also noted the number of doses as a barrier because young people do not like the idea of receiving three shots, particularly if they are already due for other routine immunizations.

> *Just in practice, I feel that from the boys that I see who are getting the Gardasil, it hasn't been such a big deal, but the girls' parents just tend to be more nervous about it, have more questions, or bring up more of the news articles and things they're seeing on TV or heard from other people.*
>
> —Provider at a suburban private practice

For a small number of respondents, challenges with state registries or EHR systems were burdensome to the point where providers relied on patient self-report or paper vaccination records to determine whether or not to vaccinate.

> *A lot of the providers don't have the time to look up the IIS record, so they will just vaccinate based on their vaccine record only.*
>
> —Provider at an urban SBHC

PROFESSIONALS SUGGEST PROVIDER TRAINING, REMINDER SYSTEMS, STREAMLINED WORKFLOW, AND DATA MONITORING TO IMPROVE VACCINATION COVERAGE

Overview

Respondents discussed several ways to improve vaccination rates:

- Standardize provider language around vaccine promotion
- Institute better patient reminder systems
- Streamline workflow and increase flexibility for providers and patients
- Engage providers in quality improvement efforts through report cards

Most respondents believed that clinical systems improvements, rather than technology, were key to increasing vaccination rates. Several emphasized that standardizing provider language around vaccine promotion could support vaccine acceptance. For example, providers identified reframing the vaccine within the context of cancer prevention versus sex as a helpful strategy. Additionally, respondents suggested that staff could improve patient uptake by recommending it as strongly as they do other vaccines. A couple believed that health care providers should also take messages about the importance of HPV vaccines beyond the clinical setting and reach young people and their parents in schools, social media, and other venues.

> *I guess the other thing is just trying to focus on why we give the HPV [vaccine]. We're protecting for the future, because people are still really, 'I don't want to discuss this because we're talking about something that is sexually transmitted,' and parents of 11 year olds don't want to hear that. We're focusing on the, 'When your child becomes sexually active, they're going to be exposed. We want to protect them before... stressing that before,' and so I guess more emphasis on that... less that it's sexually transmitted and more that this is like the common cold. If you could protect your child from ever getting the cold again, wouldn't you do it?... Would you protect your child from cervical cancer for 40 years down the road if you could?*

—Provider/administrator at a rural tribal clinic

> *Maybe instead of just me being the front line of getting the vaccine information across, having more staff trained in the importance of it so that they're hearing it from multiple medical professionals. So, there's been some experiences— they were probably more at the beginning of my career here—where I would try to tell my staff, instead of saying 'We're due for tetanus, meningitis, and did you also want the Gardasil?' You know, making it into a separate vaccine sounds scarier. It sounds like they're making a different decision now. So, I think just, in general, training, and I think we're getting better at that part, too.*

—Provider at a suburban private practice

Respondents commonly suggested improved patient reminder systems to improve series completion. Specifically, some envisioned that patient navigators could call and remind patients to return to the clinic for second and third doses. Others envisioned a two-tiered approach in which EHR system alerts would both notify providers and automatically e-mail, text, or a send a postcard to patients when they were due for another dose.

> *Probably another way to do it—I don't think we're doing this—is a reminder phone call before they're due: 'You're due for your HPV number two this week or next week.' A reminder phone call… it would just require a staff member to have the time to do that, basically.*

—Provider at a suburban private practice

> *Finding some way to identify a person to actually do some outreach to pull people in who are overdue or due, like a navigator or an administrative person making phone calls to bring people in.*

—Provider/technical expert at an urban hospital

When respondents described workflow changes, they primarily focused on standing orders and walk-in appointments. They asserted that expanding use of standing orders to providers other than just physicians would streamline clinic flows and save the patient time. Respondents also expressed that allowing walk-in appointments would offer greater flexibility to patients and be more patient-centered.

> *If a patient walks in and having their 2nd or 3rd dose, versus having an appointment on the schedule, I think that would be really helpful. And, I think that's why our Depo [Provera] rates are so high because they don't have to make an appointment. They can just walk in whenever they want.*

—Administrator/technical staff at an urban FQHC

Some respondents suggested provider or clinic report cards to help staff monitor vaccine initiation and series completion rates. A few argued that disseminating this information would motivate staff, especially providers who are below the agency's average vaccination rate. One respondent proposed an incentive system linking provider salaries to improvements in vaccination rates or benchmarks – a common practice at the respondent's agency for other required vaccines. Recognizing the technological hurdles at play, a few respondents noted that systems improvements would require a large IT commitment.

THE ROUNDTABLE CAN SUPPORT HPV VACCINE COVERAGE THROUGH ENGAGEMENT WITH VENDORS AND STATES, PROVIDER AND COMMUNITY EDUCATION CAMPAIGNS, AND ADDRESSING BARRIERS TO ACCESS

Overview

Respondents recommended several approaches for the Roundtable to advance vaccination coverage.

- Discuss systems improvements with EHR vendors and state IIS
- Organize professional development opportunities for providers to learn best practices for promoting vaccine uptake
- Launch public awareness campaigns
- Address cost and reimbursement barriers for HPV vaccine

When discussing how the Roundtable could provide support to their agency to improve vaccine initiation and completion, respondents overwhelmingly expressed a need for the Roundtable to work with EHR vendors and state governments to enable bidirectional communication and other improvements. They noted that bidirectional systems, improved vaccination templates, and more accessible EHR modules would simplify monitoring, removing the onus of designing supportive EHR mechanisms from the agency itself.

> *I think that it would be wonderful if up-flow and down-flow from the registry were seamless. We're headed in that direction. Some places that happens, but we're not quite there yet.*
>
> —Provider/expert at an urban hospital

> *The IIS system…it's great that we're required to upload it, but it would be better if it could communicate with our EMR, as well, and automatically download it into the immunization section, because that would prevent a lot of additional doses that are not medically necessary, or it's too soon in the series.*
>
> —Provider at an urban SBHC

Several respondents mentioned that the Roundtable could contribute to positive changes in vaccination rates through provider education. For some, provider education entailed online continuing education courses that would enable those in rural areas and in smaller practices to stay current on key messaging strategies and encouraging uptake through bundling the HPV vaccine with other adolescent immunizations. A few others expressed that sponsored learning collaboratives for practices with the same or similar EHRs would provide a forum to exchange strategies and ideas for improvements like patient and provider reminder systems.

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> *Well I think that continuing education modules are important and making them as accessible as possible is important. You could see lectures, then, about HPV online… So either supporting that or producing that. That would be great! It is a way to reach rural people and people in smaller practices.*
>
> —Provider/administrator at an urban hospital

> *I think, learning collaboratives are hugely helpful with health care providers making the recommendations that HPV is important and needs to be provided.*
>
> —Provider/administrator at an urban public health department

Respondents emphasized that the Roundtable could help improve HPV vaccination rates by strengthening public awareness campaigns aimed at changing social norms around the significance of the HPV vaccine. For example, they were encouraging of ACS campaigns focused on cancer prevention, without connecting it to sex. A few suggested that a campaign like that could be done in partnership with manufacturers. Respondents also urged the Roundtable to engage youth through social media outlets, and one recommended a reminder app for smartphones and other devices that would notify patients when they are due for follow-up doses.

A few respondents suggested that the Roundtable explore opportunities to reduce out-of-pocket expenditures for individuals who may not be eligible to receive the vaccine through the VFC program. In particular, young adults between the ages of 19 and 26 who do not qualify for VFC face increased barriers due to cost. Some respondents were eager to see opportunities to increase access among this population.

Others expressed that it would be helpful to create an interstate or national vaccine registry to alleviate some of the challenges of tracking patients as they move across state lines. Respondents also supported increased efforts to promote the national benchmark for HPV vaccination.

> *Advocate for a national immunization database, because it is a problem when we get a lot of people moving from other states here and they either lost their record or they're trying to spend months getting it from a provider that they no longer see in their prior state. It's a mess. Instead of having every state have their own immunization record, if we had a national one where everyone was putting in all of this, it would be able to solve that huge problem.*
>
> —Provider/administrator at an urban public health department

> *That's such a huge problem, especially state to state…Not just the EHRs, the state immunization [registries], they don't talk to each other right now… I just think that more advocacy on that front would always be nice… to be able to have either the systems talk to each other, or have some sort of provider access so you can get on, and get a national registry.*
>
> —Provider at an urban community pharmacy

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RECOMMENDATIONS

Based on the findings from in-depth, key informant interviews with medical practitioners, administrators, technical staff, and field experts, the following are recommendations to improve HPV vaccination coverage nationwide. These recommendations relate to changes in data systems, agency and provider practices, and systemic policies and community attitudes.

DATA SYSTEMS CHANGE

Encourage vendors to improve EHR usability

EHRs should be activated to the fullest extent possible to facilitate bidirectional interface with IIS. Providers should be able to easily download patients' IIS vaccination histories into their EHR vaccination histories and vice versa. Costs for transforming systems to enable interoperability can be high; efforts should explore ways to streamline those costs.

EHRs should be equipped with clinical decision aids (e.g., pop-up boxes, highlighted fields) to notify providers when patients are due for initial or follow-up HPV vaccine doses. Ideally, decision aids:

- **Include forecasting features** that automatically compute and clearly describe when a patient will be due for a follow-up dose
- **Integrate with other immunization and health promotion service reminders**
- **Default to an active setting** within EHR, rather than requiring providers to independently activate such decision aids in their EHRs

By default, **EHRs should generate accurate and useful coverage reports** to monitor vaccine uptake and series completion and to assist agencies with quality improvement.

Ideally, coverage reports:

- Feature **clinic- and provider-level** vaccination coverage
- **Allow comparison** across patient demographic characteristics
- Support provider **dashboards** that display coverage for their patient panels

EHRs should include standardized templates and modules to track vaccination histories and monitor coverage by default to avoid the need for agencies to customize and develop their own tools and templates.

Support bidirectional, universal, real-time, and interstate IIS

State IIS should bidirectionally interface with EHRs to coordinate care for patients who receive services at multiple sites, particularly those in urban and suburban areas. Funding at the state and federal levels to support the technology infrastructure is critical to achieve bidirectional communication between EHR and IIS systems.

State IIS should strongly encourage that all providers report HPV vaccinations to achieve complete and accurate registry data.

Stakeholders should work toward real-time IIS data updates to allow immediate access to patient vaccination history information.

Stakeholders should explore opportunities to support interstate data exchange via a hub or national registry, or otherwise allow for inter-IIS coordination because patients often move or cross state lines to receive care.

AGENCY AND PROVIDER PRACTICE CHANGE

Promote prioritization of vaccination coverage

Stakeholders should promote vaccination coverage as a priority among clinic leaders. When HPV vaccination is not identified as a leadership priority, agencies seldom pursue quality improvement efforts to expand coverage. Leadership can:

- **Implement multi-pronged quality improvement strategies,** incorporating many of the activities described in this report.
- **Seek funding and partnership opportunities to support and enhance quality improvement efforts**. Government agency grants and research projects can provide opportunities to implement new quality improvement projects. The Roundtable could support the identification of such opportunities.
- **Integrate sufficient IT staff** into their clinical settings to further meaningful use of EHR features.

Advance quality improvement strategies in clinical settings

Agencies should consider:

- Establishing **clinic and provider benchmarks** for vaccine initiation and series completion
- **Monitoring disaggregated coverage rates through** EHR or IIS reports by site and provider
- Generating **routine reports of patients due for initial and follow-up vaccination**

The Roundtable may consider **disseminating information on best practices** for strategies to improve HPV vaccination coverage in clinical settings.

Encourage adoption of diverse communication strategies in clinical settings

Agencies should consider:

- Launching **patient reminder protocols** for scheduling initial and/or follow-up doses
- Using **more accessible communication methods** to contact families and young people (i.e., text messages, emails, phone calls and/or postcards)
- **Leveraging existing resources or tools from pharmaceutical companies**, like text message reminder systems

Support new strategies and streamlined workflow in clinical settings

Agencies should consider:

- Adopting a **"no missed opportunity" approach** to ensure that patients receive the vaccine regardless of their primary reason for a visit
- **Implementing standing orders** so nurses or medical assistants may administer follow-up doses
- **Establishing walk-in appointments for follow-up doses** to encourage series completion

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Increase provider and staff understanding of how to improve vaccination coverage

Accessible professional development opportunities related to:

- **Motivational interviewing** to help providers communicate with families and young adults who are vaccine hesitant
- **Stronger recommendations** for the HPV vaccine, aligning with communication around other important vaccines
- **Team-based approaches** to achieving higher vaccination coverage rates, emphasizing the role of each care team member
- **EHR and IIS capabilities** to generate reports, customize templates, and incorporate decision aids and dashboards

SYSTEMIC POLICIES AND COMMUNITY ATTITUDE CHANGE

Explore opportunities for improved access to the HPV vaccine

Patients should have access to the HPV vaccine without cost sharing. Access is still an issue for some patients, due to the high cost of vaccination, particularly those individuals not eligible for VFC.

Continue efforts to reframe the HPV vaccine through innovative marketing and patient education

Support the continuation of marketing campaigns that increase public awareness of the benefits of the HPV vaccine.

Reinforce efforts to "desexualize" language around the HPV vaccine, and shift the focus to cancer prevention.

Convene EHR vendors and IIS vendors and administrators to enhance data systems coordination

The Roundtable should consider:

- **Facilitating conversations among prominent EHR vendors and IIS vendors and administrators** to bolster their coordination.
- **Developing functional standards for EHR vaccination records** and a roadmap for enhancing data systems interoperability through synthesis of stakeholder input.

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APPENDICES

Appendix A. Interview Guide

Appendix B. Electronic Screening Form

Appendix C. Consent Form

Appendix D. Sample Reports

- **Sample HPV Vaccination Report Card**

- **Sample Adolescent Benchmark Report**

APPENDIX A. INTERVIEW GUIDE

Introduction

The goal of this project is to better understand how healthcare providers use their Electronic Health Records (EHR) and Immunization Information Systems (IIS) to support HPV vaccination. I work for Cardea Services, a non-profit organization that provides research and program evaluation services to health and human service agencies. We are contracted with the American Cancer Society to conduct interviews with administrators, clinicians, and technical staff working for healthcare providers across the United States.

The information collected during these interviews will be used to prepare a report for the American Cancer Society about how providers are currently using EHR/IIS systems to support HPV vaccination. The report will also describe what additional support for providers or modifications to EHR/IIS systems may help to improve uptake of HPV vaccination.

This interview will last about 30-60 minutes. Participation in this interview is completely voluntary and confidential. You may choose not to answer any question at any time.

To ensure that we are able to capture accurate and complete responses, we would like to record this interview. We are using a transcription service, Rev.com, to create transcripts of the interviews. The transcripts will be reviewed by Cardea evaluation staff. Recordings will be destroyed after the data are analyzed and summary reports completed. Your name and any identifying information will be removed from any reports or transcripts provided to ACS.

If you do not want the interview recorded, I will write notes reflecting what you say to me.

Do we have permission to record?   YES   NO

[If permission to record is declined, confirm that we will take written notes.]

Do you have any questions before we begin either about the study or the consent form that you filled out and returned to us?   YES   NO

Start the recorder [if subject provided permission].

Please make sure to ask interviewees all questions and corresponding probes.

Note: The following discussion guide will be used to direct the conversation. Questions may not be asked verbatim or in the exact order below, and interviewers will probe for further detail as needed. Respondents may also raise topics not listed explicitly in this guide.

Background

I'd like to start by confirming some of the information that my colleagues provided about your agency/ that you provided on the screening form that you completed.

1. Can you tell me briefly about your health center, the area or population that you primarily serve, and your role(s)?
   a. Probes: confirm agency name, org type, population served, geographic location, population density, % clients ages 10-26
   b. Confirm roles of all participants
      i. Technical staff – what activities are you responsible for? (EHR implementation, configuration, or training; EHR maintenance; data extraction/analysis; reporting and analytics; other activities)
2. Can you tell me a little about the Electronic Health Record or "EHR" and immunization registry or information system that your agency currently uses?
   a. Confirm name of EHR and IIS

Knowledge of HPV vaccination rates among the respondent's patient base
3. To what age range do providers at your organization offer HPV vaccination?
4. About what percentage of adolescents complete an HPV vaccine series at your agency?
   a. Probes: breakdown by age, gender, other demographics, average age of completion?
   b. Are there many who initiate but do not complete the series?

Methods for collecting/updating vaccination histories with and without EHR/IIS
My next set of questions is about how your agency keeps track of patient's vaccination histories.
5. How does your agency currently track and update patients' HPV vaccination histories?
   a. Probes: How is it documented in your EHR (structured/unstructured EHR/IIS fields)?
   b. How do you track individual doses vs. series completion?
   c. Does this differ from other vaccinations?
   d. Is there an option to mark HPV vaccination as a confidential service in your EHR if requested by the client? Does this carry over to your IIS? If yes, is this used often?
6. How would you characterize the degree of interoperability between your EHR and your IIS? For example, can your EHR automatically import information from your IIS, and vice-versa?
   e. [If yes] Is this feature enabled for HPV and other vaccinations? Why/why not?
   f. [If no] How do providers determine whether a patient has already been vaccinated for HPV?
   g. [If no] How does your agency report HPV vaccinations given to your IIS?

Methods for tracking HPV vaccinations and administration of-follow up doses
7. What supportive tools does your agency use to remind providers when patients are due for HPV vaccination?

    h.   Does your EHR have pop-up reminder prompts, patient empanelment reports, or other clinical decision support tools related to HPV vaccination?

        i.   What features are available with your system, and which ones are turned on/off?

    i.   Does the clinical decision support system notify the clinician when a patient is due for an initial HPV vaccination? What about when they are due for their next dose?

    j.   Is this a built-in feature of your EHR, or something that was built ad-hoc? (e.g. Excel pivot tables, etc.)

    k.   Does your EHR/IIS produce coverage rate reports all patients in the clinic? Is this a feature that you use? Why or why not?

Strategies for systematically improving vaccination rates at respondents' site

My next set of questions is about the strategies your agency has used or could use to improve HPV vaccination rates.

8.   Please describe any quality improvement initiatives at your agency related to HPV vaccination or HPV series completion.

9.   Please describe any tools or procedures your agency uses to monitor HPV vaccination rates

    l.   Probes: quarterly report cards, etc.

    m. Who is responsible for creating these reports and how often?

    n.   Who reviews the reports and how often?

Strengths and weaknesses of EHR/IIS for HPV vaccination tracking, documenting, and reporting

I'd like to hear your perspectives on the strengths and weaknesses of your EHR and IIS systems as they relate to HPV vaccination…

9.   Overall, how well would you say your EHR and IIS support your agency in ensuring that patients are vaccinated for HPV?

    a.   What aspects of these systems have been helpful for monitoring and improving HPV vaccination rates at your agency?

        i.   Probes: making sure vaccination is offered? Keeping track of vaccinations given? Making sure vaccinations are reported to the IIS? Making sure the vaccination series is completed?

    b.   What aspects of these systems make it difficult to monitor and improve HPV vaccination rates?

        i.   Probes: making sure vaccination is offered? Keeping track of vaccinations given? Making sure vaccinations are reported to the IIS? Making sure the vaccination series is completed?

    c.   What about issues outside of the technology itself such as workflows, training, etc.?

        i.   Probes: making sure vaccination is offered? Keeping track of vaccinations given? Making sure vaccinations are reported to the IIS? Making sure the vaccination series is completed?

Brainstormed ideas for improvements to EHR/ISS to increase HPV vaccination rates and documentation

10. Can you think of ways in which your agency could use your current EHR and IIS systems to better support data monitoring and quality improvement around HPV vaccination?
    a. Probes: what would it take for your agency to implement this?

11. How could your agency adapt quality improvement tools or protocols that you've used for other routine preventive health services to help improve HPV vaccination?

12. What recommendations or ideas do you have about support that the American Cancer Society or others could provide to help your agency better document and make use of HPV vaccination data?
    a. Probes: Examples could include advocating to EHR vendors to make adjustments, supporting training or learning collaborative for IT staff…

Closing

We are done with the interview. Is there anything else that you want to share about how EHR/IIS could be used to improve HPV vaccination?

Thank you so much for your time and all of the information that you shared.

APPENDIX B. ELECTRONIC SCREENING FORM

(untitled)

National HPV Vaccination Roundtable: Use of Electronic Medical Records and Registries to Support HPV Vaccination

Thank you for your interest!

About this project

The goal of this project is to help the American Cancer Society (ACS) better understand how healthcare providers are using Electronic Health Records (EHR) and immunization information systems (IIS) to support timely provision of the HPV vaccination series.

We are seeking administrators, clinicians, and technical staff across the United States to take part in a 30-60 minute interview. The information collected during interviews will be used to prepare a report for the American Cancer Society about how providers are currently using EHR and IIS to support HPV vaccination. This report will also describe what additional support for providers and/or modifications to EHR/IIS may help to increase HPV vaccination rates.

ACS has contracted with Cardea Services to conduct the interviews. The ACS roundtable pilot projects are supported by the US Centers for Disease Control and Prevention.

If you are interested in participating in an interview, please take a few minutes to complete the screening form below.

By completing this form, you are agreeing to provide your contact information to Cardea Services so that we may contact you about scheduling an interview. Cardea Services will not use the information for any other purpose, and we will not share your contact information with anyone.

1. First, please let us know how we can contact you.

First Name

Last Name

Title

Organization

Site, department, branch, or unit (if applicable)

State

Email Address

Phone Number
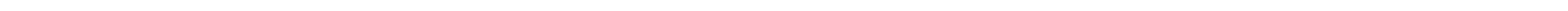
2. How would you best describe your organization? *

- ○ Federally Qualified Health Center (FQHC)

- ○ Community Health Center (not federally qualified)

- ○ Private practice

- ○ Pharmacy

- ○ Tribal Clinic

- ○ Military Clinic

- ○ School-based health clinic

- ○ Health department - Immunizations branch/unit

- ○ Health department - Other branch/unit (please specify)

  [   ]   *

- ○ University health center or hospital

- ○ Other, please specify:

  [   ]   *

---

3. How would you describe the area your agency serves?

- ○ Small town/rural

- ○ Suburban

- ○ City/urban

4. Does your agency specialize in serving any of the following populations? (check all that apply)

- ☐ Racial/ethnic minorities
- ☐ Low income clients
- ☐ Women
- ☐ Children under age 18
- ☐ Residents of rural areas
- ☐ Individuals with special healthcare needs
- ☐ LGBT clients
- ☐ Other, please specify:

[   ]   *

5. Approximately what proportion of the patients served by your agency are between the ages of 11 to 26? If your agency has multiple clinics, please refer only to those that serve adolescents/young adults.

- ○ Less than 20%
- ○ 20-40%
- ○ 41-60%
- ○ 61-80%
- ○ 81% or more

(untitled)

6. Does your site provide HPV vaccinations to youth and young adults? *

- ○ Yes
- ○ No
- ○ Don't Know

7. Does your organization currently use an Electronic Health Record (EHR)? *

- ○ Yes
- ○ No
- ○ Don't know

8. What is the name of your Electronic Health Record (EHR) vendor?

○ AllScripts

○ Care360

○ Centricity

○ eClinicalWorks

○ Epic

○ McKesson

○ NextGen

○ SuccessEHS

○ Vitera

○ Other - Please Specify:

[   ]   *

`LOGIC` Show/hide trigger exists.

9. Does your organization report vaccinations to a state or local immunization information system (IIS)? *

○ Yes

○ No

○ Don't Know

`LOGIC` Hidden unless: Question "Does your organization report vaccinations to a state or local immunization information system (IIS)?" #9 is one of the following answers ("Yes")

10. What is the name of the immunization information system (IIS)

[   ]

(untitled)

`LOGIC` Show/hide trigger exists.

11. What are your role(s) at your organization?

☐ Clinician

☐ IT or other technical support

☐ Manager or administrator

☐ Pharmacist

☐ Other, please specify:

[   ]   *

---

12. Which of the following best describes your role?

○ Nurse (RN, LVN, LPN, NP, etc.)

○ Physician Assistant (PA)

○ Physician

○ Medical Director

○ Medical Assistant

○ Other, please specify:

[   ]   *

---

13. Which of the following activities do you personally perform? (check all that apply)

☐ EHR implementation, configuration, or training

☐ EHR maintenance

☐ EHR data extraction or analysis

☐ EHR reporting and analytics

☐ Other EHR management activities, please describe:

[   ]   *

☐ None of these

14. Are you a Super User for your EHR?

*Super users are staff members trained to move through the electronic health record (EHR) system quickly and who are responsible for teaching other staff to use the EHR.

○ Yes

○ No

---

15. How strongly do you agree/disagree with the following statements?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I am knowledgeable about the capabilities of my agency's EHR to support HPV vaccination.	○	○	○	○	○
I am knowledgeable about the functionality of my agency's IIS	○	○	○	○	○
I am knowledgeable about policies and practices in my organization surrounding HPV vaccination	○	○	○	○	○
I am familiar with the types of quality improvement tools that my agency uses (e.g. dashboards, provider/empanelment reports, etc.)	○	○	○	○	○

---

16. Are there additional administrators, clinicians, or technical staff from your agency who may be interested in participating in the interview? (check all that apply)
Note: If coordinating schedules for a group interview poses a challenge, we are able to interview individuals separately.

☐ Administrator

☐ Clinician

☐ Technical staff

☐ Other - Write In

[   ]

☐ None of the above

17. Please suggest a few dates/times that you would be available for an interview between May 2 and June 17th. Please specify your time zone.

Date/Time: [   ]

Date/Time: [   ]

Date/Time: [   ]

Thank You!

Thank you for completing this screening form. A Cardea staff member will contact you within two business days. Please note that we are seeking respondents who represent a diversity of geographies and agency types. Thus, we may not be able to interview everyone who is interested in participating.

APPENDIX C. CONSENT FORM

INFORMED CONSENT DOCUMENT
AGREEMENT TO BE IN A RESEARCH STUDY
KEY INFORMANT INTERVIEW

NAME OF SPONSOR COMPANY: American Cancer Society

PROTOCOL NUMBER/TITLE OF STUDY: ACS1; "National HPV Vaccination Roundtable: Electronic Health Records & Registries HPV Vaccination Pilot Project"

NAME OF PERSON IN CHARGE OF STUDY
(STUDY INVESTIGATOR):   Sarah Salomon, MPH

TELEPHONE NUMBER, DAYTIME: 206-447-9538
TELEPHONE NUMBER, AFTER HOURS: 206-715-6379

Introduction

You are being invited to volunteer for a project evaluation (research study). You must read and sign this form before you agree to take part in this study. This form will give you more information about this study. Please ask as many questions as you need to before you decide if you want to be in the study. You should not sign this form if you have any questions that have not been answered.

The study investigator is being paid by the sponsor (the company paying for this study) to conduct this research study.

It is important that you are honest about your impressions in order to gather accurate data.

Why is the study taking place?

Cardea Services (Cardea) is an agency that provides research and program evaluation services to health and human service agencies. In partnership with the American Cancer Society and US Centers for Disease Control and Prevention, Cardea has been hired to conduct a pilot project named "the National HPV Vaccination Roundtable: Electronic Health Records & Registries HPV Vaccination Pilot Project", or "Pilot Project" for short. Through the Pilot Project, the partner agencies are collecting information about how healthcare providers use their Electronic Health Records (EHR) and Immunization Information Systems (IIS) to support HPV vaccination. We are asking you and other administrators, clinicians, and technical staff working for healthcare providers across the United States to take part in a 30-60 minute individual or group interview. We anticipate 35 – 45 participants in this study. The information from the Pilot Project will be used to prepare a report for the American Cancer Society about how providers are currently using EHR/IIS systems to support HPV vaccination. The report will also describe what additional support for providers or modifications to EHR/IIS systems may help to improve uptake of HPV vaccination.

What would I be asked to do?

Administrators, clinicians, and technical staff are asked to volunteer as subjects for key informant interviews. The interview will be conducted in person or by phone and should take 30 to 60 minutes. With your permission, the interview will be taped. If you do not give permission to tape the interview, then it will not be taped. The interviewer will ask questions and also take notes during the interview.
While in the interview you can choose to answer some questions and to not answer others. You can also

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MAY 9, 2016

tell the study staff at any time if you want your answers removed from the interview notes or tape, even comments you made earlier in the interview. Your name will not appear in any of the interview notes or transcripts. All interview notes and tapes will be kept in a locked file at Cardea's offices. Once all interviews have been completed and notes or transcripts of tapes produced then Cardea staff will code and analyze them. After the project is completed all records will be destroyed.

What are the possible risks or harms if I take part?

The partner agencies do not expect any legal, medical, physical, psychological, social, or other risks or discomfort to you as a result of taking part in this project. The questions will address your feedback about how your current EHR and IIS systems do or do not support HPV vaccination. You will also be asked to think about ways in which your EHR and/or IIS could be modified to enhance delivery, documentation, tracking, and coordination of HPV vaccination. Finally, you will be asked about your office practices and barriers that you or other staff experience using your EHR and IIS systems. In addition, you may be asked to provide samples of any population/panel management tools (e.g., dashboards) that your agency is using related to HPV vaccination. Any tools shared with Cardea staff will be stored electronically on Cardea's secure, password-protected server and your permission will be obtained separately if we intend to share these tools with anyone.

You can choose to not say anything during the interview if you feel stress or discomfort. You can also choose to leave the interview at any time if you are upset, distressed or for any other reason. Taking part in this project evaluation will have no effect on your work at your agency. If needed, the project can assist you in getting help with any problems due to the interview.

What are the possible benefits?

The expected benefits are that the partner agencies will increase their understanding of how to improve HPV vaccination uptake through support for providers and improvements to EHR/IIS.

What are my choices if I *don't* take part?

Since this study is for research only, the only other choice would be not to be in the study.

Who would see study information about me?

Your name will not appear in the interview notes or transcript, only the date and time of the event and an evaluation-assigned identification number will be written on these documents. The notes, without your name appearing anywhere in them, will be kept in a locked file at Cardea. Taped interviews will be transcribed without your name on the transcript. All tapes are erased after the transcription is completed. Only study staff will have access to the transcripts to code and analyze the data.

Your records of being in this study will be kept private except when ordered by law. The following people will have access to your study records:

•   Study investigator
•   Sponsor company or research institution
•   Country, state or federal regulatory agencies
•   IntegReview IRB

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https://cardeaservices.sharepoint.com/seattle/shared documents/acs hpv ehr iis/completed screening pdf, consent forms, and transcripts/5-9-16 ehr-hpv consent approved by integreview.docx

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MAY 9, 2016

The Independent Review Board (IRB), IntegReview, and accrediting agencies may inspect and copy your records, which may have your name on them. Therefore, your absolute confidentiality cannot be guaranteed. If the study results are presented at meetings or printed in publications, your name will not be used.

LEGAL RIGHTS

You will not lose any of your legal rights by signing this consent form.

CONTACT INFORMATION

If you have questions, concerns, or complaints about this study or to report a study related injury, contact:

Sarah Salomon, MPH
206-447-9538 daytime telephone number
206-715-6379 after hours number

If you do not want to talk to the investigator or study staff, if you have concerns or complaints about the research, or to ask questions about your rights as a study subject you may contact IntegReview. IntegReview's policy indicates that all concerns/complaints are to be submitted in writing for review at a convened IRB meeting to:

Mailing Address:	OR	Email Address:
Chairperson IntegReview IRB 3815 S. Capital of Texas Highway Suite 320 Austin, Texas 78704		integreview@integreview.com

If you are unable to provide your concerns/complaints in writing or if this is an emergency situation regarding subject safety, contact our office at:

512-326-3001 or
toll free at 1-877-562-1589
between 8 a.m. and 5 p.m. Central Time

IntegReview has approved the information in this consent form and has given approval for the study investigator to do the study. This does not mean IntegReview has approved you being in the study. You must consider the information in this consent form for yourself and decide if you want to be in this study.

Would I be paid or compensated for my time? Will the study cost me anything?

You will not be paid for your time. There is no cost to you to participate in the Pilot Project.

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VOLUNTEERING TO BE IN THE STUDY

It is your choice if you want to be in the study. No one can force you to be in the study. You may not want to be in this study or you may leave the study at any time without penalty or loss of benefits to which you are otherwise entitled.

The study investigator, the sponsor agency, or IntegReview IRB may take you out of the study without your permission, at any time, for the following reasons:

- If you do not follow the study investigator's instructions
- If we find out you should not be in the study
- If the study is stopped

If information generated from this study is published or presented, your identity will not be revealed. If you leave the study, no more information about you will be collected for this study. However, all of the information you gave us before you left the study will still be used.

SUBJECT'S BILL OF RIGHTS

You will be given a separate copy of the California Experimental Research Subject's Bill of Rights. If you have not received a copy of this document, please notify study staff.

THE REASON FOR INDEPENDENT REVIEW BOARDS AND INFORMED CONSENT

What is a consent form?
The informed consent document contains information required by federal regulations. The informed consent document must be approved by an Independent Review Board (IRB).

What is an Independent Review Board (IRB)?
An Independent Review Board (IRB) is a group of people that reviews research studies. The main goal of this review is to protect the rights and well-being of the human subjects participating in research studies.

IntegReview, the IRB for this study
IntegReview is an IRB whose board members provide IRB services across the United States, Canada, Japan, and Latin America.

To meet requirements of the law, the IntegReview Board currently includes:

- Doctors
- Pharmacists
- Nurses
- Toxicologists (people who study the harmful effects of chemicals)
- Other specialists
- Others who do not have a background in science/medicine

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AGREEMENT TO BE IN THE STUDY

This consent form contains important information to help you decide if you want to be in the study. If you have any questions that are not answered in this consent form, ask one of the study staff.

Please answer **YES** or **NO** to the following questions:

A.   Is this document in a language you understand?   _____
B.   Do you understand the information in this consent form?   _____
C.   Have you been given enough time to ask questions and talk about the study?   _____
D.   Have all of your questions been answered to your satisfaction?   _____
E.   Do you think you received enough information about the study?   _____
F.   Do you agree that you were **NOT** pressured by the study investigator or study
        staff to be in this study? If you feel that you have been pressured to be in this
        study, do not answer "YES" to this question.   _____
G.   Do you know that you can leave the study at any time without giving
        a reason and without affecting your work at your agency?   _____

IF YOU ANSWERED "NO" TO ANY OF THE ABOVE QUESTIONS,
OR YOU ARE UNABLE TO ANSWER ANY OF THE ABOVE QUESTIONS,
YOU SHOULD NOT SIGN THIS CONSENT FORM.

If you agree to participate:

The study described above has been explained to me. By signing below, I voluntarily consent to take part in the Pilot Project. I have been told that I can refuse to answer any question or leave the interview at any time, without penalty. I have had a chance to ask questions. I have been told that I may call the evaluators if I have any questions. I have been told that I may call IntegReview (the IRB overseeing the evaluation) if I have questions about my rights or if I have concerns or complaints about the evaluation.

_____
Printed Name of Adult Study Subject

_____
Signature of Adult Study Subject   Date

_____
Printed Name of Person Explaining Consent Form

_____
Signature of Person Explaining Consent Form   Date

_____
Sarah G. Salomon, MPH   Date
Study Investigator

You will be given a signed and dated copy of this informed consent to keep.

Copies to: Subject
                    Study Investigator's File

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APPENDIX D. SAMPLE REPORTS

- Sample HPV Vaccination Report Card
- Sample Adolescent Benchmark Report

BRAVO
Boosting Recommended Adolescent Vaccines On Time

▮▮▮▮▮▮ *MD, Adolescent Vaccine Report*
As of December 2015

Vaccine coverage by Age Group

	11-12 years				13-17 years		
	1st HPV dose	3rd HPV dose	MCV4	Tdap	1st HPV dose	3rd HPV dose	MCV4	Tdap

Values (You, dark bar): 46, 12, 78, 90 (11-12 years); 57, 32, 90, 97 (13-17 years)

■ You   ■ System   ☐ Department

*The Healthy People 2020 goal is 80% coverage for all adolescent vaccines

---

HPV vaccine series completion (all 3 doses)

Among your patients who have started the HPV vaccine series >7 months ago: 69%

HPV vaccination missed opportunities*

Number of eligible 11-17 year old patients you saw:	124
Number of patients who started the HPV vaccine series:	27
Missed opportunities* (lower is better):	78%
Missed opportunities during the same time period last year:	85%

$$*\text{Missed opportunities} = \frac{\text{patients who did not initiate the HPV vaccine series}}{\text{HPV eligible patients you saw}}$$

Adolescent Benchmark Report

To run a benchmark report for adolescents in ███ please follow these steps:

1) Select the 'benchmark report' link under reports section of the menu panel.
2) Select the 'Patients Associated with Selected Site' radio button and select the clinic's name from the dropdown menu. This will bring back patients who are active and who have been immunized by the organization.
3) Select the 'All Patients, regardless of whether they met the benchmark or not' option.
4) Select the 'Any Gender' option.
5) Select the 'Less than or equal to 72 months old (or Adolescent Benchmarks)' option.
6) Select the 'Standard Assessment' option.
7) Enter today's date in the Select Evaluation Date field.

8) From the Age Specific Immunization Benchmarks section, select the @13-15 yrs to highlight all the columns in that row.
9) Click the 'Generate' button.

Age Specific Immunization Benchmarks						
Age	DTaP	Hep B	Hib	MMR	Polio	Pneumo	Varicella
@ 3 months	1	1	1		1	1	
@ 5 months	2	2	2		2	2	
@ 7 months	3	2	2		2	2	
@ 9 months	3	2	2		2	2	
@ 12 months	3	2	2		2	2	
@ 16 months	4	3	3	1	3	3	1
@ 19 months	4	3	3	1	3	3	1
@ 21 months	4	3	3	1	3	3	1
@ 24 months	4	3	3	1	3	4	1
@ 72 months	5	3	4	2	4	4	1

Or select one of these aggregate outcomes:						
@ 24 months			431	43133	431331	4313314	
@ 36 months			431	43133	431331	4313314	

Adolescent Benchmarks						
	TdaP/Td	Hep B	MMR	Varicella	Meningo	HPV	
@ 13-15 yrs	1	3	2	2	1	3	

Adult Benchmarks						
	TdaP/Td	MMR	Varicella	HPV	PPV 23	Zoster	
@ 18+	1	1	2	3	1	1	
				Influenza			

Clear Selection

Generate   Cancel

10) The Benchmark Report results screen will display. After selecting the Refresh button, select the Benchmark link under the Report Type field.

11) The results will show the total number and percentage of 13-15 year olds for the organization and whether or not they met the specific benchmark:

Filter conditions used for this report:

Patients Associated with Site: IOWA TRAINING ORG

Both patients who DID or did NOT meet the selected benchmark(s)

Just consider immunizations as meeting the benchmark

Patients of gender: Any Gender

Age between 13 and 15 years old

Evaluation date: 01/22/2016

Benchmark age @ 180 months

Selected benchmarks: TdaP/Td (1), HepB (3), MMR (2), Varicella (2), Meningo (1), HPV (3)

Total patients: 12; 0 patients (0%) met all benchmark criteria, 12 patients did not

Report 17492; Results 1 - 12 of 12

No	First Name	Last Name	Birth Date	Primary Phone Number	Street	City	State	Zipcode	TdaP/Td (1)	HepB (3)	MMR (2)	Varicella (2)	Meningo (1)	HPV (3)
1			02/03/2001			REDFIELD			N	N	N	N	N	N