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Implementation Challenges and Opportunities Related to HPV Vaccination Quality Improvement in Primary Care Clinics in a Rural State

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Abstract

Efforts to understand low human papillomavirus vaccine coverage led us to explore quality improvement (QI) decision-making programs and processes to increase vaccine uptake. These QI programs often include interventions recommended by the AFIX (Assessment Feedback Incentives eXchange) Program that supports Vaccines for Children (VFC) clinics. However, little is known about decision-making around intervention selection or extent of implementation. In collaboration with the state public health department in the rural Midwestern, investigators developed a survey to explore vaccine-related QI in VFC clinics. The survey was distributed via email to all VFC clinics (n = 605); results presented are from the primary care clinics (n = 115). Respondents (VFC liaisons) reported decisions about vaccine QI were made by multiple actors within their own clinics (45.1%), by a clinic manager in charge of multiple clinics (33.0%) and/or at a centralized administrative office (35.2%). Additionally, the majority of respondents considered external actors, like insurance companies (52.7%) or Medicaid/Medicare (50.5%), important to the decision-making process. Most commonly implemented interventions focused on provider knowledge and patient education. Least commonly implemented interventions required systematic changes, such as reminder/recall and follow-up after missed appointments. This preliminary research indicates there are multiple points of decision-making within clinics and health care systems, and therefore change agents at all points need to be involved. The most commonly implemented interventions focus on providers and patients, with an emphasis on education. Interventions requiring system-level changes and use of electronic health records are less common and more attention should be directed towards such interventions.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Keywords

Papillomavirus vaccines; Quality improvement; Primary health care; Evidence-based interventions

Background

The human papillomavirus (HPV) vaccine is a powerful tool to prevent HPV-related cancers [1] and genital warts [2]. HPV infection can cause cancer of the cervix, anus, vagina, vulva, penis, and oropharynx, and each year approximately 31,500 HPV-associated cancer cases are diagnosed in the United States [3]. Since its introduction in 2006, the HPV vaccine has continuously been proven safe and effective [4], but national immunization rates remain well below the Healthy People 2020 goal of 80% coverage [5]. National coverage rates in 2017 for adolescents (13–17 years of age) were 65.5% for ≥ 1 dose with only 48.6% of adolescents completing the series [6].

Public health practitioners and clinicians have begun to focus on evidence-based interventions (EBIs) to improve vaccine uptake and move towards eliminating HPV infections. The majority of this work has been conducted in metropolitan areas. Meanwhile, there has been limited investigation of the disparity between urban and rural HPV vaccine coverage, with rural adolescents being less likely to initiate and complete the series. The 2016 CDC National Immunization Survey-Teen (NIS-Teen) reported 70.1% of teens living in metropolitan statistical area (MSA) principal cities had received one or more doses of the HPV vaccine, compared to 59.3% of teens living in non-MSA areas [6]. In one rural Midwestern state, the NIS-Teen estimates the completion rate for 13–17 year olds was 53.7% in 2017, while Immunization Registry (IR) data for 13–15 year olds indicated only 38% had completed the HPV vaccination series [7]. Given the changing landscape of health care in rural areas and the increase in consolidation of health care systems [8], it is important to focus on what is happening in rural clinics to be able to support them to improve HPV uptake.

Evidence-based interventions (EBIs) provide promising options for improving vaccine coverage [9–11], but little is known about how EBIs are best adapted and implemented in rural communities [12]. This project focused on decision-making for selection and implementation of EBIs in primary care clinics in a rural state as related to adolescent vaccination generally and HPV specifically. The EBIs of interest were those recommended through the Assessment, Feedback, Incentives, eXchange (AFIX) program, an initiative of the Centers for Disease Control and Prevention to increase the uptake of vaccines [13]. AFIX supports Vaccines for Children (VFC) providers by giving them evidence-based practices that are customizable. “Assessment” refers to the appraisal of adolescent vaccination data and the establishment of a target for improvement. “Feed-back” refers to the process of sharing assessment findings with immunization providers, while “Incentives” serve as motivational tools to encourage provider action. The final program element, “eXchange” refers to the exchange of information and ideas between providers that serves to coordinate resources and motivate improvement.

The AFIX approach has been shown to increase vaccination coverage [14, 15], especially in younger adolescents [9]. Research to date has demonstrated the success of AFIX in clinical settings to promote vaccine uptake; however, recent and ongoing changes in health care system structures may affect the success of future implementation of the program. As health care systems evolve, with smaller primary care clinics joining larger systems, it is unclear at what level decisions are made about quality improvement (QI) programs like AFIX, which makes it unclear where researchers and practitioners can most effectively promote interventions. To fill this gap, we designed this study with the goal gaining an understanding of the decision-making process of intervention selection and implementation from the perspective of VFC liaisons.

Methods

In conjunction with the state department of public health, we developed an online survey to clarify the decision-making process around both general and vaccine-related QI strategy selection and implementation and to ascertain the extent to which AFIX strategies were being implemented in clinics. The first section of the survey collected demographic information about the survey respondent and the clinic at which they work. We then focused on where general and vaccine-specific QI decisions were made and the actors involved in that process. We chose to include the following points of decision-making: within an individual clinic, by a clinic manager who is in charge of multiple clinics, or at a centralized administrative office.

The second section explored how often the seventeen AFIX strategies were used in clinics for both general vaccine uptake and for the HPV vaccine. We used language from the AFIX site visit guide to describe the specific strategies, as terminology would be familiar for VFC liaisons from AFIX site visits or assessments [13]. Respondents could report whether specific strategies were always, sometimes, or never implemented or indicate the clinic was planning future implementation.

The University of Iowa Institutional Review Board determined that this project was not human subjects' research, but we did include informal consent language describing the project to potential participants on the first page of the online survey, allowing participants to opt out if they wished. The sample for this survey consisted of VFC liaisons for all 605 VFC clinics in a rural Midwestern state, who received the Qualtrics survey link via email from the state department of public health. During the course of data collection, two follow-up emails were sent to non-completers. Data collection occurred during a 5 week period in the fall of 2017.

For the analyses presented in this paper, only the primary care (family practice and pediatric) clinics were included. Data were downloaded, cleaned in Microsoft Excel and then transferred to IBM SPSS v 24 for analysis. Duplicate responses were eliminated, as well as responses from clinics who failed to answer questions beyond demographics. In cases of multiple responses from the same clinic, the earliest recorded response was retained and subsequent responses were eliminated from analysis. If a respondent failed to identify the zip code or county of their VFC clinic, a member of the research team used the information

provided to obtain an accurate zip code and county. For each set of analyses, we used listwise deletion and results specify the number of respondents used to calculate frequencies for each question. Open responses were coded by a member of the research team. Appropriate frequencies, descriptive statistics, and Pearson Chi square tests were examined for all relevant variables using SPSS v 24.

Results

A total of 175 VFC liaisons completed the survey, for an overall response rate of 29.09%. For this analysis, we excluded Federally Qualified Health Centers, Title X clinics, county public health departments, and other community organizations or institutions, leaving only family practice and pediatric clinics. With these exclusions, our original sample for analysis consisted of 115 clinics. We present key demographics of the respondents and clinics in Table 1. Respondents were located in over half of the state's counties and represented a mix of urban and rural zip codes.

Our first goal was to determine whether decisions about vaccine-related QI and general QI were being made consistently within an individual clinic, by a clinic manager in charge of multiple clinics, or by the central administrative office. Only respondents who specified that their clinic engaged in QI related to vaccination answered both of these questions, which was a total of 91 (79.1%) primary care clinics. For each of these potential points of decision-making, there was a significant association for vaccine and general-QI (Table 2). For example, 45.1% of the sample reported that both general and vaccine-related QI decisions were made within the clinic and 30.8% reported neither type of QI decisions were made within the clinic. The remaining 24.2% of respondents reported that either vaccine or general QI decisions were made within their clinic, but not both. This same pattern continued for decisions made by a clinic manager in charge of multiple clinics and decisions made by a centralized administrative office.

We asked respondents about other actors or groups who were involved in QI processes (Table 3). For both general (n = 115) and vaccine-related QI processes (n = 91), respondents reported high levels of involvement from Medicaid/Medicare, insurance companies/payers, and Accountable Care Organizations (ACOs). More than half of respondents indicated for both general and vaccine-related QI, Medicaid/Medicare and insurance companies were involved in the decision-making processes of their clinics. We also asked respondents to identify current resources or other organizations they rely on for vaccine QI support. The most commonly utilized resources were the state department of public health (57.4%), the state-level VFC assessment staff (54.8%), other internal resources (34.8%), and local public health agencies (30.4%). However, respondents reported still needing support in several areas, primarily related to staffing needs. The greatest need identified was increased support to train staff about QI efforts (32.3%). Similar needs were identified for more staff dedicated to QI (22.6%), as well as assistance with identifying QI projects (22.6%) and available QI resources (21.7%), and with analyzing existing data (21.7%).

In addition to investigating decision-making processes and involved actors, we explored the extent to which vaccine-related QI initiatives were implemented in clinics, focusing on the

17 evidence-based strategies promoted by the AFIX program. Table 4 details the number and percent of respondents who reported their clinic always used particular AFIX strategies. Only respondents that reported answers for each of the 17 strategies were included in this analysis, which left a total of 69 responses or 60.0% of the overall sample of 115 clinics. Half or more of respondents reported always utilizing 12 of the 17 strategies in relation to the HPV vaccine. The other, less-used strategies often involved a systematic process, like reminder/recall, or working with front desk staff around scheduling issues. Additionally, despite widespread use (98.6%) of the IR System to report vaccines, relatively few clinics (24.6%) always use the system to inactivate patients.

Conclusions

Information on where the QI decisions are made in an organization is useful for understanding where best to focus vaccine QI efforts for the greatest impact. Efforts expended at the wrong point of decision-making, such as asking clinics to make changes to their electronic health records (EHR) system when the system is under the control of a larger health entity, will not produce the changes needed to increase HPV vaccination coverage rates. On the other hand, if vaccine and general QI decisions are being made consistently, expertise developed in general QI decision-making can be leveraged to inform development of HPV vaccination interventions.

The sample of this study includes rural clinics, which are underrepresented in the current literature, and important to study because of the disparity in HPV vaccination rates between rural and urban areas [6]. For example, in a recent study exploring implementation of interventions from a provider perspective, only 9% of the sample was comprised of respondents from rural areas [16]. However, we know that these rural areas differ from urban areas and that to be able to close the gap in vaccine coverage between rural and urban adolescents, we need a better understanding of what is happening in rural clinics. The majority of our respondents worked in family practice clinics, a setting more typical of rural areas, where children and adolescents are less likely to be seen by pediatricians. In 2010, the majority of rural counties (56.1%) in the United States had no practicing pediatricians, compared to 21.3% of urban counties. Of remote rural counties, 79.1% lacked a pediatrician [10]. In a recent survey of a rural Midwestern state, the primary care clinics that served adolescents most commonly identified as family practice clinics (87.7%) [17].

Family care practices may not employ as many providers with a focus on the adolescent population, so providers may not be as comfortable discussing and administering adolescent vaccines. Moreover, family care practitioners have been found to be less likely to adopt new vaccines than pediatricians [18–20]. Additionally, implementing EBIs to promote HPV vaccine in rural practices is made more challenging by the fact that these smaller family practice clinics are increasingly being absorbed by larger health care systems leading to changes in actors involved in QI processes [8].

Decision-making about QI, whether related to vaccination or other practice issues, appears to be made consistently, where that decision is made at the clinic, by (multiple) clinic management, or at a centralized administrative office. This finding highlights the potential

for QI efforts with one objective (such as efforts to improve breast cancer screening through reminder/recalls) to provide knowledge and processes/systems that could be replicated for HPV vaccination QI.

Our findings could also help move the needle on the adoption of underutilized AFIX strategies. Respondents more frequently reported always using AFIX strategies that required the lowest levels of systems change (such as providing parents with vaccination information). Strategies implemented least often were those that required more changes to processes and systems or would require engaging decision-makers such as people with more power in the health system. Examples of these types of interventions include adopting standing orders, offering walk-in clinics, or having a reminder/recall system. Unfortunately, the less-implemented strategies are probably the most effective interventions to increase HPV vaccination rates. The majority of our survey respondents represented clinic employees with limited decision-making power related to the more complex interventions needed to increase vaccination rates. Making changes to the EHR system, adjusting scheduling procedures, or instituting a reminder/recall system is often beyond the purview of medical assistants and registered nurses in a typical clinic. In addition, engaging others in the clinic or health system who are involved in QI and implementing interventions for other health behaviors should make change easier. Our findings also point to potential QI partners beyond the clinic or health system, including Medicaid, insurance companies, and Accountable Care Organizations. Engaging those types of partners will likely be valuable, given their shared interest in keeping members healthy and up to date on preventive care [21].

However, this study was not without limitations. One weakness was that survey responses were inevitably based on information available to the respondents. A VFC liaison without all pertinent information or with only a limited perspective may not have conveyed the reality of his or her clinic. Also, the items used to measure AFIX intervention implementation do not fully capture implementation. Whether respondents were able to accurately apply the meaning of always, sometimes, and never related to implementation is not known and intervention implementation is likely to be more nuanced than these response categories allow. Finally, while the response rate is lower that desired, we were able to capture many rural clinics in the sample, which was essential to our understanding of challenges that may be important in these settings.

As HPV vaccine completion rates remain below the Healthy People 2020 coverage goal of 80%, we need to continue exploring innovative ways to promote the vaccine. In our study, we were interested in understanding which actors are involved in vaccine-related QI and whether this was consistent with those involved in general QI. Our finding that these actors are generally the same for vaccine and general QI efforts indicates the potential to utilize existing QI strategies to inform and provide infrastructure for QI efforts focused on HPV. This could be especially valuable to clinics as they noted that their greatest needs were related to shortages in QI staff, time, and training. Furthermore, in exploring the extent of AFIX strategy implementation, those most commonly utilized focus on patient education and provider knowledge, whereas those less commonly utilized require systematic changes involving multiple actors to implement. With an increasing focus on targeting health systems

as agents of QI change, these findings are especially relevant. It is important to recognize that the ability to institute such changes at a systems level may be beyond that of VFC liaisons and that it is necessary to include the appropriate actors.

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Table 1

Descriptive statistics for respondents and primary care vaccine for children clinics

Characteristics of clinic/respondent	n	Percent (%)
Located in a rural zip code	64	55.7
Type of clinic (check all that apply)		
Family practice	91	79.1
Internal medicine	5	4.3
Pediatric	25	21.7
Primary care	14	12.2
General practice	13	11.3
Rural health	2	1.7
Title of respondent (check all that apply)		
MD/DO	1	0.9
NP	2	1.7
PA	0	0.0
MA	26	22.6
RN	53	46.1
LPN	17	14.8
Office manager	19	16.5
Quality improvement coordinator	1	0.9
Pharmacist	2	1.7
Other	3	2.6

Table 2

Comparison of points of decision-making for general and vaccine-related QI in clinics (n = 91)

		Quality improvement for vaccines		X^2
		Decisions made at clinic	Decisions not made at clinic	
General quality improvement	Decisions made at clinic	41 (45.1%)	11 (12.1%)	23.34*
	Decisions not made at clinic	11 (12.1%)	28 (30.8%)	
		By a clinic manager	Not by a clinic manager	
	By a clinic manager	30 (33.0%)	13 (14.3%)	36.58*
	Not by a clinic manager	4 (4.4%)	44 (48.4%)	
		At a centralized/administrative office	Not at a centralized/administrative office	
	At a centralized/administrative office	32 (35.2%)	17 (18.7%)	24.21*
	Not at a centralized/administrative office	6 (6.6%)	36 (39.6%)	

Percentages appear in parentheses next to frequencies

* $p < .001$

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Table 3

Involvement of outside groups in clinic QI processes

	General QI (n = 115)		Vaccine QI (n = 91)	
Outside groups	**n**	**%**	**n**	**%**
Accountable care organizations	53	46.1	36	39.6
Insurance companies	61	53.0	48	52.7
Medicaid/medicare	67	58.3	46	50.5

Table 4

Respondents reporting always using AFIX strategies for HPV vaccination QI efforts (n = 69)

AFIX strategy	n	%
Inactivate patients in IRIS who are no longer seen by your practice	17	24.6
Reminder/recall	20	29.0
Front desk/scheduling staff are trained so they know when it's appropriate to schedule vaccination appointment	25	36.2
Contact parents/patients within 5 days of missed appointment	27	39.1
Have a system to schedule wellness visits for patients 11–12 years old	29	42.0
Schedule next vaccination appointment before patients leaves office	37	53.6
Have an immunization champion	42	60.9
Document vaccine refusals	50	72.5
Offering walk-in/vaccine only visits	51	73.9
Have standing orders for RNs, PAs, and MAs to vaccinate	53	76.8
Educate parents about vaccines and disease they prevent even when they refuse to vaccinate	59	85.5
Report vaccinations previously administered by others to IRIS	60	87.0
Vaccination staff are knowledgeable and comfortable with current ACIP recommendations	61	88.4
Use IRIS to determine which vaccination are due for patients	61	88.4
Have vaccination information available to parents/patients	62	92.8
Staff knowledgeable and comfortable administering all vaccines	63	91.3
Clinic reports vaccinations through the IRIS	68	98.6