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Amma G. Boakye Date

Understanding the Feasibility of Addressing Missed Opportunities in HPV Vaccination Uptake:

A Qualitative Approach to Bring Practical Solutions

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University of North Carolina at Chapel Hill
2016

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Abstract

Understanding the Feasibility of Addressing Missed Opportunities in HPV Vaccination Uptake:

A Qualitative Approach to Bring Practical Solutions

By Amma G. Boakye

Background: Human papillomavirus (HPV) is the most common sexually transmitted infection among adolescents and adults in the United States; HPV causes anogenital tract (i.e. cervical, anal, vaginal, vulvar, penile cancers) and oropharyngeal cancers, and genital warts. Although there are vaccines to reduce HPV transmission, uptake of the vaccine remains low due to missed opportunities in vaccination and adolescents' underutilization of preventive services.

Purpose: To understand the feasibility of vaccinating at every opportunity from the provider, parent, and adolescent perspective to minimize missed opportunities in HPV vaccination.

Methods: Consenting healthcare facilities in urban and rural healthcare settings lead to participant recruitment of providers, parents, and adolescents to conduct in-depth interviews; interviews were analyzed using the qualitative analysis software, MaxQDA to complete the coding process and create emerging themes. This process was used to identify relevant perceptions of missed opportunities and vaccinating at every opportunity.

Results: A total of 25 in-depth interviews (n=25) were conducted, nine with healthcare providers (n=9), nine with parents (n=9), and seven with adolescents (n=7). Most providers discussed applying the vaccinating at every opportunity approach. Parents were primarily hesitant of multiple vaccines during an acute visit due to potential contraindications. Adolescents were generally fearful of vaccines due to pain. There was no discussion of a standard protocol used to apply the vaccination at every opportunity method since some providers recommended vaccines during acute visits while others only provided vaccinations at wellness visits.

Discussion: Creating a practical and standard method to apply the vaccinating at every opportunity method that is recommended in the ACIP and CDC guidelines is necessary to reduce missed opportunities in HPV adolescent vaccination. A primary barrier to address is the adolescents' underutilization of preventive care services and examining alternative methods to promote and administer HPV vaccination to increase HPV vaccination uptake.

Keywords: HPV, vaccination, adolescent health, missed opportunities.

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Chapter I: Introduction

Human papillomavirus (HPV) is a very common sexually transmitted infection (STI) among adolescents in the U.S.[1] HPV vaccination provides an opportunity to prevent HPV infections that causes anogenital tract (i.e. cervical, anal, vaginal, vulvar, penile cancers) and oropharyngeal cancers and genital warts; however, coverage and uptake in the United States remains low. Previous studies have examined the barriers to coverage and missed opportunities to immunize adolescents. A primary barrier addressed in the literature is adolescent utilization of preventative services. Many adolescents underutilize preventative care and do not visit health facilities often for these preventive services, compared to other pediatric groups.

Physician and public health organizations urge healthcare providers to use every opportunity to recommend and vaccinate their adolescent patients yet protocols necessary to enforce this principle have not been implemented to standardize this recommendation. This study used a qualitative research approach to explore the feasibility of vaccinating at every opportunity by understanding the perceptions of the provider, parent, and adolescent (patient) on using every opportunity to vaccinate adolescents.

Chapter II: Literature Review

HPV & Vaccination Prevention

Human papillomavirus (HPV) infection is the most common sexually transmitted infection among adolescents and adults in the United States (U.S.).[1] Approximately 43% of adults aged 18 - 59 years had a genital infection with any HPV type from 2013 – 2014.[1] Vaccines to combat the spread of HPV are available and will be discussed in detail below. Prior to the usage of the HPV vaccine, 33% of females aged 14 - 19 years were infected with at least one strain of HPV and 12% were infected with one of the four strains in the quadrivalent HPV vaccine (4vHPV). [2, 3] Most HPV infections are cleared by the natural immune response; however, some HPV infections can persist, leading to severe diseases such as anogenital tract (i.e. cervical, anal, vaginal, vulvar, penile cancers) and oropharyngeal cancers, as well as genital warts.

Several HPV vaccine formulations have been recommended for preventative use.[4-6] In 2015, the 9-valent HPV vaccine (9vHPV) was recommended as one of the three HPV vaccines to be used for routine vaccination.[5] After 2016, 9vHPV became the only HPV vaccine to be distributed in the United States; other vaccines include the bivalent and 4vHPV vaccines.[5] The 9vHPV can protect against approximately 90% of cervical cancers, which is an increase from the 70% originally offered by the 4vHPV.[7]

In the United States, it was estimated that in 2018, there are 84,720 incident cases of female anogenital tract (cervical, anal, vulvar, and vaginal cancers) and oropharyngeal cancers; 17,890 deaths would occur due to the previously mentioned cancers.[8-12] Not only is HPV the cause of

several diseases, but approximately $4 billion are spent annually to address the effects of the infection.[13]

Research supports the efficacy of the HPV vaccine and routine administration of the vaccine is recommended in the U.S. within 18 months of the other adolescent vaccine recommendations such as the Meningococcal conjugate vaccine (MenACWY) and the tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap).[14, 15] Although HPV vaccines have been recommended, vaccination uptake remains low compared to MenACWY and Tdap immunization rates; the 2016 National Immunization Survey-Teen provided adolescent immunization rates from 2015 to 2016.

Vaccination coverage for adolescents aged 13 – 17 years with at least one dose of MenACWY increased from 81.3% to 82.2% and coverage with at least one dose of Tdap increased from 86.4% to 88%.[16] In comparison, HPV vaccine also increased but remained low with only 60.4% of adolescents receiving at least one dose of HPV vaccine; 43.4% completed the vaccine series where less than 40% were adolescent males and less than 50% were adolescent females.[16] These vaccination rates are below the Healthy People 2020 objective that seeks for 80% of adolescents to complete at least 3 doses of the HPV vaccination series. [17]

Current Adolescent Vaccination Standards

In 1996, the National Vaccine Advisory Committee (NVAC), the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), and the American Medical Association (AMA) started to focus more on adolescent vaccinations. They collaborated with partners from local, state, and

federal agencies to create the Standards for Child and Adolescent Immunization Practices that was distributed in February 2002.[18] These standards were aimed towards healthcare professionals who share the responsibility for child and adolescent vaccinations. In the article, the authors acknowledged that some healthcare professionals may find it difficult to adopt these standards due to certain circumstances; however, providers should strive to achieve these standards since they are required immunization practices.

The NVAC also identified barriers to receiving vaccines such as delays in scheduling appointments and requiring a wellness visit. Authors highlighted that providers are not limited to administering vaccinations during a wellness visit and are permitted to administer vaccinations during other patient visits such as an acute or vaccination only visit. In addition, it is recommended that health care professionals administer vaccines simultaneously at the same visit if it aligns with the recommendations from the professional immunization organizations.[18] This recommendation would lead to a decrease in the number of visits necessary to complete vaccinations in a patient, minimize the likelihood for missed doses, and allow for earlier protection to enhance vaccine efficacy.

Currently, major physician and public health organizations continue to encourage every healthcare provider to recommend vaccinations at every patient visit whether it is a sick or wellness visit.[18-20] It is also recommended to screen for contraindications which are defined as conditions in a patient that increases the risk for a serious adverse reaction - although most vaccines can be administered even if the child has a mild illness.[20]

In 2016, the CDC and ACIP changed the dosing schedule and recommend that 11 or 12-year-old adolescents receive 2 doses of HPV vaccine instead of 3 for people who begin the vaccination series before their 15th birthday.[20-22] Three doses of HPV vaccine are recommended for people starting the vaccination series on or after their 15th birthday and includes those who have immunocompromising conditions.[20-22] For adolescents who begin the vaccination series before the 15th birthday, the second dose should be administered 6 to 12 months after the first dose, creating a 0, 6 - 12-month schedule. Individuals who begin the series after the 15th birthday or have immunocompromising diseases would receive the second dose 1 to 2 months after the first, and the last dose 6 months after the first dose.[21, 22]

These recommendations were updated after the CDC and ACIP reviewed data that compared the 2-dose schedule to the 3-doses; results showed that the antibody response after the 2 doses for adolescents between the ages of 9 and 14 administered at least 6 months apart were as good or better than the 3 doses given to older adolescents and young adults.[21, 22]

Missed Opportunities for HPV Vaccination

Szilagyi and Rodewald wrote an article that pioneered the discussion for missed opportunities for childhood immunizations; the authors' findings showed that missed opportunities was a primary contributor to the under immunization of children. If healthcare facilities were able to eliminate these missed opportunities, vaccine coverage levels would improve by up to 30%.[23] Wong and colleagues continued to explore the impact of missed opportunities as they examined adolescent immunizations in their research study. They defined a missed opportunity as an opportunity that occurs when a vaccine-eligible patient is seen for care but remains unvaccinated.[24] They also noted that about 60% of adolescent girls had a missed opportunity for HPV vaccine dose 1 at

their 11-12-year preventive care visit. This exceeded the number of missed opportunities for the Tdap vaccine.

A 2014 CDC report used data collected from the 2007 – 2013 National Immunization Survey-Teen to evaluate missed opportunities for adolescents to receive the HPV vaccine by age 13. The percentage of unvaccinated girls who were 13 years old with at least one missed opportunity for HPV vaccination increased from 9.3% in 1994 to 83.7% in 2000. In this study, a missed opportunity was defined as a healthcare encounter occurring on or after the 11th birthday, before the 13th birthday, and on or after 2007 when the ACIP recommended the 4vHPV for girls. The findings exemplify that if all missed had been eradicated for the girls born in 2000, more than 90% of girls would have received at least one dose of HPV vaccine.[4]

Previous research studies have been conducted to address these missed opportunities in vaccination uptake by examining adolescent healthcare utilization. About 70% of visits by adolescents were for acute visits rather than preventive care, which is less frequent compared to other pediatric age groups.[25, 26] National data has also shown that over 30% of adolescents do not use healthcare services in a 12-month period;[27] this shows the importance for physicians to capitalize on each adolescent visit whether it is an acute, well, or scheduled appointment.

Current Methods to Increase HPV Vaccination Uptake

Researchers have discussed potential strategies and solutions to increase adolescent vaccination uptake specifically through policy. An article by Head, Biederman, Sturm, and Zimet focused on strategies to increase adolescent HPV vaccine uptake in the United States.[28] They addressed the power in policy and how it has been one of the most effective methods for achieving high vaccination rates through school entry requirements (i.e. mandates). This successful method was

used for MenACWY and Tdap vaccines and the results in the acceptance and increase in vaccination rates validates the strength in school entry requirement mandates. These mandates are effective; however, exemptions from these requirements are easily approved, and as a result, decrease vaccination rates and increase the potential for outbreaks of preventable diseases.[28] Few states have passed school entry requirements for HPV vaccine; although some states made an attempt, the enacted policies were not strongly enforced and lacked coverage. Rhode Island serves as an example of how school required mandates are effective since they successfully implemented a gender-neutral school entry requirement in 2015 and currently have one of the highest HPV vaccination rates in the U.S.[28]

In addition to school-based policies, vaccination policies that modify the number of doses necessary to complete the HPV vaccination series has shown evidence of increasing vaccination uptake. The ACIP recently changed the previous recommendation of three doses to two if the adolescent received his or her first dose before the age of 15.[28] Vaccine experts also discussed the impact of altering the age recommendations of the vaccine from 11-12 years old to a younger age of 9-10 years old. This would help ameliorate the association between the HPV vaccine and sexual behavior of adolescents, while also leading to the completion of a two-dose series if adolescents receive the second dose at the 11-12-year old visits.

Implementation of Recommended HPV Vaccine Uptake Strategies

A majority of the research conducted provides knowledge of HPV and adolescent immunization rates, missed vaccination opportunities, and recommendations to improve adolescent immunization rates. There is limited research that focuses on the feasibility and practical measures necessary to implement and standardize recommendations relating to using every

opportunity to vaccinate although it is recommended by immunization experts and healthcare professionals. Yarnall and colleagues discussed the amount of time needed to provide prevention services in healthcare settings. They estimated that the average time to provide immunization services was 0.5 minutes.[29] The amount of time assumed for these services are relatively small but there is still underutilization of preventative services among adolescents.

Rand and colleagues studied that more than three times as many preventative visits were made by early adolescents than late adolescents.[25] They also discovered that the annual preventive care visit to a health facility would be a critical time to provide immunization and other recommended preventative services.[25] With this knowledge, it is imperative to translate this information from evidence into practice to examine the feasibility of these recommendations to increase adolescent vaccination uptake. Much research and knowledge are evident in the literature on HPV vaccination uptake; however, there is a need for more information on how to develop standards that are focused on vaccinating at every opportunity to practically integrate these standards into healthcare settings to bolster HPV vaccination uptake.

Chapter III: Manuscript

Abstract

Background: Human papillomavirus (HPV) is the most common sexually transmitted infection among adolescents and adults in the United States; HPV causes anogenital tract (i.e. cervical, anal, vaginal, vulvar, penile cancers) and oropharyngeal cancers, and genital warts. Although there are vaccines to reduce HPV transmission, uptake of the vaccine remains low due to missed opportunities in vaccination and adolescents' underutilization of preventive services.

Purpose: To understand the feasibility of vaccinating at every opportunity from the provider, parent, and adolescent perspective to minimize missed opportunities in HPV vaccination.

Methods: Consenting healthcare facilities in urban and rural healthcare settings lead to participant recruitment of providers, parents, and adolescents to conduct in-depth interviews; interviews were analyzed using the qualitative analysis software, MaxQDA to complete the coding process and create emerging themes. This process was used to identify relevant perceptions of missed opportunities and vaccinating at every opportunity.

Results: A total of 25 in-depth interviews (n=25) were conducted, nine with healthcare providers (n=9), nine with parents (n=9), and seven with adolescents (n=7). Most providers discussed applying the vaccinating at every opportunity approach. Parents were primarily hesitant of multiple vaccines during an acute visit due to potential contraindications. Adolescents were generally fearful of vaccines due to pain. There was no discussion of a standard protocol used to apply the vaccination at every opportunity method since some providers recommended vaccines during acute visits while others only provided vaccinations at wellness visits.

Discussion: Creating a practical and standard method to apply the vaccinating at every opportunity method that is recommended in the ACIP and CDC guidelines is necessary to reduce missed opportunities in HPV adolescent vaccination. A primary barrier to address is the adolescents' underutilization of preventive care services and examining alternative methods to promote and administer HPV vaccination to increase HPV vaccination uptake.

Keywords: HPV, vaccination, adolescent health, missed opportunities.

Introduction

Human papillomavirus (HPV) is a very common sexually transmitted infection (STI) among adolescents in the U.S.[1] HPV vaccination provides an opportunity to prevent HPV infections that cause anogenital tract and oropharyngeal cancers and genital warts; however, coverage and uptake in the United States remains low.[4, 16] Previous studies have examined the barriers to coverage and missed opportunities to immunize adolescents.[4, 23-27] A primary barrier addressed in the literature is adolescent utilization of preventative services. Many adolescents underutilize preventative care and do not visit health facilities often for these preventive services compared to other pediatric groups.

Physician and public health organizations urge healthcare providers to vaccination at every opportunity to promote and vaccinate their adolescent patients yet protocols necessary to enforce this principle have not been implemented to standardize this recommendation.[18-20, 23, 24] This study uses a qualitative research approach to explore the feasibility of vaccinating at every opportunity by understanding the perceptions of the provider, parent, and adolescent (patient) on using every opportunity to vaccinate adolescents.

Methods

Setting and Participants

We utilized outreach events at meetings of the Georgia chapter of the American Academy of Pediatrics to make connections with pediatric providers and practice managers around the state. From these contacts, we recruited two practices – one in an urban setting, and one in a rural setting - who agreed to allow individual-level recruitment of physicians, nurses, parents of 11-12-year-old adolescents, and the adolescents themselves for in-depth interviews.

The participant recruitment process for the parents and adolescents involved a contact information sheet that was given to each practice for distribution to parents at the time of check in. On this information sheet, we collected the parents' name, phone number, email address, best time for contact, and adolescent child vaccination status. These sheets were maintained at the practice until collected by the research staff who used this contact information to schedule in-depth interviews with the parents and adolescents. The research staff consisted of one male and three female interviewers which allowed gender matches between the participants and the interviewer. Parent and adolescent interviews were conducted independently by separate interviewers but conducted at the same time for logistical simplicity.

Prior to each interview, a research team member met with the participants individually to provide information about the research study and allowed the opportunity to ask questions as a part of the informed consent process. Healthcare providers were asked to provide informed consent for themselves. Parents were asked to provide informed consent for themselves and their adolescent child. The adolescents were also given information about the study and had the opportunity to provide assent after parental consent. All participants who consented to be interviewed were also asked to give consent for the interview to be audio-recorded. Informed consent and assent was documented through signed copies of the informed consent and/or assent document. The participants were offered a $50 gift card as a thank you for participating in the interview.

Key Informant Interviews

Interviews were conducted in person using a semi-structured interview guide. Interviews for the healthcare providers included questions regarding adolescent health and healthcare utilization, concerns about vaccines, communication between the parent/adolescent and the healthcare

providers, and assessment of potential novel interventions to improve adolescent vaccine acceptance and uptake. Interviews for the parents and adolescents included questions regarding adolescent healthcare in their practice, barriers and facilitators to adolescent vaccine acceptance and uptake, parental concerns about adolescent vaccines, strategies to address parental concerns, and assessment of potential novel interventions to improve adolescent vaccine acceptance and uptake. After the conclusion of the interview, research staff returned to the research offices and transferred the audio recording from the recorder to a password-protected, limited access networked server. All informed consent documentation, gift card tracking logs, and interview guides with notes were stored in a locked file cabinet in a locked office in the research space.

The study was approved by the Institutional Review Board of the lead author's university.

Qualitative Analysis

Individual research team members transcribed each interview into transcripts, which were stored on a password-protected, limited access network server. Transcripts were deidentified, and then analyzed using MaxQDA to complete the coding process. This process began with an initial reading of each transcript to create themes that emerged from the interviews and were relevant to the existing literature. Each theme was given a definition to ensure consistency when identifying these themes in each transcript. After selecting the themes, each transcript was analyzed to further examine the perceptions of the providers, parents, and adolescents to code each portion of the interview as it relates to each theme to extract relevant quotes that informed the emerged themes.

Results

A total of 25 in-depth interviews were conducted, 9 with healthcare providers, 9 with parents, and 7 with adolescents. A semi-structured interview guide was used after participant recruitment at two Georgia pediatric clinics, one urban and one rural.

Participant Demographics

Providers

Key informant interviews were conducted with 7 pediatricians and 2 clinical nurse coordinators. The sample was composed of eight females and one male participant. Seven providers were Caucasian and two were African American.

Parents

Key informant interviews were conducted with 9 parents. The sample was composed of 8 mothers and 1 father of at least one adolescent in their household. Over half of the parents were Caucasian, a third were African American, and one was of Asian descent.

Adolescents

Key informant interviews were conducted with 7 adolescents, five males and 2 females. Many of the adolescents were Caucasian, with two African Americans and one of Asian descent. All adolescents were between the ages of 11 to 12 years at the time of the interview; academic grade levels ranged from late elementary to early middle school (5th-7th grade).

The following key themes were examined during the analysis process: vaccination opportunities, vaccination process, visit type, and vaccine reluctance. Some topics were focused more on one group in the sample population than others.

Vaccination Opportunities

Provider Perspective

Providers felt that there were many opportunities to improve HPV vaccination uptake. Many agreed that parents needed continuous reminders of when their child was scheduled for the next vaccine dose. Most providers said their practice currently use phone reminder systems and refrigerator magnets to notify parents of their HPV vaccine appointments.

All providers felt that continuously educating parents on the purpose of the vaccine and what it prevents would be essential. Most providers also discussed the importance of schools requiring students to have HPV vaccination.

One provider said, *"…And so I- but if school had required it, she would have done it probably reluctantly and I feel like it's not going to get, we're not going to get that eighty, ninety percent until it is." – Doctor 2*

Others felt that the adolescents need to advocate for themselves on their health needs and inform their parents on what they feel are important measures to protect their health.

One provider said, *"…I think we probably could do a better job, um, putting the responsibility on adolescents. Um, cause we typically just rely on the parents. I know that an eleven-year-old, but I think um, you know, reaching the adolescents, um, and letting them know that, you know … this is their health and well-being as well. This is their body they need to protect." – Doctor 3*

The majority of the providers agreed that utilizing each patient visit to recommend and administer vaccines would also increase HPV vaccine uptake and completion of the vaccination series.

A quote from a provider said, *"…And some people are very on top of it like some families are very on top of it and some families' not. For the teenagers, I'll try to kind of catch it if they come back for sick visits but of course if they've got the flu or something they don't want to get a shot unless it's a follow-up for asthma or a follow up for something else, like for acne, but if they're sick they're not wanting to get…a shot when they're sick, so. It's a challenge." – Doctor 5*

Another provider said, *"Oh yeah, one visit, cause you never know if they're coming back. And um, maybe the other provider said this, at our conference um, in April, Georgia conference, um they it recommended changing our lingo and for me anyway I used to say these are required, this HPV is recommended, you know this is why and I've since said, "I recommend that you get all of these," and I've had very little to nobody not get the HPV." – Nurse 1*

Parent Perspective

Parents discussed that they received refrigerator magnets and phone reminders that were helpful in ensuring they did not miss an appointment. Parents had mixed feelings on vaccine recommendations that occurred during an acute or sick visit. Some expressed that this was acceptable while others thought it would be too overwhelming for a child who was ill.

One parent said, *"I didn't have an idea that that was going to happen and then actually it was probably good…I mean it would be so anxiety provoking there was no point in waiting to have it done." – Parent 1*

Another parent discussed how it would be an adjustment until it became a normal routine during patient visits. The parent said, *"...I mean if it was done as routine and norm…I don't think I'd care but it doesn't, um, I'm trying to think, it would certainly be odd initially..." – Parent 4*

Despite mixed views, a majority of the parents seemed amenable to vaccine recommendations during an acute/sick visit, but more hesitant towards administering the vaccine during these visits.

Vaccination Process

Provider Perspective

All of the providers said they adhere to the CDC guidelines and discussed similar vaccination processes at their practice. Providers used the state immunization information system, Georgia Registry of Immunization Transactions and Services (GRITS), to verify which immunizations the adolescent received, and which immunizations should be recommended based on the patient's age. Prior to each scheduled visit, providers reviewed the adolescent's immunization records and proceed to recommend the vaccines; most providers felt that the order in which the vaccines were recommended affected the parent's willingness to allow the adolescent to receive the HPV vaccine. Providers also discussed that they give the Vaccine Information Sheet (VIS) to parents and provide additional resources if they have questions. They also discussed that they recommended all adolescent vaccines and do not differentiate them by saying which vaccines are required and not required for school. All providers said nurses and medical assistants administered the vaccines during patient visits.

Visit Type

Provider Perspective

Many providers had mixed feelings on the parents' receptiveness to vaccine recommendations during unscheduled visits. Some providers experienced parents who allowed their child to receive all the recommended vaccines despite the primary purpose of the visit.

Other providers had experienced parents who would not allow their child to receive vaccinations if they were not given prior notice. A quote from a provider said, *"So I think it's more of a convenience for them and they look at it that way because its saving them a trip to come back, um, they don't have to worry about it, they're already here, you aren't that sick, you don't have a fever, we'll just go ahead and do it." – Nurse Coordinator 1*

Parent Perspective

Most parents felt that wellness visits were the most appropriate time to receive vaccines. Some discussed how they did not visit the doctor for sick visits often but would schedule visits if the child needed a vaccine. The majority of parents felt that they would accept vaccine recommendations during patient sick visits; however, some did not agree. Some parents discussed how they would prefer to be informed prior to any visit on the recommended vaccines for their child and if the child would receive the vaccine during the visit. One parent said, *"But um, if they were to spring something at me, like if I'm just going for this then I wouldn't do it because like it's totally not- we're going to a sprained ankle not, Hey, we gotta get that shot today right away. When y'all are supposed to tell us before." – Parent 2*

One parent discussed both parental perceptions on vaccinating at each visit. The parent said, *"It's just part of the, you know, I think you could capture some folks that way. Um, and you know, people are people. You know, you're going to get some they can appreciate it and some, they're just annoyed." – Parent 6*

One parent also discussed the importance of age and the amount of independence a child has in relation to vaccinating during a sick or acute visit. The parent said, *"You know, that's my—at that point, you know, just give it to them. Get it out of the way, it's convenient. And um, but when*

they get older, the convenience is taken away a little bit because they have similar independence and I got to tell them this is going to happen." – Parent 9

Some parents also described that they were willing to accept vaccine recommendations during acute/sick visits since they trusted the providers to take proper care of their child.
One parent said, *"...I'm okay with [providers discussing vaccines during a sick or acute visit] because I'm okay with it again because I trust that group. That lets me know too that they're looking, checking to make sure everything is up to date and the child has been taken care of." - Parent 5*

Overall, parents were amenable to receiving vaccine recommendations during sick or wellness visits, but it is more dependent on the severity of the adolescent's illness and whether parents were notified prior to the visit of the recommended vaccines.

Adolescent Perspective
Few adolescents were asked of their perspective on receiving vaccines at acute/sick visits. One adolescent that discussed this action seemed to think that it was something beneficial to do.
A quote from this adolescent said, *"I'd probably say I'd still [receive a vaccine if I sprained an ankle] because it may actually like help heal the sprain ankle factor or it could prevent any infection or any disease from occurring." – Adolescent 6*

Vaccine Reluctance

Provider Perspective

Providers felt that parents were the most reluctant to have their child receive the HPV vaccine. Most of the providers agreed that vaccine reluctance was due to the parents' concerns on how safe the HPV vaccine was, the age in which the vaccine was given, and potential side effects. Some providers discussed how vaccine reluctance is fear-based and related to school required and non-school required vaccines. A quote from a provider said, *"I think it's fear-based, I think that there's large, uh, amount of fear in the U.S. in general regarding vaccines… There's like this why would I do anything that's not required it must not be needed or approved or necessary." – Nurse Coordinator 2*

The majority of providers felt parents were hesitant towards vaccinating their child while they are being treated for another illness. Providers thought parents perceived that the administering of multiple vaccines and the present illness would lead to contraindications and result in the child acquiring an additional illness such as epilepsy or autism. Many providers agreed that the internet and media influence the parents' reluctance for the HPV vaccine. Providers also discussed different approaches on how to discuss vaccines with reluctant parents. Some providers try to educate parents on the safety and the importance of the HPV vaccine. Others answer questions and give parents more time to think about the information before they allow their child to receive the vaccine. Providers felt that parents who expressed reluctance towards all vaccines were more likely not to get the HPV vaccine and were more difficult to convince. Providers felt that adolescent vaccine reluctance was related to the pain of the injection and potential side effects. Providers discussed how they console reluctant adolescents by discussing

what will happen when they receive the vaccine and what they can do if they experience any pain.

Parent Perspective

Parents had the greatest reluctance towards the HPV vaccine. Unfamiliarity and limited vaccine knowledge, fear of safety, and discussion of sexual health led to a majority of the hesitancy in parents. Some parents felt their child was too young to receive the HPV vaccine since the child was not sexually active. Most parents were not reluctant towards vaccination procedures but had concerns relating to contraindications and the potential for illness when a child receives multiple vaccines at once. One parent who had these concerns discussed that her adolescent is on a delayed vaccination schedule. The parent said, *"I don't rely on the doctor to keep the chart." I space it out the way I want to and if I have to make an extra visit or an extra co-pay, so be it. Some people can't do that.*" *- Parent 7*

Parents also felt that it would be surprising or unsettling if providers began to recommend and administer vaccines at visits that were not initially scheduled for vaccinations. Some discussed that they would prefer to be notified of vaccine recommendations prior to the scheduled visit.

Discussion

Providers, parents, and adolescents were amenable to vaccination recommendations occurring at each visit. Providers generally followed the CDC guidelines and provided vaccination information to parents and adolescents. Parents seemed more hesitant towards multiple vaccinations at one visit and preferred early notification of the recommended vaccines due for their adolescent. Adolescents were indifferent towards vaccination recommendations and receiving vaccines during acute or sick visits.

Research Implications

Understanding the perceptions of the providers, parents, and adolescents gave insight into the receptiveness of the CDC and NVAC guidelines to use every opportunity to recommend and vaccinate patients. The results showed there were inconsistencies primarily at the provider and parental levels on the feasibility and acceptance of this recommendation. Providers discussed that they followed national immunization guidelines; however, some providers were not using every opportunity to vaccinate while others expressed that they did apply this method. Parents discussed these inconsistencies in the results as some mentioned the providers did discuss vaccinations at sick visits while others had not experienced this approach from providers.

Although the vaccinate at every opportunity approach is embedded in the national guidelines, there is variability in the receptiveness of this approach during patient visits. Providers agree that the application of this method would increase HPV vaccination uptake and lead to more vaccination series completed; however, there is no practical and standardized approach specified in the national guidelines for the providers to apply in practice. Although parents would be hesitant to receive vaccine recommendations during an acute visit, the continuous application of using every opportunity to vaccinate would become normalized after consistent use. This aspect of capitalizing on acute visits would lend to an adjustment period from the parents and providers and should be acknowledged during the implementation phase of this strategy.

Relevance of the study

This study is relevant since it describes the perceptions of vaccination opportunities at every level. The study provides a basis for future research, specifically in optimizing health care staff utilization, adolescent age, frequency for adolescent visits, and examining potential areas for

HPV vaccine promotion and distribution. The narrative described by the participants show the complexity of vaccinating at every opportunity and provides researchers and policy makers evidence-based support to assist in the development of practical and standard methods to formalize this approach. This study also contextualizes the nuances involving the vaccinate at every opportunity standard and shows that is not the only solution to resolve the issue. Applying this principle in combination with other tools to increase knowledge and mitigate the negative stigma associated with the vaccination also serves an important purpose in addressing HPV vaccination uptake. The overall research provides information for future implementation of these standards into provider training curricula and health facilities.

Significance

The research findings are significant despite a small sample size. There is limited research in this area, which allows this preliminary research to begin to allow immunization experts and health professionals to understand some of the nuanced issues in using each opportunity to vaccinate adolescents. Participants also provided insight on the feasibility and receptiveness of vaccinating at every opportunity in health care settings.

Strengths and Limitations

A strength of the research is that it serves as a pilot study to begin the exploration of how to implement vaccinations at every opportunity. Participants from both rural and urban environments was beneficial to help address all individuals involved in adolescent health care and increase the potential for generalizability. However, this study has some limitations. The results had high variability and mixed views. A larger sample size would help ameliorate the ambiguity and mixed perceptions to help delineate clear perceptions on vaccinating at every opportunity. Greater variability in the sample population in terms of race, age, and profession

would strengthen the study. In addition, increasing the sampling frame from two clinics to several other clinics in Georgia would lead to data saturation. This calls for future research involving a larger qualitative study to assess the feasibility of vaccinating at every opportunity on all levels (provider, parent, and adolescent).

Chapter 4: Recommendations & Conclusion

Recommendations

Using every opportunity to vaccinate would lead to an increase in HPV vaccination rates but would require standard and practical methods that would be used to train providers. Utilizing all healthcare professionals, not merely doctors, would also assist in the increase and alleviate some of the burden and time it takes to apply prevention services. When developing the guidelines, immunization experts should consider the target age of the adolescents and the frequency of their hospital visits. Parents mentioned that they did not bring their child to the hospital often because the child did not get injured or sick often.

Exploring other alternatives by using every day spaces such as grocery stores, pharmacies, or non-profits to recommend and administer vaccinations would be beneficial; in addition, developing promotional and marketing campaigns to bring awareness of other vaccinations sites would help people know where to receive vaccinations at other venues Addressing the complexities of applying this approach by considering children who may have pre-existing conditions and the potential contraindications is also important. It is also necessary for future research to address vaccine types when considering vaccinating at every opportunity to examine if parents are more receptive to Tdap than HPV in a setting that applies the vaccinating at every opportunity principle.

Examining the vaccination process at different health facilities such as a small community-based clinic compared to a large national hospital would also help to describe logistical measures that could impact the feasibility of the developed standards. Other stakeholders should assist in the development process such as health economic experts who would assess the resources needed

and how to appropriately allocate these resources. A cost benefit analysis could be conducted to ensure that the benefits outweigh the risks when implementing the developed standard. Providers should also share more information on the potential for contraindications relating to the HPV vaccine to parents to improve their knowledge on the safety of simultaneous immunizing at each health visit.

Conclusion

Vaccinating at every opportunity is critical to increase HPV vaccination uptake in the U.S. Perceptions at all levels are receptive towards this method and supports the need for a standard guideline and protocol to be developed. Immunization experts, health providers, and other relevant stakeholders should develop a comprehensive protocol that is amenable to those in the field and recipients of the protocol. Conducting more research studies relating to this topic would help in the efforts of providing more evidence-base support to guide the development of the protocol to ensure its feasibility and receptiveness in the healthcare community.

References

1. Mcquillan, G., et al., *Prevalence of HPV in Adults Aged 18-69: United States, 2011-2014.* NCHS data brief 2017. **April 2017**(280): p. 1-8.

2. Hariri, S., et al., *Prevalence of genital human papillomavirus among females in the United States, the National Health And Nutrition Examination Survey, 2003-2006.* J Infect Dis, 2011. **204**(4): p. 566-73.

3. Dunne, E.F., et al., *Human papillomavirus (HPV) 6, 11, 16, and 18 prevalence among females in the United States--National Health And Nutrition Examination Survey, 2003-2006: opportunity to measure HPV vaccine impact?* J Infect Dis, 2011. **204**(4): p. 562-5.

4. Center for Disease Prevention and Control, *Human papillomavirus vaccination coverage among adolescent girls, and postlicensure vaccine safety monitoring, 2006– 2013—United States.* MMWR Morb Mortal Wkly Rep, 2014. **63**(29): p. 620-624.

5. Petrosky, E., et al., *Use of 9-Valent Human Papillomavirus (HPV) Vaccine: Updated HPV Vaccination Recommendations of the Advisory Committee on Immunization Practices.* MMWR. Morbidity and Mortality Weekly Report, 2015. **64**(11): p. 300-304.

6. Markowitz, L.E., et al., *Quadrivalent Human Papillomavirus Vaccine: Recommendations of the Advisory Committee on Immunization Practices (ACIP).* Morbidity and Mortality Weekly Report: Recommendations and Reports, 2007. **56**(RR-2): p. 1-24.

7. Yang, D.Y. and K. Bracken, *Update on the new 9-valent vaccine for human papillomavirus prevention.* Canadian Family Physician, 2016. **62**(5): p. 399-402.

8. American Cancer Society. *Key Statistics for Anal Cancer*. 2018 January 4, 2018 [cited 2018 March 11]; Available from: https://www.cancer.org/cancer/anal-cancer/about/what-is-key-statistics.html.

9. American Cancer Society. *Key Statistics for Cervical Cancer*. 2018 January 4, 2018 [cited 2018 March 11]; Available from: https://www.cancer.org/cancer/cervical-cancer/about/key-statistics.html.

10. American Cancer Society. *Key Statistics for Oral Cavity and Oropharyngeal Cancers*. 2018 March 9, 2018 [cited 2018 April 1]; Available from: https://www.cancer.org/cancer/oral-cavity-and-oropharyngeal-cancer/about/key-statistics.html.

11. American Cancer Society. *Key Statistics for Vaginal Cancer*. 2018 January 4, 2018 [cited 2018 March 11]; Available from: https://www.cancer.org/cancer/vaginal-cancer/about/key-statistics.html.

12. American Cancer Society. *Key Statistics for Vulvar Cancer*. 2018 January 16, 2018 [cited 2018 March 11]; Available from: https://www.cancer.org/cancer/vulvar-cancer/about/key-statistics.html.

13. Mayne, S.L., et al., *Effect of Decision Support on Missed Opportunities for Human Papillomavirus Vaccination.* American Journal of Preventive Medicine, 2014. **47**(6): p. 734-744.

14. Bilukha, O.O., N. Rosenstein, and National Center for Infectious Diseases - Center for Disease Control and Prevention (CDC), *Prevention and Control of Meningococcal Disease: Recommendations of the Advisory Committee on Immunization Practices (ACIP).* Morbidity and Mortality Weekly Report: Recommendations and Reports 2005. **54**(RR-7): p. 1-21.

15. Broder, K.R., et al., *Preventing Tetanus, Diphtheria, and Pertussis Among Adolescents: Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP).* Morbidity and Mortality Weekly Report: Recommendations and Reports, 2006. **55**(RR-3): p. 1-42.

16. Walker, T.Y., et al., *National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13–17 Years — United States, 2016.* MMWR. Morbidity and Mortality Weekly Report, 2017. **66**(33): p. 874-882.

17. U.S. Department of Health and Human Services - Office of Disease Prevention and Health Promotion. *Healthy People 2020: Immunization and Infectious Diseases*. 2018; Available from: https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases/objectives.

18. National Vaccine Advisory Committee, *Standards for Child and Adolescent Immunization Practices.* Pediatrics, 2003. **112**(4): p. 958-963.

19. American Academy of Pediatrics. *Immunizations: Office of Strategies for Improving Immunization Rates* 2018 [cited 2018 March 11]; Available from: https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/immunizations/Practice-Management/Pages/office-strategies.aspx.

20. Kroger, A.T., J. Duchin, and M. Vázquez. *General Best Practice Guidelines for Immunization. Best Practices Guidance of the Advisory Committee on Immunization Practices (ACIP)* Contraindications and Precautions 2013 February 21, 2018 [cited 2018 March 25]; Available from: https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/downloads/general-recs.pdf.

21. Meites, E., A. Kempe, and L.E. Markowitz, *Use of a 2-Dose Schedule for Human Papillomavirus Vaccination—Updated Recommendations of the Advisory Committee on Immunization Practices.* American Journal of Transplantation, 2017. **17**(3): p. 834-837.

22. Center for Disease Prevention and Control. *Supplemental information and guidance for vaccination providers regarding use of 9-valent HPV*. 2016 January 25, 2018 [cited 2018 April 3]; Available from: https://www.cdc.gov/hpv/hcp/clinician-factsheet.html.

23. Szilagyi, P. and L. Rodewald, *Missed Opportunities for Immunizations: A Review of the Evidence.* J Public Health Manag Pract, 1996. **2**(1): p. 18-25.

24. Wong, C.A., et al., *Missed Opportunities for Adolescent Vaccination, 2006–2011.* Journal of Adolescent Health, 2013. **53**(4): p. 492-497.

25. Rand, C.M., et al., *National health care visit patterns of adolescents: Implications for delivery of new adolescent vaccines.* Archives of Pediatrics & Adolescent Medicine, 2007. **161**(3): p. 252-259.

26. Lee, G.M., et al., *Adolescent Immunizations: Missed Opportunities for Prevention.* Pediatrics, 2008. **122**(4): p. 711-717.

27. Yu, S.M., et al., *Factors associated with use of preventive dental and health services among U.S. adolescents1 1The opinions expressed in this paper are the authors' and do not necessarily reflect the views or policies of the institutions with which the authors are affiliated.* Journal of Adolescent Health, 2001. **29**(6): p. 395-405.

28. Head, K.J., et al., *A retrospective and prospective look at strategies to increase adolescent HPV vaccine uptake in the United States.* Human Vaccines & Immunotherapeutics, 2018: p. 1-10.

29. Yarnall, K.S.H., et al., *Primary Care: Is There Enough Time for Prevention?* American Journal of Public Health, 2003. **93**(4): p. 635-641.