Pre-existing Chronic Health Conditions and Health Insurance Status as Determinants of Vaccine Receipt Among Adolescents in Richmond County, Georgia

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Purpose: The Advisory Committee on Immunization Practices (ACIP) recommends four vaccines for adolescents on the routine immunization schedule: Tdap, HPV, MCV4, and a yearly seasonal influenza vaccine. While effective strategies for improving vaccination rates among adolescents may be needed, certain vulnerable populations such as those with chronic health conditions or no health insurance need specific approaches due to higher susceptibility or lower perceived access to vaccines. We examined the impact of a multi-faceted intervention designed to promote vaccine acceptance among middle and high-school adolescents in eastern Georgia.

Methods: We conducted a cluster-randomized controlled trial among adolescents in Richmond County, Georgia. Eleven schools were recruited and randomized for their students to receive either: Arm 1) no Intervention; Arm 2) informational materials sent to parents; Arm 3) Arm 2 materials plus an in-class curriculum for students. Parents in all arms were surveyed by telephone or website each year to assess attitudes and beliefs about the four recommended adolescent vaccines, self-report of vaccine receipt of their adolescent(s) or teen(s), chronic health conditions and insurance status. The surveys were administered at baseline and during the two subsequent intervention years. Chi-square tests were performed using SAS for this preliminary analysis to assess differences between groups (significance at p<0.05).

Results: We identified 686 parents in total from the three intervention arms (Arm 1 n=210, Arm 2 n=251, Arm 3 n=225). Overall, 91% reported that their teen had received at least one of the four adolescent vaccines. For chronic health problems, 71% reported that their teen had no health problems, while 23% reported asthma, <1% reported sickle cell anemia or diabetes, and 4% reported other health problems (eczema, allergies, etc). For insurance, 60% used Medicaid, 34% used private insurance and 6% had no insurance. Among families with no insurance, 71% of teens had received at least one adolescent vaccine whereas families using Medicaid or private insurance reported higher vaccination rates, 93% and 91% respectively (p<0.0001). For teens with at least one chronic health condition, 98% had received one or more adolescent vaccine versus 89% of teens with no chronic health conditions (p<0.0001). Both the overall insurance and chronic health condition associations persisted regardless of intervention arm and were statistically significant in Arms 2 and 3.

Conclusions: The lower vaccination rates among teens with no insurance reveals an additional area for intervention. The Vaccines for Children program offers ACIP recommended vaccines free of cost to any child under the age of 18 who is eligible (e.g. has no health insurance). While this information was included in our parent brochure, this finding highlights a communication priority. The higher reported vaccination rates among teens with a chronic health condition is reassuring, and possibly indicates a higher perceived susceptibility among these children, a higher perceived sense of efficacy provided by vaccines, or simply more interaction with and emphasis by providers among this population.

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**HPV Vaccine Hesitancy: Findings From a Statewide Survey of Health Care Providers**

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**Purpose:** Despite national guidelines for routine administration of human papillomavirus (HPV) vaccine to 11-12 year old females and males, uptake remains suboptimal. Communication with a doctor or other health care provider about HPV vaccine is an important predictor of vaccine uptake yet, little is known about providers’ communication with parents who are perceived as hesitant to get their child vaccinated against HPV. We sought to describe health care providers’ HPV vaccine recommendation practices and to explore their perceptions of, and approaches to addressing, HPV vaccine hesitancy among parents of young adolescents.

**Methods:** A statewide sample (n=575) of Minnesota health care providers drawn from state Board lists completed our online survey in April 2013. Respondents were pediatricians (20%), family physicians (47%), and nurse practitioners in pediatric and family specialties (33%). We analyzed data using descriptive statistics and assessed differences by provider type using chi-square analyses and one-way ANOVAs. Logistic regression analyses assessed associations between HPV vaccine recommendations and (a) parental reactions to HPV vaccine recommendations, and (b) providers’ self-efficacy to address parental concerns, controlling for provider type.

**Results:** Only three-quarters of providers (76%) reported routinely recommending HPV vaccine for girls ages 11-12, and far fewer (46%) did so for boys of the same age (p<.001). Pediatricians recommended HPV vaccine for boys more frequently than did family physicians or nurse practitioners (67% vs. 42% and 41% respectively, p<.001); there were no statistically significant differences in recommendation practices for girls by provider type. Health care providers reported that parents frequently reacted to HPV vaccine recommendations with requests to delay vaccination (51%) or with vaccine refusal (12%). While most (74%) reported asking questions to explore parents’ concerns, many felt they lacked time to probe parents’ reasons (47%) or that there was not much they could do to change parents’ minds (55%). Providers who more frequently reported that parents request to delay or refuse HPV vaccine had lower odds of routinely recommending the vaccine to girls or to boys (OR=.40 and OR=.46, respectively, both p<.001). Providers with higher self-efficacy to address parental concerns had greater odds of routinely recommending HPV vaccine (p<.05). Information tailored to parents’ specific concerns or cultural background, screening tools to identify specific concerns, and discussion guides were identified as potentially helpful tools for addressing HPV vaccine hesitancy.

**Conclusions:** Health care providers perceive parental HPV vaccine hesitancy as widespread and such hesitancy may discourage providers from routinely offering the vaccine. Findings suggest that improving providers’ self-efficacy to address parental vaccine hesitancy may be important for improving HPV vaccine uptake in the target age group, and point to potential avenues for tools and strategies to support these efforts. Future research is needed to identify effective ways of recommending HPV vaccine and best practices for assessing parental concerns.

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Baseline Trust in School-located Immunization Programs: Correlates and Future Directions
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Purpose: School-located immunization programs (SLIPs) provide a convenient avenue of access for adolescents to receive their vaccines, and trust in SLIPs is an important factor in parents’ decisions to participate. The extent to which parents trust SLIPs is unknown. The aim of this study was to examine baseline trust in SLIPs of a low-income, largely Hispanic population of middle school students’ parents prior to the implementation of a SLIP in their school.

Methods: Middle schools with high percentages of students in the free lunch program were invited to participate in a multi-visit SLIP in Fall, 2012. Eight schools participated and received surveys in Spanish and English for parents to complete. Surveys assessed demographic items (race, ethnicity, level of education, primary language spoken at home, annual household income, type of child’s health insurance, child’s participation in a medical home), history of participation in SLIPs, and degree of agreement with the importance of vaccines. Parental trust in SLIPs was assessed using a five-item scale; mean trust score (range: 1-5, 5 = maximum trust) was calculated based on parents’ responses to the scale items. Associations between demographic items and trust score were examined using two-sample t-tests, one-way ANOVA, and multiple regression analysis.

Results: 1608 of 1913 surveys contained completed 5-item scales and were included in the analysis. The majority of respondents were Hispanic (85%), spoke Spanish at home (67%), had a medical home for the child (82%), had never participated in a SLIP (86%) and felt that vaccines were important (93%). One-third of parents reported an annual income =$10,000, and fewer than 5% of respondents had an annual income over $50,000. Medicaid/CHIP (68%) was the primary form of insurance for children. Mean trust score among all respondents was 3.59; 25% had a trust score corresponding to 3.0 or below. Correlation between reported assessment of vaccines’ importance and trust in SLIPs was 0.20 (P<0.001). Statistically higher mean trust scores were noted among parents who: had an annual income < $50,000 (3.60) vs higher income (3.32); completed Spanish surveys (3.68) vs English (3.53); had previously participated in a SLIP (3.76 vs 3.57); identified as Hispanic (3.61 vs 3.51); had not graduated from high school (3.63 vs 3.56); were Medicaid or self-pay (3.59, 3.70) vs those with private insurance (3.44); and those who spoke Spanish (3.62) vs those who spoke primarily English (3.53) at home. In the multiple regression analysis, survey version, annual income, perceived vaccine importance, Medicaid versus private insurance, and previous SLIP participation were significant independent variables in the model describing trust; however, all betas were less than 0.16, implying questionable practical importance.

Conclusions: These analyses indicate that parental trust in SLIPS among a primarily lower SES, Hispanic population in a large, urban area was high. Future research should examine whether greater trust in SLIPS is associated with greater likelihood to participate in school-located immunization programs.

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Social and Behavioral Factors Associated with HPV Vaccination Uptake in Adolescents
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Purpose: HPV vaccination uptake has plateaued compared to its adolescent vaccine counterparts. With persistently low proportions of adolescents receiving HPV vaccination, the true benefits of a safe and effective vaccine cannot be fully achieved. To increase HPV vaccination, we sought to determine social and behavioral factors that may contribute to vaccination uptake.

Methods: Data were obtained from male and female patients, ages 11-21 at an outpatient pediatric and adolescent clinic in the South. Demographics, insurance status and HPV vaccination history were obtained through electronic medical record abstraction. The self-administered Guidelines for Adolescent Prevention Services cross-sectional survey was used to collect data on health, risk and protective behaviors. Chart abstraction and survey data were combined and analyzed using STATA 12.0. Univariate analysis was used to evaluate sample characteristics and bivariate chi-square analysis assessed associations between demographics, insurance and behaviors on HPV vaccination initiation and completion.

Results: 314 adolescents (48% male, 52% female, 21% white; 45% black, 27% Hispanic, 8% other) participated. Most had public insurance or were uninsured (82%). 36% of teens had initiated HPV vaccination; 43% completed vaccination. There were no differences in HPV vaccination initiation or completion between those with public or private insurance or uninsured. There were differences in vaccination uptake by race, but these differences were not statistically significant. Females were more likely to complete vaccination than males (54% vs. 32%, x2<0.001). Increasing age was also associated with HPV vaccination completion (x2<0.001). At age 11, 75% had begun the HPV vaccination series, but none had completed it. The greatest initial peak of HPV vaccination completion occurred at age 15, where 61% of 15 year olds had completed vaccination, compared with 38% of 12 year olds, 33% of 13 year olds and 52% of 14 year olds. Teens who reported currently dating (56%), prior sexual activity (61%), having sexually active friends (60%), or using pregnancy prevention methods (56%) were more likely to complete HPV vaccination than those who did not (x2<0.05). Teens who reported their parents discussing sex with them were more likely to complete vaccination than those whose parents did not discuss sex with them or those who were unsure (47% vs. 24% vs. 32%, x2= 0.014). No other personal risk behavior measured: eating/weight/body, schools, weapons/violence/safety, tobacco, substance use, emotions or special circumstances were significantly associated with HPV vaccination.

Conclusions: Among the measured demographics and behaviors surveyed, only female gender, age, parent discussion of sex, and teen sexual behaviors were associated with HPV vaccination initiation and/or completion. While encouraging that sexually experienced adolescents were more likely to be vaccinated, it is important to ensure vaccination of young adolescents prior to sexual activity and emphasize HPV vaccination of males. Since parent communication about sex was associated with increased vaccination, future interventions incorporating parent discussions of sex may be effective and should be explored.

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Do Adolescents Want Their Parents to Receive Text Message Reminders for Their Appointments?
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Purpose: Application of text messaging by health care providers among adolescent patients is often shaped by provisions for keeping information about health care encounters among adolescents confidential from their parents or guardians. We examined text messaging enrollment patterns among adolescents and their guardians to determine whether adolescents and their parents seek similar partitioning of information.

Methods: Data were drawn from a study offering text message appointment reminders to adolescents (ages 11-21) and/or their parents for the HPV vaccine in a single urban clinic in an academic medical center. Adolescents receiving either the first or second HPV vaccine in the 3-dose series were offered the option of receiving text message appointment reminders for subsequent doses. Adolescents were offered the option of having reminders sent to their phone, to the phone of a parent or guardian, or to both. During the consent process, each potential participant (adolescent or parent) was reminded of adolescents' rights to obtain confidential care and that the confidentiality of text messages cannot be guaranteed. Descriptive and chi-squared analyses were used to examine recipient preferences and whether these varied by age, gender, and contract versus pay-as-you-go cellular plans. Based on analysis of enrollment preference patterns, participants were grouped by the following age categories: 11-15, 16-17, and 18-21.

Results: In a 4-month period, 211 patients had at least 1 family member opt to receive appointment reminders for the adolescent’s next dose of HPV. We had 231 discrete phone numbers—including 20 adolescent and parent pairs jointly enrolled—and only 5 recipients without unlimited texting and 68 pay-as-you-go plans (vs 162 contract vs 1 text application). The average age at enrollment was 14.4 years (Median 13.6 years, SD 2.8). One-quarter (N=52) of recipients were adolescents, 65.9% (N=139) were parent/guardian, and 9.5% were sent to both the adolescent and parent (N=20). 112 adolescents enrolled at shot 1 and 99 enrolled at shot 2.

Adolescent preference for having a parent receive reminders did not vary by gender (p=0.88); however there were differences in enrollment patterns by age. Among adolescents ages 11-15, 93.5% of families opted to have text messages sent to the parent (either alone or in conjunction with the adolescent); of those ages 16-17, 51.8% of adolescents elected to be the sole recipient, while 48.2% elected to have messages sent only to the parent or to both the parent and adolescent. Of those 18 and older, 90.3% opted to have all text messages sent only to the adolescent (p<0.001).

Conclusions: In an urban clinic setting, younger adolescents (=15) prefer to have parents receive reminders. As adolescents age, they prefer to be the only recipient of text message reminders. This suggests that adolescents and their families can, when given the option, make informed and reasoned choices about the flow of information about appointments. Health care providers should make every effort to provide a range of communication options to adolescents and not make assumptions about their preferences for sharing information with parents or guardians.

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Human Papilloma Virus Vaccine Continuation, Completion and Missed Opportunities
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Purpose: Adolescent immunization rates for all vaccines are low when compared to the high rates of childhood immunization in the US. This is especially true with multi-dose vaccines, such as the Human Papilloma Virus (HPV) vaccine. The American Academy of Pediatrics recommends HPV vaccination for females and males from 11 to 26 years of age. Missed opportunities for the HPV vaccine are common. The CDC reports that in 2012, if all missed opportunities for initiation of HPV vaccination had been eliminated, coverage with ≥1 dose of HPV vaccine could have reached 92.6%. Even after the vaccine has been initiated, there are still many occasions for missed opportunities. Adolescents who are 18-25 years old have particularly low rates of starting and completing the HPV vaccine. Delayed or non-completion of HPV series may decrease protection against HPV infection especially if exposure to HPV occurs prior to completion. Our objective was to examine HPV series completion in adolescent-specific, medicine and family planning clinics and to assess the frequency of missed opportunities when adolescents come in for any type of care.

Methods: Electronic medical records were queried for young women 18-25 years old who initiated the HPV vaccine series in the Adolescent Medicine, Young Mother’s or Family Planning clinics at Children’s Hospital Colorado from 1/1/2010 to 12/31/2011. Visits for preventive or non-preventive care during appropriate dosing intervals of HPV vaccine where the 2nd (4-14 weeks after 1st dose) or 3rd (21-40 weeks after 1st dose and >12 weeks after 2nd dose) doses were not administered were counted as “missed opportunities.”

Results: 567 females initiated the HPV series during the study period and 22.2% of these patients completed the full series within one year of initiation. 33.5% of patients who did not receive their 2nd dose had at least one missed opportunity visit and 23.8% of patients who received the 2nd but not 3rd dose had a missed opportunity for completion. Women who initiated the vaccine in the Family Planning clinic were less likely to have missed opportunities than those who initiated in other adolescent clinics (29.8% v. 42.2%; p<0.005). There were no racial or ethnic differences between those who completed the series and those who did not.

Conclusions: A significant number of adolescent females who initiated the HPV vaccine had missed opportunities for continuation and completion. This emphasizes the importance of provider-awareness of vaccine updates at every adolescent visit. The lower missed opportunity rate in Family Planning may reflect increased provider knowledge and counseling focused on the importance of HPV vaccination. Our overall completion rate is significantly lower than previously published rates and may reflect older adolescents’ inexperience in managing their own preventive health care. Our results clearly identify the need for provider and patient interventions to improve vaccine series completion.

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Vaccinating Sons Against HPV: Results From a U.S. National Study of Parents
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Purpose: HPV is the most common sexually transmitted infection. The quadrivalent HPV vaccination was approved for use in males ages 9 to 26 in 2009 and recommended for routine administration in 2011. The purpose of this study was to uncover predictable commonalities amongst parents who chose to vaccinate their 11-17 year old sons against HPV.

Methods: We complied data from a U.S. national sample of parents with sons 11-17 years old using a web-based survey. Using a survey research company (SSI), we collected data from a national sample of U.S. adults in July and August of 2012. This survey covered parental demographics, political affiliation, and religious service attendance, parental discussion of sexual health topics with their sons, son’s health care utilization and recent influenza vaccination history. We used binary logistic regression to model sons’ receipt of 1 or more doses of HPV vaccine. Behavioral and sociodemographic predictors were first modeled individually for univariate associations and then significant predictors (p<.05) were combined in a multivariable model. All analyses were performed using SPSS 21.

Results: A total of 779 parents (52% female) with a mean age of 42 years (SD 11.54) completed the survey. Overall, 21.7% of parents reported that their son had received one or more doses of HPV vaccine. Increasing parental age was associated with decreased odds of HPV vaccination (OR 0.98; 95% CI 0.96-0.99). Parents who had discussed sexual health topics with their sons were more likely to vaccinate (OR 1.61; 95% CI 1.37-1.89). Sons who were evaluated by healthcare providers sometime in the last year more frequently received at least one dose of the vaccine (OR 2.22; 95% CI 1.12-4.40) as did those who had received a flu shot in the last two years (OR 1.82; 95% CI 1.45-2.26). Parent gender, religiosity, political affiliation, parental education, and sons’ age were not significant predictors of HPV vaccination.

Adjusted odds ratios, controlled for ethnicity, confirmed that parental age (AOR 0.98; 95% CI 0.97-0.99), openness to discuss sexual health with sons (AOR 1.58; 95% CI 1.33-1.88), and receiving a flu shot in the last two years (AOR 1.71; 95% CI 1.36-2.15) remained independent predictors of HPV vaccination in a multivariate model.

Conclusions: The rate of male vaccination in this study, although low, is higher than 2011 national CDC data. There is a significant increase in rate of vaccination in those who have had exposure to health care providers. Both SAHM, and Bright Futures, recommend routine care for adolescents. This study suggests that vaccination rates would increase by following this practice. Additionally, the finding that older parents were less likely to vaccinate their sons is interesting and may have implications for clinical practice, but requires further investigation.

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Longitudinal Impact of Knowledge and Risk Perceptions on Sexual Attitudes and Behaviors Among 11-12 year-old Girls Following HPV Vaccination
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Purpose: Our aim was to examine 1) the impact of knowledge about human papillomavirus (HPV) and the HPV vaccine on vaccine-related risk perceptions, and 2) the impact of knowledge and risk perceptions on sexual attitudes and behaviors among 11-12 year-old girls over the 30 months after receiving their first HPV vaccine dose.

Methods: Participants (n=25) were recruited from urban and suburban practices. They completed individual semi-structured interviews within 2 days of and at 6, 18, and 30 months after their first HPV vaccine dose. At each interview, knowledge, risk perceptions, and attitudes about sexual behaviors were assessed. History of sexual activity was assessed at 30 months. Risk perceptions were assessed by asking the participant whether she perceived that the HPV vaccine 1) decreased her risk of HPV and 2) decreased her risk of sexually transmitted infections (STIs) other than HPV. Appropriate risk perceptions were defined as participant report of decreased risk of HPV and no decreased risk of other STIs. Sexual attitudes were assessed by asking the participant how her risk perceptions about HPV and other STIs would influence her future decisions about sexual behaviors. Interviews were conducted face-to-face by a trained interviewer, audiorecorded, and transcribed by an independent transcriptionist. The authors analyzed the qualitative data systematically using a Framework analysis approach.

Results: Baseline knowledge about HPV and HPV vaccine was generally poor. In 12 of 25 participants, knowledge increased over time, primarily due to conversations with mothers and sexuality education in school. Most girls (n=21) developed appropriate risk perceptions about HPV by the 30-month visit; however, only half of girls (n=14) developed appropriate risk perceptions about other STIs. Girls who reported good baseline knowledge and/or increasing knowledge were generally able to articulate risk perceptions and developed appropriate risk perceptions over time. Conversely, girls who reported poor baseline knowledge and/or no increase in knowledge over time were unable to articulate risk perceptions and developed inappropriate risk perceptions. Among girls who could articulate how their risk perceptions about HPV and other STIs would influence their future decisions about sexual behaviors, all but one reported a plan to abstain from sex or practice safer sexual behaviors. While some girls endorsed feeling safer having sex following vaccination, the vast majority of girls (n=23) felt unsafe having unprotected sex and endorsed the need to practice safer sexual behaviors. By 30 months, 6 participants had initiated sexual activity. Among these girls, none had good or increasing knowledge and none had appropriate or increasingly appropriate risk perceptions. In contrast, the majority of girls who had not initiated sexual activity had good or increasing knowledge (11/19) and appropriate risk perceptions (10/19).

Conclusions: We found a link between good knowledge, appropriate risk perceptions, healthy sexual attitudes, and protective sexual behaviors. Providing education about HPV, STIs, and the HPV vaccine may help girls form appropriate risk perceptions, which may strengthen their decisions to practice safer sexual behaviors.

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