TRAINING FOR PEDIATRIC RESIDENTS ON PREGNANCY OPTIONS COUNSELING
Laura Kirkpatrick, MD, Susan Wiener, MD, Lauren Bell, MD, Nicholas Szoko, MD, Benjamin Hazen, MD, Amy Collins, MD, Tahniat Syed, MD  
UPMC Children’s Hospital of Pittsburgh

Purpose: The purpose of this study was to evaluate the effectiveness of a roleplay-based training on pregnancy options counseling (POC) skills for first-year pediatric residents. The American Academy of Pediatrics recommends that pediatricians should be prepared to provide comprehensive POC to pregnant adolescents. There have been no previous published studies evaluating the efficacy of a roleplay-based training on POC among pediatric residents.

Methods: We developed a two-hour, resident-led, small group simulation-based curriculum including short didactic and role-plays among first-year pediatric residents (n=35). The role-plays included a simulated patient and facilitator covering 6 different case scenarios involving POC. One case addressed conscientious objection. Our primary outcome was knowledge and confidence regarding POC before and after training, and our secondary outcome was comparison of these measures between trained first-year residents and untrained senior residents (second-year and above). Outcomes were assessed with pre- and post- online surveys. Data were analyzed using Chi-square and Wilcoxon signed-rank tests.

Results: 35 first-year residents completing a training, and 34 completed pre/post surveys. 33 senior residents completed a survey but not training. On knowledge-based questions, first-year residents and senior residents initially scored 44% and 45% correct respectively (Chi-square = 0.2, P=0.91), while trained PGY-1 residents improved to scoring 81% correct (pre/post Chi-square = 27.85, p<0.00, trained first-year/senior Chi-square = 25.95, P<0.00). 90% of PGY-1 residents improved in their self-rating of their ability to discuss and refer ofr abortion (Z=-4.569, P<0.00), while 97% and 93% reported similar improvement regarding adoption (Z=-4.652, P<0.00) and parenting/prenatal care (Z=-4.671, P<0.00). Trained interns also more positively rated their abilities in these areas than untrained seniors for all options (Abortion: 93% vs. 33% positive self-rating, Chi-square=33.509, P<0.00); Adoption: 100% vs. 58% positive self-rating, Chi-square=51.56, P<0.00; Parenting/prenatal care 100% vs. 34% positive self-rating, Chi-square = 40.81, P<0.00). In addition, only 20% and 22% of PGY-1 and senior residents positively rated their knowledge of referral options before the training, while 97% of trained PGY-1 residents positively rated their knowledge of referrals (pre/post Chi-square=117.39, P<0.00, trained first-year/senior Chi-square = 116.71, P<0.00). The training was rated highly by participants in terms of importance (3.93/4) and usefulness (3.84/4) on Likert-type scales.

Conclusions: We demonstrate a novel approach to training pediatric residents in comprehensive POC as recommended in the most recent AAP policy. Untrained interns and senior residents performed similarly on assessments of knowledge and confidence in skills, suggesting that residency experience alone is not providing training in this skillset. PGY-1 interns significantly improved in knowledge an confidence after training and outperformed their seniors. Our intervention yielded increased knowledge regarding pregnancy options and self-reported ability to discuss parenting, adoption, and abortion, including self-rated ability to refer to appropriate resources. In addition, the training was rated highly by participants in terms of importance and usefulness. By improving resident knowledge, comfort, and resource provision in the setting of pregnancy, we hope to improve the quality of care to delivered to pregnant adolescents.

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HPV VACCINE EFFECTIVENESS WITH DIFFERENT DOSING SCHEDULES IN A COMMUNITY SETTING

Courtney Covert, MS1, Jessica Kahn, MD, MPH2, Lili Ding, DP2, Eduardo Franco, DrPH, MPH3, Darron Brown, MD, MPH4, Aaron Ermel, MD5

1Cincinnati Children’s Hospital; 2Cincinnati Children’s Hospital Medical Center; 3McGill University; 4Indiana University School of Medicine; 5Indiana University Medical Center

Purpose: Clinical trials of the human papillomavirus (HPV) vaccine have demonstrated that younger vs. older individuals have higher immune responses to vaccination, and that in individuals <15 years of age, 2 doses (and possibly 1 dose) of the vaccine have similar immunogenicity to 3 doses. However, little is known about the real-world effectiveness of vaccination among those vaccinated at ≥15 years, those who initiated sex prior to vaccination, or those who received fewer than 3 HPV vaccine doses, which are common scenarios in clinical practice. Therefore, the aims of this study were to 1) examine vaccine-type HPV prevalence in young women by age of vaccination (≥15 vs. <15 years) and whether they had vs. had not initiated sex before vaccination, and 2) to examine vaccine-type HPV prevalence by number of vaccine doses, stratified by age at vaccination and sexual initiation before or after vaccination.

Methods: We enrolled young women 13-26 years of age from an urban hospital-based teen health center and a community health department in three cross-sectional surveillance studies from 2009-2017 (N=1209); 3% received the 9-valent HPV vaccine and were excluded from analyses. Participants completed a survey and cervicovaginal swabs were collected and tested for 36 HPV types using the Roche Linear Array test. Among all women who had received ≥1 vaccine dose (N=825), we examined vaccine-type HPV prevalence (HPV6, 11, 16, and/or 18) by age at vaccination (≥15 vs. <15 years) and sexual initiation (before vs. after vaccination), using chi-square and Fisher’s exact tests. We then compared vaccine-type HPV prevalence by number of vaccine doses (1, 2, or 3), in all women and stratified by age at vaccination and sexual initiation before or after vaccination.

Results: The mean age of participants was 18.3 (SD 2.1, range 13-26). The mean age at vaccination was 14.4 years (SD 2.5) and the mean age of sexual initiation was 15.0 years (SD 1.7). There was a significantly higher prevalence of HPV among those who were ≥15 vs. <15 years of age at vaccination (9.5% vs. 3.6%, p=0.0004) and among those who initiated sex before vs. after vaccination (8.8% vs. 4.0%, p=0.004). Vaccine-type HPV prevalence was higher among all women who received fewer doses (12.5% for 1 dose, 4.5% for 2 doses, 5.3% for 3 doses, p=0.02), and among those ≥15 years of age at vaccination who received fewer doses (1 dose: 12.8%, 2 doses: 4.7%, 3 doses: 5.3%, p=0.02). A similar pattern was observed among those <15 years of age at vaccination and among those who initiated sex before and after vaccination, but the differences were not statistically significant, likely due to small sample size.

Conclusions: These findings suggest that among young women in a real-world setting who were at elevated risk for HPV, vaccination was less effective in those vaccinated at ≥15 years of age and among those who initiated sex before vaccination, and that 1 HPV vaccine dose is less effective than 2 or 3 doses.

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A QUALITY IMPROVEMENT PROJECT TO INCREASE LARC FOLLOW-UP FOR ADOLESCENTS AND YOUNG ADULTS
Sarah Pitts, MD\(^1\), Carly Milliren, MPH\(^1\), Grace Berg, BA\(^2\), Danielle McPeak, BA\(^2\), Amy DiVasta, MD, MMSc\(^1\)
\(^1\)Boston Children's Hospital; \(^2\)Boston University School of Public Health

**Purpose:** Clinical follow-up for adolescents and young adults after long-acting reversible contraception (LARC) insertion is variable, challenging a clinician's ability to both understand their patient’s LARC experience and to address any side effects. We implemented a quality improvement (QI) endeavor to improve LARC follow-up using a HIPAA compliant texting/email platform. We then sought to assess the effectiveness of this intervention, hypothesizing that its use would improve LARC follow-up rates.

**Methods:** Starting August 1, 2018, patients scheduled for LARC insertion in the Boston Children’s Hospital’s Adolescent LARC Program could opt in to receive visit reminders and post-visit surveys using the Medumo texting/email platform. A “co-pilot” (i.e., parent/guardian) could also receive these texts/emails. Patients/co-pilots received visit reminders prior to insertion and at 8-12wk and 1yr follow-up visits. They also received a 4wk post-insertion side effect survey to assess bleeding, acne, mood, pain, and weight concerns. We compared rates of self-reported side effects and completed follow-up encounters following LARC insertion between patients who opted in to Medumo (Medumo users) versus those who did not (non-users) through July 31, 2019. Medumo users were compared to non-users on clinical characteristics using chi-square tests and two-sample t-tests. All statistical analyses were performed in SAS (v9.4; Cary, NC). This QI project was exempt from IRB review per the Boston Children’s Hospital Performance Excellence Group.

**Results:** 246 LARC insertions (48% IUD and 52% Nexplanon\(^\oplus\)) were performed and included in the analysis. The average age at insertion was 19.1 years (SD=3.1). Three quarters (78%) of patients chose LARC for contraception, while 48% sought treatment for menstrual difficulties. A total of 162 patients (66%) opted into Medumo. No differences existed between Medumo users vs. non-users by age at insertion, BMI, menstrual history, or reason for choosing to get a LARC method. Medumo users were more likely than non-users to have any follow-up, including clinic visits and survey responses (53% Medumo vs. 35% non-users; p=0.006), and were more likely to have completed a clinic visit within 3 months of insertion (45% vs. 28%; p=0.01). Side effects were reported more commonly by Medumo users compared to non-users (31% vs. 18%; p=0.02); report of serious complications was comparable between groups (p=0.99). Twelve patients had their LARC removed (5%), five within 3 months of insertion, with no difference between Medumo users or non-users.

**Conclusions:** Use of the Medumo texting/email platform increased LARC follow-up interactions in adolescents and young adults. Medumo users reported more side effects, as they were more likely to follow-up in clinic or via electronic survey, allowing clinicians to monitor their patients’ well-being and manage their care appropriately. No differences were found in clinical characteristics or in LARC continuation rates at 1 year between users and non-users, and the Medumo participation rate was high. We conclude that implementing the Medumo platform was a successful QI intervention to improve longitudinal care of adolescent and young adult LARC recipients.

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Differences in Adolescent Condom Use Trends by Global Region

Emily H. Koumans, MD MPH¹, Rachel Welch, MD², D. Lee Warner, PhD³

¹Centers for Disease Control; ²Rainbow Babies Children's Hospital; ³Centers for Disease Control and Prevention

Purpose: According to the Joint United Nations Programme on HIV and AIDS, the male latex condom is the single, most efficient, available technology to prevent the sexual transmission of HIV and other sexually transmitted infections, and is moderately effective for prevention of pregnancy. Condoms are also often the method used at sexual debut for contraception and sexually transmitted infection prevention. We examined the global prevalence and trends of condom use at last sex among adolescents by country since 1991.

Methods: We considered only publicly available prevalence data from nationally representative household- or school-based surveys of male and female adolescents aged 13-19 years or in a respective grade of school from 1991-2017, from countries in the following regions: Americas, Europe, sub-Saharan Africa, north Africa, central Asia, south/southeast Asia, and western Pacific. We present condom use prevalence for the first available year(s), the year(s) use peaked, and the most recent year(s) if different from peak year(s) from a total of 72 countries, by region (except the U.S), from the following surveys [question used in brackets]: Youth Risk Behavior Surveillance System (YRBSS)[the last time you had sexual intercourse, did you or your partner use a condom?], Health Behavior of School-Aged Children (HBSC)[the last time you had sexual intercourse, did you or your partner use a condom?], Global School-Based Student Health survey (GSHS)[the last time you had sexual intercourse, did you or your partner use a condom (or country-specific slang term for condom)?], and the Population-based HIV Impact Assessments (PHIA)[was a condom used the last time you had sex with a non-marital, non-cohabiting partner in the last 12 months?].

Results: U.S. YRBS data show that, among males, condom use at last sex increased between 1991 and 2005 from 55% to 70%, then declined to 61% in 2017; among females, it increased from 38% in 1991 to 57% in 2003, then declined to 47% in 2017. Among 41 European countries participating in HBSC, the mean prevalence of condom use among males was 80% in 2001-2002, increased to 81% in 2005-2006, then declined to 68% in 2013-2014; among females the mean prevalence was 70% in 2001-2002, increased to 76% in 2009-2010, and declined to 62% in 2013-2014. Among 21 African, South American, southeast Asian, and western Pacific countries participating in GSHS, from 2012-2014 to 2015-2017, the respective mean prevalence of condom use changed from 52-55%, 51-62%, 59-53% (one country), and 44-51%. Additional nationally representative data from PHIA support the GSHS data from African countries.

Conclusions: Among adolescents across the globe, the use of condoms at most recent sex has declined in recent years in the United States and Europe, while it has increased in African, South American, and western Pacific countries, reaching prevalences of 51-62% worldwide in most recent years. While these data suggest that use of condoms has increased in many regions, many adolescents remain at risk for sexually transmitted infections, including HIV, and unintended pregnancy. The recent declines in North America and Europe bear further investigation.

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TESTING A MOBILE APP AND COUNSELING-BASED WAITING ROOM INTERVENTION CREATED WITH AND FOR YOUNG BLACK WOMEN TO EDUCATE ABOUT DUAL PROTECTION

Soo Young Lee, MSW\(^1\), Luciana E. Hebert, PhD\(^2\), Crystal P. Tyler, PhD\(^1\), Motolani Akinola, MPH\(^3\), Melissa Gilliam, MD, MPH\(^4\)

\(^1\)Ci3 at the University of Chicago; \(^2\)Washington State University; \(^3\)C Space Health; \(^4\)University of Chicago

**Purpose:** Brief, behavioral theory-based interventions incorporating interactive media offer a promising way to engage young people in making sexual and reproductive health (SRH) decisions in the clinic setting. Using human-centered design, we developed rPlan – a clinic-based intervention involving an educational mobile app and motivational interviewing (MI) session – created with and for young black women. The rPlan intervention aims to address dual protection, simultaneously protecting against sexually transmitted infections (STIs) and pregnancy with condoms alone or condoms plus another method. We tested rPlan for feasibility, acceptability, and immediate and longer-term effects on contraceptive knowledge and use, dual protection behaviors, and STIs.

**Methods:** Young black women (aged 15-25 years, sexually active with a male partner during the past six months) were recruited while waiting for SRH appointments at a university medical facility and community-based clinic on Chicago’s South Side. Participants completed a baseline survey of demographic characteristics, SRH histories, contraception-related variables (e.g., awareness, method perceptions, self-efficacy, use intentions), and condom use. Participants then engaged with the rPlan app, featuring: videos of young black women discussing their experiences with long acting reversible contraceptive (LARC) methods and addressing common concerns, an instructional video on condom use, a video of a couple negotiating condom use, condom negotiation strategies, and information about each contraceptive method. Following a survey of app usability and contraceptive knowledge, participants engaged in a brief individualized MI session with research staff to explore any ambivalence about whichever method they were considering and identify potential barriers and support strategies. Participants completed 3-month follow-up surveys of dual protection behaviors, method use, contraceptive knowledge, and risk reduction behaviors. Chi-square or Fisher’s Exact tests (categorical variables), and paired t-tests and Mann-Whitney U tests (continuous variables) were used to compare outcome variables at baseline, immediately post-app, and at 3-month follow-up.

**Results:** We recruited 104 participants (Mean [M] age = 20 years). Ninety-three percent reported liking the app, 96% said it was easy to use, 94% said it provided them with useful information, and 91% reported it being a good use of waiting time. Immediately following app use, scores of future IUD use intentions increased (M = 2.43 to 2.75, p = 0.0039). Future implant and condom use intentions remained unchanged. At 3-month follow-up (with 78 of 104 retained), participants had higher composite scores of contraceptive effectiveness knowledge compared to baseline (M = 1.05 to 1.40, range 0.0-3.0, p = 0.0049), and their mean number of sexual partners in the past three months decreased (M = 1.33 to 1.03, p = 0.0063). There were no significant differences in dual protection behaviors, condom self-efficacy and attitudes, contraceptive self-efficacy and attitudes, or STI results between baseline and follow-ups.

**Conclusions:** The rPlan intervention, which used interactive media to provide dual protection education and MI to address ambivalence, was an acceptable and feasible way to make valuable use of waiting time prior to a healthcare appointment.

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SEXUAL NETWORKING PATTERNS AND THEIR ASSOCIATION WITH GENITAL AND ANAL HUMAN PAPILLOMAVIRUS INFECTION IN ADOLESCENT AND YOUNG MEN AFTER VACCINE INTRODUCTION

Brittany L. Rosen, PhD¹, Pamina Gorbach, DrPH, MHS², Lili Ding, PhD¹, Courtney Covert, MS¹, Aaron Ermel, MD³, Emmanuel Chandler, MD¹, Talia Malagón, PhD⁴, Jessica Kahn, MD, MPH¹
¹Cincinnati Children's Hospital Medical Center; ²University of California, Los Angeles; ³Indiana University; ⁴McGill University

Purpose: Identifying risk factors for human papillomavirus (HPV) infection in the post-vaccination era among men is necessary for the design of evidence-based interventions to prevent HPV-related cancers. No previous studies have examined both individual- and partner-level (sexual networking) factors associated with HPV in men after vaccine introduction. The study aim was to determine individual- and partner-level factors associated with HPV infection (>1 HPV type and HPV16/18) in vaccinated and unvaccinated men.

Methods: Young men 13-26 years of age (N=747) completed a sexual history survey and were tested for genital and perianal/anal HPV (36 types) from 2013-2017. Sexual networking variables included recent and lifetime concurrency practice (being in more than one sexual relationship at the same time) and recent sex partner discordance (by race, ethnicity, age difference >3 years, and number of sexual partners). We determined the prevalence of any genital and/or anal HPV (>1 type) and HPV16/18, and determined individual-level and sexual networking variables associated with the two outcome variables among vaccinated and unvaccinated men, using separate multivariable logistic regression models.

Results: Participants’ mean age was 21.2 years; 33% had received >1 vaccine dose; 64% were positive for >1 HPV type and 21% for HPV16/18. Factors associated with >1 HPV type in unvaccinated men included: recruitment site (health department [HD] vs. teen health center [THC], AOR=2.06, 95%CI 1.12–3.80; HD vs. community, AOR=2.90, 95%CI 1.72–4.89); lifetime concurrency (yes vs. no, AOR=2.34, 95%CI 1.54–3.54; don’t know vs. no, AOR=3.70, 95%CI 1.01–13.58). Factors associated with >1 HPV type in vaccinated men included: recruitment site (HD vs. THC, AOR=2.85, 95%CI 1.43–5.66; community vs. THC, AOR=2.94, 95%CI 1.09–7.96); Chlamydia history (AOR=2.20, 95%CI 1.06–4.57); main male partner (vs. female, AOR=20.0, 95%CI 2.17–100.0); number of lifetime female partners (2-10 vs. 1, AOR=4.35, 95%CI 1.52–12.50; 2-10 vs. 11+, AOR=2.13, 95%CI 1.01–4.47); and no condom use with female partner (AOR=4.55, 95%CI 1.20–16.67). Factors associated with HPV16/18 in unvaccinated men included: race (Multiracial vs. White, AOR=2.35, 95%CI 1.02–5.45; Multiracial vs. Black, AOR=2.94, 95%CI 1.37–6.67), partner concurrency (yes vs. no, AOR=3.05, 95%CI 1.53–6.07; yes vs. don’t know, AOR=2.02, 95%CI 1.19–3.45). Factors associated with HPV16/18 in vaccinated men included: ethnicity (Hispanic vs. non-Hispanic, AOR=14.90, 95%CI 2.68–82.77); main male partner (vs. female, AOR=6.67, 95%CI 2.33–20.0; vs. no main partner, AOR=3.13, 95%CI 1.04–9.10); and recent concurrency (don’t know vs. yes, AOR=3.57, 95%CI 1.33–10.0).

Conclusions: Both individual-level and sexual networking variables were associated with HPV infection, but differed by vaccination status and HPV type (any vs. vaccine-type), suggesting that the risk factors for HPV infection may change over time as the proportion of vaccinated men increases. Another novel finding was that report of concurrency and not knowing whether one had practiced concurrency were consistent risk factors across models; the latter could be a proxy for lesser-known sex partners, and clinicians should consider including concurrency in the sexual history to determine risk of HPV.

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FEASIBILITY AND ACCEPTABILITY TESTING OF A MOBILE APP AND WAITING ROOM INTERVENTION TO EDUCATE YOUNG BLACK WOMEN ABOUT POSTPARTUM CONTRACEPTION AND BIRTH SPACING

Ailea Stites, AB, Ellen McCammon, MPH, Tina Schuh, MPH, Jessica Law, BA, Crystal Tyler, PhD, Michael Quinn, PhD, Melissa Gilliam, MD, MPH
Ci3 @ University of Chicago

Purpose: Interpregnancy intervals of less than 18 months are associated with poor health outcomes for mothers and families. Waiting room educational interventions may be a convenient way to educate patients without impeding clinic workflow. The Patient-Centered Postpartum Contraception Toolkit ([PC]2) app is a theory-based app developed in concert with providers and patients to activate patients around asking questions about interpregnancy intervals and postpartum contraception. We used lean start up methods, testing the minimum viable product (MVP) to determine efficacy, feasibility, and acceptability.

Methods: The research team iteratively developed the [PC]2 app MVP with health care providers and pregnant adolescents. It features a young African American main character who describes the importance of postpartum contraception use and demonstrates ways to initiate conversation with providers. The app was evaluated in the waiting rooms of four urban low-risk OB clinics. Eligible women were between 15 and 25 years old, at least 24 weeks pregnant, and self-identified as African American or Black. Participants completed informed consent procedures and received the app. Pre- and post-survey instruments included questions modeled on the information-motivation-behavior framework. We also assessed the feasibility, usability, and acceptability of the app. Paired Wilcoxon tests were used to analyze pre and post survey results.

Results: Twenty patients participated in the [PC]2 app intervention while waiting to see their provider. Patients who used the app reported improved scores on information measures on birth spacing (pre-test mean 3.9/7, post-test mean 5.95/7, p<0.01). At post-test, women were significantly less likely to agree that they worried that their healthcare provider did not have time to answer their questions (p<.05) and significantly more likely to agree that spacing pregnancies would be good for their health and the health of their families (p<.05). In an open-ended post-test question on what they learned from the app, 65% of women reported that they should space their pregnancies and 15% of women reported that it was important to ask their provider questions. The app scored high on feasibility, usability and acceptability measures: 90% of users said they liked the app, and 74% of users rated the quality of the app as very good or excellent. Patients agreed the waiting room was a convenient time to use the app, and 75% said they were likely or extremely likely to recommend to a friend.

Conclusions: The [PC]2 app MVP was feasible and acceptable for informing patients about birth spacing and encouraging asking questions about postpartum contraception. These findings support ongoing design and development of the app.

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