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Commentary

"My mom said it wasn't important": A case for catch-up human papillomavirus vaccination among young adult women in the United States

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ABSTRACT

The human papillomavirus (HPV) vaccine prevents HPV-related diseases, including anogenital cancers and genital warts. In the United States, while it is recommended to adolescents ages 11 to 12, catch-up vaccination is available for those previously unvaccinated until age 26. Parental decisions or lack of provider recommendation during adolescence are barriers to on-time vaccination. Young adult women, ages 18 to 26, are a key catch-up vaccination population as this is a period for autonomous decision-making, high healthcare utilization, and other recommended prevention behaviors. Additional intervention research is required to promote HPV vaccine uptake among young adult women. Evidence-based and theory-informed interventions need to be developed and evaluated to reach a large number of women. In order to improve HPV vaccination among young adult women, future research should integrate the themes of health literacy, alternative healthcare settings, and OB/GYN providers to facilitate improved access and shared decision-making for the vaccine. This last chance for HPV-related cancer prevention should not be forgotten in public health efforts.

1. Human papillomavirus vaccination in the United States

Vaccine-preventable diseases are recognized as one of the ten great public health achievements of the beginning of the 21st century (Centers for Disease Control and Prevention, 2011). Scientific advances within the vaccine field have contributed to the development of the human papillomavirus (HPV) vaccine. This safe and effective primary prevention mechanism can prevent multiple types of HPV that are causal agents for genital warts and cancer (i.e., anal, cervical, vaginal, vulvar), and thus can significantly reduce morbidity and mortality from HPV-related diseases (Markowitz et al., 2014). Since 2006, the quadrivalent vaccine has been available and mainly targeted toward 11 to 12 year old adolescent girls, and in 2011 was recommended for adolescent boys. As of 2015, there are three, 3-dose vaccines available that prevent various types of HPV – bivalent (types 16 and 18), quadrivalent (types 6, 11, 16, 18), and nonavalent (types 6, 11, 16, 18, 31, 33, 45, 52, 58) vaccines. Women can receive any of the three vaccines until age 26, while men can receive the quadrivalent and nonavalent vaccines until age 21, and high-risk populations until age 26 (Petrosky et al., 2015). And, as of 2016, adolescents before age 15 only need 2-doses of the vaccine (Meites et al., 2016). While the HPV vaccine is available for both sexes, the recommendation for adolescent girls and young adult women has surpassed a decade with marginal success. Additionally, adolescent girls and young adult women face unique barriers for this vaccination (Daley et al., 2017), and have different opportunities for young adult uptake compared to boys and men. Thus, this commentary describes the rationale for continued HPV vaccination efforts and areas of future research for young adult women in the United States.

Vaccination efforts have primarily been aimed at the young adolescent period of ages 11 to 12 years. However, rates of HPV vaccine uptake and completion among this population have been suboptimal. As of 2015, only 62.8% of adolescent girls ages 13 to 17 years had received one dose of the HPV vaccine, 52.2% received at least two doses, and 41.9% received at least three doses (Reagan-Steiner et al., 2016). These are well-below the national objectives for 80% HPV vaccine completion (3-doses) among 13 to 15 year old adolescents (U.S. Department of Health and Human Services, 2016).

A contributing factor to these low rates of uptake is the lack of school-based approaches for HPV vaccine dissemination in the United States. Countries with school-based delivery of HPV vaccination have higher rates of coverage (Bosch et al., 2013). In the US, HPV vaccination occurs within the primary care settings and relies both on provider recommendations to parents and on parents' decision-making for the vaccine (Niccolai et al., 2016). Unfortunately, physicians report inconsistency and difficulty in their recommendations for HPV vaccination (Gilkey et al., 2015a; Gilkey et al., 2015b). A study conducted in

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Abbreviations: HPV, human papillomavirus; OB/GYN, obstetrics and gynecology
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Table 1
Reasons for non-vaccination for HPV during adolescence as reported by parents of adolescents and young adult women.

Reasons for non-vaccination for HPV during adolescence	
Reported by parents of adolescents[a]	Reported by young adult women[b]
• Lack of knowledge (15.5%)	• Never heard of the vaccine (42.0%)
• Not needed or not necessary (14.7%)	• Mother said it was not important to receive (28.0%)
• Safety concerns/side effects (14.2%)	• Not sexually active at the time (22.0%)
• Not recommended (13.0%)	
• Not sexually active (11.3%)	

[a] Survey-weighted data from National Immunization Survey-Teen 2013 (Stokley et al., 2014).
[b] Data from convenience sample (n = 50) of young adult women (Thompson, 2015).

2013 found that if all clinical missed opportunities for HPV vaccination were addressed for adolescent girls, vaccine coverage would be nearly 90% in the US (Stokley et al., 2014).

Since HPV vaccination during adolescence is reliant on parental decision-making, this can be a barrier to vaccine uptake. Research has indicated that parents may be more hesitant about the HPV vaccine compared to other recommended adolescent vaccinations (Roberts et al., 2015). Additionally, the reasons for non-vaccination reported by parents are abundant and cross multiple spheres of barriers (Table 1). National data from 2013 indicate that the primary reasons for non-vaccination of adolescent girls as self-reported by parents include: lack of knowledge (15.5%), not needed or not necessary (14.7%), safety concerns/side effects (14.2%), not recommended (13.0%), and not sexually active (11.3%) (Stokley et al., 2014). As a result, many adolescents will fall through the cracks and not receive the HPV vaccine during this vital period of adolescence. Moreover, in a study of 50 young adult women, when reflecting on their adolescence participants provided the following reasons for not receiving the vaccine during this time period: (1) never heard of the HPV vaccine, (2) their mother said the HPV vaccine was not important, or (3) did not need the HPV vaccine since they were not sexually active at the time. As one participant in this study stated, "*My mom said it wasn't important…and my mom was just like, 'Oh, you don't need that,' and I don't know why she said that.*" (Thompson, 2015) These parental reasons for non-vaccination serve as persistent barriers for HPV vaccination during adolescence, and therefore, shifts the responsibility for vaccination to young adulthood.

2. HPV vaccination for "catch-up" age young adult women

Young adulthood presents a unique opportunity for catch-up vaccination, especially among women. Young adult women can "catch-up" with the HPV vaccine until age 26. Emerging young adulthood (ages 18 to 26) is a period for newly acquired autonomous decision-making for reproductive health (Harris et al., 2017) where women can override the decisions made by parents during the adolescent period, and this can include HPV vaccination. According to National Health Interview Survey data, about a third of unvaccinated women (18–26 years) were interested in receiving the HPV vaccine (Schmidt and Parsons, 2014).

Women in young adulthood experience a high level of healthcare interaction, especially with obstetricians and gynecologists (OB/GYNs), which could facilitate access to the vaccine. According to the National Survey of Family Growth 2006–2010, among women ages 20 to 24 years, 73.8% of women received at least one medical service in the last 12 months. These services can include pap testing (66.2%), pelvic exams (57.2%), and counseling, testing, or treatment for STDs (30.0%) (Martinez et al., 2013). The U.S. Preventive Services Task Force (USPSTF) recommends pap testing to screen for cervical cancer every three years for women aged 21–65, or every five years in combination with HPV testing for women aged 30–65. Since HPV testing is not recommended until age 30, the commencement of pap testing at age 21 can serve as a prompt for HPV vaccine recommendation at this time (Moyer and U.S. Preventive Services Task Force, 2012). Moreover, HPV screening continues to be a key service for the prevention of HPV-related disease. As a result, HPV vaccination and HPV screening must continue to be a health priority among women, as the costs of cancer treatment are substantial (Angioli et al., 2016).

A survey of family medicine providers, internists, nurse practitioners, pediatricians, and OB/GYNs also revealed that providers are more likely to recommend the HPV vaccine to 18 to 26 year old women than 11 to 12 year girls (Berkowitz et al., 2015). This convenient time when women are receiving other reproductive prevention services can be a critical window for recommending and providing the HPV vaccine, and it aligns with the President's Cancer Panel goal to reduce missed clinical opportunities for the HPV vaccine (The President's Cancer Panel, 2014). Additionally, women often view OB/GYNs as their primary care provider, and are comfortable receiving primary care services from this provider type, including the HPV vaccine (Mazzoni et al., 2017). Thus, OB/GYNs can play a critical role in the coordinated efforts for HPV primary and secondary prevention strategies.

Young adulthood is also a significant time period since women are at highest risk for acquiring HPV at these ages. While the prevalence for HPV types covered by the vaccine has declined overall, age categories 20 to 24 years and 25 to 29 years continue to have the highest prevalence. Approximately, 12.1% and 11.7% of women ages 20 to 24 and 25 to 29, respectively, had HPV types 6, 11, 16, and 18 (Markowitz et al., 2016). Continued vaccine efforts among this age group are required due to the increased risk of infection.

The HPV vaccine is recommended for adolescents, (1) at a time with enhanced immune responses, and (2) at early ages prior to the onset of sexual activity. Yet, young adult women will still benefit from the protection from the vaccine during the catch-up age period. According to systematic reviews and meta-analyses, the vaccine is effective during this age range even among sexually active individuals (Couto et al., 2014; Lu et al., 2011). Additionally, from a public health standpoint, there is the potential to improve the herd-immunity effect associated with HPV vaccination by vaccinating young adult women (Brisson et al., 2017).

Most importantly, HPV vaccination is within scope of practice for OB/GYNs, and they can be key agents for the delivery of the vaccine. The American College of Obstetricians and Gynecologists (ACOG) recommends OB/GYNs educate their patients regarding the safety and benefits of HPV vaccination (Committee Opinion No. 641, 2015; Committee Opinion No. 704, 2017). Additionally, ACOG has developed resources for obstetrician-gynecologists to integrate immunizations in their practice, including: advocating for immunization to patients; documenting patient's immunization history; educating and vaccinating; and integrating immunization through standing orders (Committee Opinion No. 661, 2016). Previous research found OB/GYNs stock and provide other recommended vaccinations and HPV vaccinations (Power et al., 2009; Leddy et al., 2009a), yet barriers may remain, including cost to store vaccinations and inadequate reimbursement (Power et al., 2009; Leddy et al., 2009a). Moreover, OB/GYNs reported needing improved immunization training and continuing medical education on vaccinations (Power et al., 2009). A study of OB/GYN clinical settings found implementing HPV vaccine standing orders were more difficult than other recommended vaccines (e.g., Tdap and influenza) (Barnard et al., 2017). Although, from the patient's perspective, a convenience sample of women aged 15 to 26 years reported standing orders for the HPV vaccine as acceptable, in addition to a provider recommendation for the vaccine (Dempsey et al., 2015).

3. Moving forward

Clearly, young adulthood is an opportune time for HPV vaccination for women. Yet as of 2013, only one-third of 18 to 26 year old women had received at least one dose of the HPV vaccine (Schmidt and