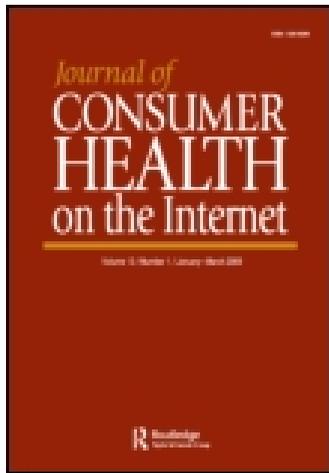


This article was downloaded by: [McGill University Library]

On: 16 September 2014, At: 09:50

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Journal of Consumer Health On the Internet

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/wchi20>

### Beta-Test Results for an HPV Information Web Site: GoHealthyGirls.org—Increasing HPV Vaccine Uptake in the United States

Randall Starling<sup>a</sup>, Jessica A. Nodulman<sup>a</sup>, Alberta S. Kong<sup>b</sup>,  
Cosette M. Wheeler<sup>c</sup>, David B. Buller<sup>d</sup> & W. Gill Woodall<sup>a</sup>

<sup>a</sup> University of New Mexico, Albuquerque, New Mexico, USA

<sup>b</sup> University of New Mexico School of Medicine, Albuquerque, New Mexico, USA

<sup>c</sup> University of New Mexico Health Sciences Center, Albuquerque, New Mexico, USA

<sup>d</sup> Klein Buendel, Inc., Golden, Colorado, USA

Published online: 03 Sep 2014.

To cite this article: Randall Starling, Jessica A. Nodulman, Alberta S. Kong, Cosette M. Wheeler, David B. Buller & W. Gill Woodall (2014) Beta-Test Results for an HPV Information Web Site: GoHealthyGirls.org—Increasing HPV Vaccine Uptake in the United States, *Journal of Consumer Health On the Internet*, 18:3, 226-237, DOI: [10.1080/15398285.2014.931771](https://doi.org/10.1080/15398285.2014.931771)

To link to this article: <http://dx.doi.org/10.1080/15398285.2014.931771>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms &

Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

## **Beta-Test Results for an HPV Information Web Site: GoHealthyGirls.org—Increasing HPV Vaccine Uptake in the United States**

RANDALL STARLING and JESSICA A. NODULMAN

*University of New Mexico, Albuquerque, New Mexico, USA*

ALBERTA S. KONG

*University of New Mexico School of Medicine, Albuquerque, New Mexico, USA*

COSETTE M. WHEELER

*University of New Mexico Health Sciences Center, Albuquerque, New Mexico, USA*

DAVID B. BULLER

*Klein Buendel, Inc., Golden, Colorado, USA*

W. GILL WOODALL

*University of New Mexico, Albuquerque, New Mexico, USA*

*A Web site, GoHealthyGirls, was developed to educate and inform parents and their adolescent daughters about human papilloma-virus (HPV) and HPV vaccines. This article provides an overview of web site development and content followed by the results of a beta-test of the Web site. Sixty-three New Mexican parents of adolescent girls tested the site. Results indicated that GoHealthyGirls was a functioning and appealing Web site. During this brief educational intervention, findings suggest that the Web site has the potential to increase HPV vaccine uptake. This research supports the Internet as a valuable channel to disseminate health education and information to diverse populations.*

**KEYWORDS** *Adolescents, HPV, Internet, vaccines*

---

© Randall Starling, Jessica A. Nodulman, Alberta S. Kong, Cosette M. Wheeler, David B. Buller, and W. Gill Woodall

Received February 28, 2014; revised April 15, 2014; accepted May 15, 2014.

Address correspondence to Randall Starling, Center on Alcoholism, Substance Abuse, and Addictions, University of New Mexico, 2650 Yale Boulevard SE, MSC11-6280, Albuquerque, NM 87106. E-mail: starling@unm.edu

Color versions of one or more of the figures in the article can be found online at [www.tandfonline.com/wchi](http://www.tandfonline.com/wchi).

## INTRODUCTION

According to the Centers for Disease Control and Prevention (Center for Disease Control and Prevention [CDC] 2013a), human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the United States, with almost 80 million existing cases of HPV and more than 14 million new cases of HPV annually. Furthermore, approximately half of sexually active adults in the United States will contract HPV at some point in their lives (CDC 2013a). There are more than 100 types of HPV, and over 40 of them infect the human anogenital tract. Persistent HPV infections with several of these HPV types have been recognized as causative factors in the development of cervical cancer and genital warts (CDC 2010; Weinstock, Berman, and Cates 2004; Grabel et al. 2013).

Currently, two vaccines have been approved by the Food and Drug Administration (FDA) that are designed to prevent various anogenital cancers and genital warts caused by HPV (CDC 2010). Gardasil, a quadravalent vaccine, is approved by the FDA for use in males and females between the ages of 9 and 26 years (U.S. FDA 2013b). Cervarix, a bivalent vaccine, is approved for females between the ages of 10 and 25 years (U.S. FDA 2013a). HPV vaccination (three injections over six months) is recommended for 11–12 year olds (CDC 2013c). Both vaccines have been shown to be effective (Garland et al. 2007; Paavonen et al. 2007; FUTURE II Study Group 2007); however, the vaccines do not treat those with pre-existing genital HPV infections (Hildesheim et al. 2007), which is why the vaccines are recommended for younger adolescents who most likely have not been exposed to genital HPV.

Although Healthy People 2020 set an objective of having 80% of adolescents receive all three recommended doses of an HPV vaccine, (U.S. Department of Health and Human Services and Office of Disease Prevention and Health Promotion) recent data from the National Immunization Survey of Teens (CDC 2013b) reveals that in 2012, only 33.4% of 13–17-year-old girls in the United States completed the three-dose series (compared with 34.8% in 2011). A reason that adolescent females are not receiving the recommended HPV vaccine may be the attitudes and beliefs of parents regarding vaccines (Rand, Humiston et al. 2011; Rand, Schaffer et al. 2011; Dempsey et al. 2009; Bernat et al. 2009).

A recent study by Darden et al. (2013) found that parents of adolescent girls reported an increase in clinician recommendations for HPV vaccines (from 47% to 52% between 2008 and 2010) (Darden et al. 2013). Despite this increase in clinician recommendations, research has confirmed many reasons that still contribute to parental decisions against HPV vaccination (Darden et al. 2013; Jacobson, Roberts, and Darden 2013; Trim et al. 2012; Gerend, Weibley, and Bland 2009). Parents are concerned about the safety of the vaccine, believe the vaccine is not necessary (Darden et al. 2013; Grabel

et al. 2013; Jacobson, Roberts, and Darden 2013), or their 11–12-year-old adolescent girl is too young or not yet sexually active (Darden et al. 2013; Jacobson, Roberts, and Darden 2013), and are worried that the vaccine may encourage promiscuity and early sexual behavior among adolescents (Luedtke 2008). Parents are also under- or mis-informed about HPV and HPV vaccines. Grabel et al. (2013) found that parents showed a lack of knowledge regarding the specifics of HPV and associated vaccines; for example, only 31% of study respondents knew that HPV vaccines have not caused thousands of deaths or only 34% being aware that HPV causes genital warts (Grabel et al. 2013). Trim et al. (2012) found that parents have reported being aware of HPV, including the HPV infection and cervical cancer link, but that awareness waned over time as did intentions to vaccinate, partially due to parents wanting further information on HPV and HPV vaccines (Trim et al. 2012). In contrast, a study by Lai et al. (2013) found that general knowledge about HPV among parents of adolescent girls was high but was not associated with a willingness to vaccinate their daughters against HPV (Lai, Tinker, and Cheung 2013).

Although parents of adolescent girls may appear to have some knowledge of HPV and HPV vaccines, their knowledge about specifics of both HPV and HPV vaccines may be insufficient in helping them make an informed decision to vaccinate their child. As such, there is an opportunity and need for additional information on these topics to be provided to parents of adolescent girls. The objective of this study was to develop and pilot-test an HPV information Web site designed for parents and their 11–13-year-old daughters to help them make an informed decision regarding being vaccinated against HPV infections.

## METHODS

### Web Site Creation

The project Web site, titled *GoHealthyGirls*, had its content and structure developed over a two-year period by an interdisciplinary research team including expertise in health communications, psychology, HPV and HPV vaccines, pediatrics, and public health and Internet-based interventions, using iterative focus groups with parents and adolescent girls, one-on-one interviews with a variety of stakeholders (Nodulman et al. under review), and input from external expert reviewers. The Web site employed theoretical concepts in diffusion of innovations (Rogers 2003) and reasoned action (Montano and Kasprzyk 2008) theories in conjunction with feedback from users to further inform its design. After the development process, the beta version of the Web site was tested for usability with mothers and daughters. Adjustments to the web site design were made based on the feedback obtained during that process.

## Web Site Overview

*GoHealthyGirls* is an interactive, multicomponent, multimedia Web site with open nonlinear navigation. The Web site contains four main modules. The first module, *Get Answers!*, addresses parents' questions about HPV and vaccines, discusses risks and side effects of the vaccine, explains the risks of HPV, and reviews the benefits of HPV vaccination and organizations that recommend HPV vaccination. Users browse this module by choosing section headings and then clicking on graphic tabs that display related visual and textual information on each subtopic. The second module, *Let's Talk!*, focuses on the communication process around vaccination. There are three features within this module, the first being a video simulation on how to talk with your daughter about HPV vaccination; the second, guidelines for how to talk to other family members about HPV vaccination; and the third, advice on how to talk with your physician about HPV vaccination.

The third module, *Info for Teens*, is specifically for adolescent users and includes an interactive game show style HPV Challenge Quiz, a "It was no big deal" texting simulation, and a teen Frequently Asked Questions (FAQ) section. Finally, the fourth module, *Preteen Vaccine*, contains a checklist for adolescent vaccines, a "We're Ready" section that locates clinics offering the HPV vaccine within the user's zip code, and an email vaccination reminder system that can issue email reminders to the user when the second and third HPV vaccine shots are due. In addition, the *GoHealthyGirls* home page contains a video introduction by the Chair of the Pediatrics Department at the University of New Mexico Health Sciences Center, and a general FAQ section that can be accessed from any page in the Web site.

## Participants and Procedures

A convenience sample of 63 parents and their daughters were recruited from the Central and Northern New Mexico area to participate in the beta-test of *GoHealthyGirls*. Participants were recruited through community contacts at schools and school based health centers in Central and Northern New Mexico communities. Participants who provided consent online engaged in beta-test activities once login instructions were provided. Two rounds of beta-testing were conducted. In Round 1, 35 participants engaged in beta-test activities, including pretest and posttest, on their personal home computers. In Round 2, 28 participants in rural areas were invited to reserved hotel conference rooms where several project computers were set to go online for simultaneous project beta-testing. Those that participated on home computers received email reminders about the project posttest. About half of these participants received follow-up phone calls in addition to the email reminders when they did not complete the posttest within a reasonable time. Participants in the reserved hotel conference rooms were asked to complete

the pretest, beta-test, and posttest in one sitting at the conference room. Data were only collected from adult participants.

Upon consent to participate, adult participants were given the URL to the assessment portion of the *GoHealthyGirls* Web site. Each participant was provided a unique six-digit code to enter the assessment site (each one of these codes had been preprogrammed into the database of the project Web site so when a user entered that code it would grant them access). Once a participant entered the code, they were asked to complete an online baseline assessment. (Only adults were asked to complete the baseline.) Upon completion of the baseline assessment, which took approximately 20 minutes, participants used the *GoHealthyGirls* project Web site. Participants were asked to browse it thoroughly, and to have their daughters browse the sections of the Web site designed for adolescents. As parents typically make health related decisions for their adolescents (Fost 1986), data and feedback from adolescents were not collected, and it is unknown if participants and their daughters had conversations about the web site. Twenty-four to 48 hours after browsing *GoHealthyGirls*, adult participants using their home computers took an immediate posttest that included measures assessed at pretest. The design was a single-group pretest, posttest design.

### Measures and Data Analysis

Participant assessments were administered online via Inquisite software. The assessments included measures that were largely adapted from previous work conducted by Zimet (Zimet 2005). A Cronbach's Alpha was conducted on each of the measures to establish internal consistency. Participant attitudes towards vaccination in general consisted of 6 items ( $\alpha = .68$ ), attitudes about HPV vaccines consisted of 8 items ( $\alpha = .89$ ), perceptions of risk due to HPV and not being vaccinated consisted of 6 items ( $\alpha = .73$ ), perception of negative consequences associated with HPV vaccination consisted of 10 items ( $\alpha = .78$ ), positive consequences associated with HPV vaccination consisted of 5 items ( $\alpha = .91$ ), self-efficacy to make informed decisions about HPV vaccination consisted of 16 items ( $\alpha = .98$ ), and HPV knowledge consisted of 12 items ( $\alpha = .60$ ). Demographics of participants were also collected online during the pretest, and feasibility of the *GoHealthyGirls* web site was collected online from participants after completion of the posttest. Measures were analyzed via SPSS Version 19 statistical software. *T* tests for repeated measures were conducted on all seven assessment factors.

## RESULTS

### Participants

The sample ( $n = 63$ , 82.5% female) had a mean age of 39.17 years,  $sd = 9.58$ , was racially/ethnically diverse (54% Hispanic/Latino, 34.9% non-Hispanic

White, 1.6% African American, 4.8% American Indian), and economically diverse using surrogates of SES (60.3% paid full price, 15.9% paid reduced price, 17.5% received free school lunch, and 6.3% did not answer this question). The average age of daughters involved in the beta-test was 12.89 years,  $sd = 2.28$ . More than 14% of participants indicated that Spanish language was spoken in their home. Educational attainment of the adult participants indicated 30% with a high school degree or equivalent, 19% with an Associates of Arts degree, 30.2% with a Bachelor's degree, 11.1% with a Master's degree, and 1.6% with a professional (M.D., J.D., or D.D.S.) degree. Approximately 9% did not answer this question. In terms of health insurance coverage, 91.4% indicated coverage, with 22% indicating Medicaid coverage. Table 1 provides a brief overview of participant demographics.

### Participant Feedback

Participants in the beta-test of *GoHealthyGirls* intervention were asked for their direct feedback on the feasibility of using the Web site. Participants, both adult and adolescents, stated that the *GoHealthyGirls* web site was easy to use and stable during use. All participants indicated that they encountered no technical problems during beta-test browsing of the program. Table 2 reflects comments from beta-test participants about their experience with the Web site.

### Pre and Posttest Results

Pretest to posttest analyses were conducted to detect desired changes in the seven measures related to vaccine adoption. Significant pretest to posttest differences for the measures were found. Attitudes toward vaccination shifted more positively at posttest ( $t(df = 50) = 3.71, p = .001$ ), as did attitudes about HPV vaccines ( $t(df = 53) = 2.01, p = 0.049$ ). Perceptions of risk due to HPV and not being vaccinated was found to be higher at posttest compared with pretest ( $t(df = 50) = 4.18, p = .0001$ ). Perception of negative consequences associated with HPV vaccination significantly decreased at posttest as predicted

**TABLE 1** *GoHealthyGirls* Beta-Test Participant Demographics

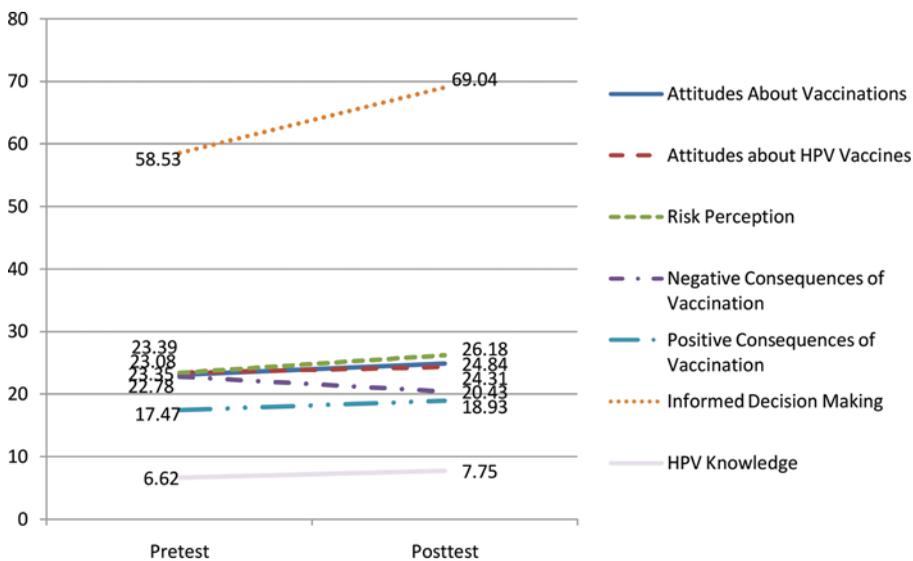
Gender	White <i>N</i> (%)	Black <i>N</i> (%)	Hispanic <i>N</i> (%)	Am. Indian <i>N</i> (%)	Other <i>N</i> (%)	Total <i>N</i> (%)
Male	0 (0)	0 (0)	5 (7.93)	0 (0)	0 (0)	5 (7.9)
Female	20 (31.7)	1 (1.6)	27 (42.86)	3 (4.8)	1 (1.6)	52 (82.5)
Not Reported	2	0	2	0	0	4
Total	22 (34.9)	1 (1.6)	34 (54.0)	3 (4.8)	1 (1.6)	61 (90.3)*

\*Not reported: 2 participants chose not to report gender and race/ethnicity, although they did answer other questionnaire items. The inclusion of these participants brings the total to 63 participants.

**TABLE 2** Navigability and Use Comments

It was easy to navigate around. Nice graphics.  
 We liked the jeopardy type quiz game. That's a great way to get information out! I prefer to have more in depth information when making a decision, so the quiz was fun and somewhat educational, but I still want more information.  
 It was easy to use. I liked the question/answer format.  
 Simple and easy to understand.  
 The website is colorful, informative, easy to read and up to date.  
 I liked that it had a section for both the moms and girls separately.  
 It's easy to navigate through.  
 The content and the games.  
 Mother daughter talking video.  
 The website has a lot of valuable information for me and my daughters to read about and become more informed about HPV.  
 Each area was easy to read and understand. In addition, responses got to the point and none were medical jargon that is difficult to understand.  
 I liked how it was organized and that it was simple (not too cluttered). It was easy to find information.  
 The information that is available some of which I did not know.  
 Every thing seemed to be pretty easy to find. I think the information is very useful for young girls. They can get on and learn the facts about HPV. I think the website can also help parents when talking to their children about HPV.  
 I liked all of the valuable info.  
 The website was user friendly. My daughter liked the sections for girls.  
 Simple to answer.

( $t$  ( $df = 48$ ) = 3.21,  $p = .002$ ). Positive consequences associated with HPV vaccination significantly increased at posttest ( $t$  ( $df = 54$ ) = 2.41,  $p = .019$ ), as did self-efficacy to make informed decisions about HPV vaccination

**FIGURE 1** Pretest to posttest means.

( $t$  (df = 46) = 4.28,  $p$  = .0001). HPV knowledge increased significantly from pretest to posttest ( $t$  (df = 60) = 4.09,  $p$  = .0001). Finally, a Chi-square analysis found a significant number of parents shifting from waiting to get their daughter vaccinated soon to intending to get their daughter vaccinated right now ( $\chi^2$  = 64.13,  $p$  = .0001). See Figure 1 for a summary of these results.

## DISCUSSION

Findings from the beta-test suggest that *GoHealthyGirls* is a usable and potentially effective Web-based intervention. Users found *GoHealthyGirls* to be easy to navigate, attractive, and informative. The information presented in the Web site had a clear, favorable impact on the seven assessment measures: 1) attitudes about vaccines, 2) attitudes about HPV vaccines, 3) risk perception, 4) negative consequences of vaccination, 5) positive consequences of vaccination, 6) HPV knowledge, and 7) informed decision making. Thus, the Web site has the potential to increase HPV vaccine uptake in an upcoming randomized efficacy trial.

Similar to results of other studies that examined knowledge among adults of HPV and HPV vaccines (Friedman and Sheppard 2007; Tiro et al. 2007), many parents of adolescent daughters in this beta-test had a limited knowledge of HPV and HPV vaccines. Most parents of this age group of children are the primary decision makers for health related matters for their children (Fost 1986); health behaviors are influenced by their health beliefs (Janz and Becker 1984). Hence, the parents' lack of knowledge of HPV and HPV vaccines may be delaying or preventing uptake of HPV vaccines. Notably, few if any studies have examined the potential for Web-based interventions to address parent HPV knowledge and decision making. The current investigation provides promising results indicating that a Web-based approach can close parents' knowledge gaps.

### Limitations

Although these findings appear positive, they should be interpreted with a few limitations in mind. First, the small number of participants limited the statistical power and the generalizability of the findings. Internal consistency was established with only a small sample, but indicated encouraging ratings. Second, although participants were demographically similar to the state of New Mexico, their reported measures of socio-economic status may not reflect state averages; for example, as recently as 2011, 21% of New Mexicans were uninsured and 22% used Medicaid (Kaiser Family Foundation 2012). Third, although parents indicated in the posttest increased intentions to have their daughter vaccinated against HPV, it is unknown if they actually did. Fourth, the lack of a control group prevented ruling out the possibility that the improvements in parents was a Hawthorne effect. An additional

limitation to be considered is that the time to posttest varied among participants between 24 and 48 hours after completing the program. It is unknown if those lagging in completing the posttest had different attitudes or perceptions regarding HPV vaccines.

### Future Research

Future research with this site will include a randomized efficacy trial targeting a large population-based sampling strategy to test the effectiveness of this site in HPV vaccination uptake. In this efficacy trial, New Mexico based parents of 11–13-year-old daughters will be randomized to receive one of two interventions, the *GoHealthyGirls* Web site or usual and customary information. Usual and customary information will consist of an online CDC pamphlet about HPV and HPV vaccination. Participants will be administered online pretests, posttest, and a follow-up survey after several months. HPV vaccine uptake by adolescent daughters of consenting participants will be evaluated using state-based vaccine administrative data several months following the posttest, and vaccination status will be correlated with parent survey responses. This information will then be analyzed to determine if HPV vaccine uptake was influenced, at least in part, by the *GoHealthyGirls* Web site.

Additional suggestions for further research specifically with the *GoHealthyGirls* Web site include 1) creating an informed decision-making Web site about HPV in Spanish language and 2) creating an informed decision-making mobile Web application on HPV and conducting an efficacy trial. With the recent recommendations for HPV vaccinations of boys, similar research should be conducted on effective strategies to help parents make informed decisions about vaccinating their sons. This may require additional studies on parents' perceptions of and barriers to HPV vaccination of boys for it may be risky to assume that prior research regarding daughters directly translates. Another research suggestion would be comparing the influence of *GoHealthyGirls* on vaccine uptake with the influence of other online consumer health information sources, for example, WebMD.

In sum, this study presents encouraging results on using the Internet to disseminate health information and education to the general public on HPV vaccination for adolescent girls. HPV infections can lead to serious health problems; therefore, a site such as *GoHealthyGirls* can be a useful tool in empowering parents and adolescents to make an informed decision about vaccination against these infections.

### FUNDING

The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Allergies

and Infectious Diseases or the National Institutes of Health. This research is funded by the U.S. National Institutes of Health (U19 AI084081).

## REFERENCES

- Bernat, D. H., S. B. Harpin, M. E. Eisenberg, L. H. Bearinger, and M. D. Resnick. 2009. Parental support for the human papillomavirus vaccine. *Journal of Adolescent Health* 45, no. 5: 525–7. doi: 10.1016/j.jadohealth.2009.04.014S1054-139X(09)00166-9 [pii].
- Center for Disease Control and Prevention. 2010. Human Papillomavirus (HPV) infection. <http://www.cdc.gov/sTd/treatment/2010/hpv.htm>.
- Center for Disease Control and Prevention. 2013a. Human Papillomavirus (HPV) <http://www.cdc.gov/std/hpv/default.htm>.
- 2013b. Human Papillomavirus vaccination coverage among adolescent girls, 2007–2012, and postlicensure vaccine safety monitoring, 2006–2013 - United States. *Morbidity and Mortality Weekly Report (MMWR)* 62, no. 2: 591–5.
- 2013c. Recommended immunizations for children from 7 through 18 years old. <http://www.cdc.gov/vaccines/who/teens/downloads/parent-version-schedule-7-18yrs.pdf>.
- Darden, P. M., D. M. Thompson, J. R. Roberts, J. J. Hale, C. Pope, M. Naifeh, and R. M. Jacobson. 2013. Reasons for not vaccinating adolescents: National immunization survey of teens, 2008–2010. *Pediatrics* 131, no. 4: 645–51. doi: 10.1542/peds.2012-2384peds.2012-2384 [pii].
- Dempsey, A. F., L. M. Abraham, V. Dalton, and M. Ruffin. 2009. Understanding the reasons why mothers do or do not have their adolescent daughters vaccinated against human papillomavirus. *Annals of Epidemiology* 19, no. 8: 531–8. doi: 10.1016/j.annepidem.2009.03.011S1047-2797(09)00083-0 [pii].
- Fost, N. 1986. Parents as decision makers for children. *Primary Care* 13, no. 2: 285–93.
- Friedman, A. L., and H. Sheppard. 2007. Exploring the knowledge, attitudes, beliefs, and communication preferences of the general public regarding HPV: Findings from CDC focus group research and implications for practice. *Health Education and Behavior* 34, no. 3: 471–85. doi: 1090198106292022 [pii]10.1177/1090198106292022.
- FUTURE II Study Group. 2007. Quadrivalent vaccine against human papillomavirus to prevent high-grade cervical lesions. *New England Journal of Medicine* 356, no. 19: 1915–27. doi: 10.1056/NEJMoa061741 [pii]10.1056/NEJMoa061741.
- Garland, S. M., M. Hernandez-Avila, C. M. Wheeler, G. Perez, D. M. Harper, S. Leodolter, G. W. Tang, D. G. Ferris, M. Steben, J. Bryan, F. J. Taddeo, R. Railkar, M. T. Esser, H. L. Sings, M. Nelson, J. Boslego, C. Sattler, E. Barr, and L. A. Koutsky. 2007. Quadrivalent vaccine against human papillomavirus to prevent anogenital diseases. *New England Journal of Medicine* 356, no. 19: 1928–43. doi: 10.1056/NEJMoa061760 [pii]10.1056/NEJMoa061760.
- Gerend, M. A., E. Weibley, and H. Bland. 2009. Parental response to human papillomavirus vaccine availability: Uptake and intentions. *Journal of Adolescent Health* 45, no. 5: 528–31. doi: 10.1016/j.jadohealth.2009.02.006S1054-139X(09)00103-7 [pii].

- Grabiell, M., T. J. Reutzell, S. Wang, R. Rubin, V. Leung, A. Ordonez, M. Wong, and E. Jordan. 2013. HPV and HPV vaccines: The knowledge levels, opinions, and behavior of parents. *Journal of Community Health* 38, no. 6: 1015–21. doi: 10.1007/s10900-013-9725-6.
- Hildesheim, A., R. Herrero, S. Wacholder, A. C. Rodriguez, D. Solomon, M. C. Bratti, J. T. Schiller, P. Gonzalez, G. Dubin, C. Porras, S. E. Jimenez, and D. R. Lowy. 2007. Effect of human papillomavirus 16/18 L1 viruslike particle vaccine among young women with preexisting infection: A randomized trial. *Journal of the American Medical Association* 298, no. 7: 743–53. doi: 298/7/743 [pii]10.1001/jama.298.7.743.
- Jacobson, R. M., J. R. Roberts, and P. M. Darden. 2013. Parents' perceptions of the HPV vaccine: A key target for improving immunization rates. *Expert Review of Clinical Immunology* 9, no. 9: 791–3. doi: 10.1586/1744666X.2013.824673.
- Janz, N. K., and M. H. Becker. 1984. The health belief model: A decade later. *Health Education Quarterly* 11, no. 1: 1–47.
- Kaiser Family Foundation. 2012. New Mexico: Health coverage & uninsured." <http://kff.org/state-category/health-coverage-uninsured/?state=NM>.
- Lai, J. Y., A. V. Tinker, and W. Y. Cheung. 2013. Factors influencing the willingness of U.S. women to vaccinate their daughters against the human papillomavirus to prevent cervical cancer. *Medical Oncology* 30, no. 2: 582. doi: 10.1007/s12032-013-0582-z.
- Luedtke, S. 2008. Human papillomavirus vaccine: are the concerns unfounded? *American Journal of Health-System Pharmacy* 65, no. 22: 2150–1. doi: 10.2146/ajhp08039265/22/2150 [pii].
- Montano, D. E., and D. Kasprzyk. 2008. Theory of reasoned action, theory of planned behavior, and the integrated behavior model. In *Health Behavior and Health Education: Theory, Research, and Practice*. Edited by K. Glanz, B.K. Rimer, and K. Viswanath, 67–92. San Francisco, CA: Jossey-Bass.
- Nodulman, J. A., R. Starling, A. S. Kong, D. B. Buller, C. M. Wheeler, and W. G. Woodall. Under review. Investigating stakeholder attitudes and opinions on school-based HPV vaccination programs. *Journal of School Health*.
- Paavonen, J., D. Jenkins, F. X. Bosch, P. Naud, J. Salmeron, C. M. Wheeler, . . . G. Dubin. 2007. Efficacy of a prophylactic adjuvanted bivalent L1 virus-like-particle vaccine against infection with human papillomavirus types 16 and 18 in young women: An interim analysis of a phase III double-blind, randomised controlled trial. *Lancet* 369, no. 9580: 2161–70. doi: S0140-6736(07)60946-5 [pii]10.1016/S0140-6736(07)60946-5.
- Rand, C. M., S. G. Humiston, S. J. Schaffer, C. S. Albertin, L. P. Shone, A. K. Blumkin, . . . P. G. Szilagyi. 2011. Parent and adolescent perspectives about adolescent vaccine delivery: Practical considerations for vaccine communication. *Vaccine* 29, no. 44: 7651–8. doi: 10.1016/j.vaccine.2011.08.002S0264-410X(11)01211-4 [pii].
- Rand, C. M., S. J. Schaffer, S. G. Humiston, C. S. Albertin, L. P. Shone, E. V. Heintz, . . . P. G. Szilagyi. 2011. Patient-provider communication and human papillomavirus vaccine acceptance. *Clinical Pediatrics (Phila)* 50, no. 2: 106–13. doi: 10.1177/00099228103799070009922810379907 [pii].
- Rogers, E. M. 2003 *Diffusion of innovations*, 5th ed., New York, NY: Free Press.

- Tiro, J. A., H. I. Meissner, S. Kobrin, and V. Chollette. 2007. What do women in the U.S. know about human papillomavirus and cervical cancer? *Cancer Epidemiology, Biomarkers & Prevention* 16, no. 2: 288–94. doi: 1055-9965.EPI-06-0756 [pii]10.1158/1055-9965.EPI-06-0756.
- Trim, K., N. Nagji, L. Elit, and K. Roy. 2012. Parental knowledge, attitudes, and behaviours towards human papillomavirus vaccination for their children: A systematic review from 2001 to 2011. *Obstetrics & Gynecology International* 2012: 921236. doi: 10.1155/2012/921236.
- U.S. Department of Health and Human Services, and Office of Disease Prevention, and Health Promotion. 2013. “Healthy People 2020.” Accessed Nov 10. <http://www.healthypeople.gov/2020/default.aspx>.
- U.S. Food and Drug Administration. 2013a. “Cervarix.” <http://www.fda.gov/biologicsbloodvaccines/vaccines/approvedproducts/ucm186957.htm>.
- 2013b. “Gardasil.” <http://www.fda.gov/biologicsbloodvaccines/vaccines/approvedproducts/ucm094042.htm>.
- Weinstock, H., S. Berman, and W. Cates, Jr. 2004. Sexually transmitted diseases among American youth: Incidence and prevalence estimates, 2000. *Perspectives on Sexual and Reproductive Health* 36, no. 1: 6–10. doi: 10.1363/psrh.36.6.0436604 [pii].
- Zimet, G. D. 2005. Improving adolescent health: focus on HPV vaccine acceptance. *Journal of Adolescent Health* 37, no. 6 Suppl: S17–23. doi: S1054-139X(05)00428-3 [pii]10.1016/j.jadohealth.2005.09.010.

#### ABOUT THE AUTHORS

Randall Starling, PhD (starling@unm.edu) is Senior Research Scientist II, Center on Alcoholism, Substance Abuse, and Addictions, University of New Mexico, 2650 Yale Boulevard SE MSC11-6280, Albuquerque, NM 87106. Jessica A. Nodulman, PhD (jnodulman@gmail.com) is Research Associate, Center on Alcoholism, Substance Abuse, and Addictions, University of New Mexico, 2650 Yale Boulevard SE MSC11-6280, Albuquerque, NM 87106. Alberta S. Kong, MD, MPH (akong@salud.unm.edu) is Associate Professor, Department of Pediatrics, University of New Mexico School of Medicine, Division of Adolescent Medicine, MSC10 5590 1 UNM, Albuquerque, NM 87131. Cosette M. Wheeler, PhD (cwheeler@salud.unm.edu) is Professor, Center for HPV Prevention, University of New Mexico Health Sciences Center, Department of Pathology, MSC08 4640, Albuquerque, NM 87131. David B. Buller, PhD (dbuller@kleinbuendel.com) is Senior Scientist, Klein Buendel, Inc., 1667 Cole Suite 225, Golden, CO 80401. W. Gill Woodall, PhD (gwoodall@unm.edu) is Professor of Communication, Center on Alcoholism, Substance Abuse, and Addictions, University of New Mexico, 2650 Yale Boulevard SE, MSC11-6280, Albuquerque, NM 87106.