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# Negative emotions and stigma associated with a human papillomavirus test result: A comparison between human papillomavirus–positive men and women

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## Abstract

Human papillomavirus has largely been framed as a women's health issue, and the psychosocial impact of human papillomavirus among men remains unclear. In this study, we found that women infected with human papillomavirus ($n$ = 154) experienced a greater degree of negative emotions and stigma than human papillomavirus–infected men ($n$ = 190). Among women, younger age and less education were associated with greater expression of negative emotions and stigma. Conversely, being single was significantly associated with a greater degree of negative emotions and stigma beliefs among men. These findings suggest the need to re-frame messages that both men and women receive regarding human papillomavirus.

## Keywords

cancer, health education, men's health, sexual health, women's health

## Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the United States (Centers for Disease Control and Prevention, 2013). Although most individuals will clear the infection on their own, persistent low-risk types of HPV (non-oncogenic) are associated with genital warts, and high-risk types of HPV (oncogenic) are associated with cancers of the vulva, vagina, cervix, penis, anus, and rectum. HPV also contributes to emotional and psychological consequences, particularly among women (Daley et al., 2010).

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McCaffery et al. (2006) found anxiety, distress, embarrassment, and concerns about sexual relationships as common responses among 74 HPV+ women interviewed. In a follow-up study, Waller et al. (2007) interviewed 30 HPV+ women with normal cytology at baseline who were undergoing a follow-up HPV test 12 months later. Women receiving a second HPV+ test reported emotional responses including anxiety, fear, concerns about fertility, and disappointment that the virus had not cleared. Conversely, women receiving an HPV− result reported feelings of relief and surprise. Perrin et al. (2006) who interviewed 54 women who had received an abnormal Pap smear also reported emotions related to fear, stigma, self-blame, anger, and powerlessness. Some research has found that being in a relationship may buffer negative emotions such as shame and stigma (Nack, 2002); however, other research has found that relationship status was not associated with sexual self-concept among women (Newton and McCabe, 2008a). Therefore, further exploration of the effect of relationship status on the psychological sequelae among those receiving an HPV+ test result is needed.

Men play a significant role in the transmission and acquisition of HPV. Except for specific anal cytological testing done among select high-risk populations of men (e.g. men who have sex with men and who engage in high-risk sexual behaviors), no routine HPV testing of any sort has yet been approved for men by the Food and Drug Administration. Although a number of studies have been conducted assessing men's knowledge, attitudes, and beliefs about HPV infection, the psychosocial impact of HPV among men remains unclear. In a small ($n = 45$) qualitative study of 18- to 22-year-old male college students, most participants recognized HPV as an STI associated with cervical cancer, but none associated HPV with anal, penile, or oropharyngeal cancer (Allen et al., 2009). Also, many did not know that men were susceptible to HPV infection and referred to HPV as a "woman's disease." Even so, most men who recognized the link between HPV and cervical cancer did not feel that the cancers or the infections were severe. McPartland et al. (2005) report similar findings among another cohort of college men 18–25 years of age. In this study, men did not perceive HPV as a severe infection for themselves, but did indicate that HPV infection was severe for women. In addition, men in this study did not believe themselves or their current partners to be at risk for HPV infection. These findings are likely related to the media's emphasis on women, vaccination, and cervical cancer (Fontenot and Morelock, 2012).

There are two HPV vaccines licensed by the Food and Drug Administration—Cervarix® and Gardasil® (Centers for Disease Control and Prevention, 2012). Cervarix prevents two high-risk types, HPV 16 and 18, which cause 70% of cervical cancers. In addition to preventing HPV 16 and 18, Gardasil also prevents two low-risk types, HPV 6 and 11, which cause 90% of genital warts. Moreover, Gardasil has been recommended for use among males for the prevention of penile cancers. The vaccine is routinely recommended for 11- and 12-year-old females and males, and "catch-up" vaccinations are recommended for 13- to 26-year-old females and 13- to 21-year-old males who have not completed the vaccination series (Centers for Disease Control and Prevention, 2012). However, both vaccines were initially recommended for females only (Garland et al., 2007).

Previously, most HPV research and media messages were female-centered, deemphasizing (1) the role of men in HPV transmission and (2) the consequences of HPV infection in men (e.g. anogenital cancers and genital warts) (Fontenot and Morelock, 2012). As such, HPV has been framed as a women's health issue, leading to the *feminization* of HPV (Daley et al., 2012). This is further demonstrated by a recent study by Smith and Parrot (2012), who concluded that men and women's mental representations of HPV were genderized female. This semantic network

analysis revealed that six terms—"cervical," "women," "vaccine," "sexually transmitted," "cause," and "prevent"—were central to individuals' mental representations of HPV and coincided with content analyses of HPV-related advertising and media coverage (Casper and Carpenter, 2008; Habel et al., 2009).

### Purpose of the study

The purpose of this report is to describe differences in psychosocial reactions, specifically, negative emotions and stigma, between participants in two distinct HPV-related studies: (1) a psychosocial study of women diagnosed with HPV and (2) a psychosocial arm of a natural history study of HPV in men. HPV has largely been framed as a women's health issue and is perceived by men as being less relevant; thus, we hypothesize that women infected with HPV will experience a greater degree of negative emotions and stigma than HPV-infected men. The following hypothesis will be tested in this study: (1) women are more likely than men to experience individual negative emotions and individual HPV-related stigma after testing positive for HPV and (2) relationship status moderates the association between gender and negative emotions/stigma among HPV-positive individuals.

## Methods

### Participants

*HPV-positive women.* Women recently diagnosed (<3 months) with HPV following an abnormal Pap smear were recruited from a student health service clinic at a large university and five Planned Parenthood clinics located in west-central Florida from October 2003 to March 2005. Details of this study have been reported previously (Daley et al., 2008, 2010). In brief, English-speaking women attending these study sites for a gynecological exam and Pap smear were invited to participate. Women with an abnormal Pap smear result were tested for HPV. Participants testing HPV-positive were invited to complete a paper-and-pencil survey assessing demographics, self-reported HPV diagnosis, HPV knowledge, health information–seeking behaviors, disclosure of HPV test results, emotional responses, sexual behavior intentions, and vaccine knowledge and intentions. A total of 154 women completed surveys.

*HPV-positive men.* Men participating in a natural history study of HPV (the HPV in men (HIM) study) located in west-central Florida (Giuliano et al., 2008) were recruited into a psychosocial study examining cognitive and emotional responses to receiving HPV test results (the Cognitive and Emotional Responses to HPV in Men (CER) study) from March 2007 to March 2010. Details of the CER study have been previously reported (Daley et al., 2009). In brief, approximately 2–4 weeks after receiving HPV test results through the HIM study, CER participants completed a computer-assisted survey instrument (CASI) assessing demographics, self-reported HPV diagnosis, HPV knowledge, information seeking, emotional responses, disclosure of HPV test results to sexual partners, changes in sexual behavior, and HPV vaccine intentions. A total of 190 men who tested HPV-positive the first time they received their HPV test results were included in the present analysis. Although data on sexual orientation were not collected, of the 111 men (58%) reporting they had a "main" sex partner, only 2 said their partner was male. Of the 26 men (14%) reporting they had an "other" sex partner, only 5 said their partner was male. Thus, we believe this population was largely heterosexual.

### Measures

*Demographics.* Among women, age was assessed by a single item, whereas among men, age was calculated using date of birth and date of study completion. Among men and women, single items assessed Hispanic ethnicity, racial identification, relationship status, and education.

*HPV knowledge.* There were 15 true/false/not sure HPV knowledge items that were included on both surveys. Example items included the

following: "HPV is a virus," "HPV causes genital warts," and "You can have HPV without knowing it." The number of correct answers was summed to create an HPV knowledge score with higher scores indicating higher knowledge of HPV (theoretical range 0–15). Previously reported reliability estimates of the 15-item knowledge measure indicated sufficient reliability ($\alpha = .72$). Reliability in the current analytic sample was less, but remained sufficient ($\alpha = .61$).

*HPV-related negative emotions.* Men and women responded to five single items assessing whether they felt particular negative emotions regarding their HPV test results. Among men, response options for these items included "Yes" or "No." Among women, response options for these items included the following: "Very much," "Somewhat," or "Not at all"; in this sample the "Very much" and "Somewhat" response options were combined to form a single category of those who felt these emotions compared to those who did not. These two categories were compared to men's responses. Example items included the following: "I am angry," "I am worried," and "I am shocked."

*HPV-related stigma beliefs.* Men and women responded to six single items concerning HPV-related stigma and their HPV-positive test result. Response options among men included the following: "Strongly agree," "Agree," "Moderately agree," "Moderately disagree," "Disagree," and "Strongly disagree." Response options among women included the following: "Strongly agree," "Agree," "Disagree," and "Strongly disagree." For both men and women, response options were combined to form two categories for each item: "Strongly agree," "Agree," and "Moderately agree" were combined for men; and "Strongly agree" and "Agree" were combined for women to create those who agreed that they felt each HPV-related stigma item. Example items included the following: "Disclosing my HPV test results is risky," "People will judge me," and "I am paying for past behaviors." Participants who reported HPV-related stigma were compared to those who did not for each item.

### Statistical analysis

The prevalence of negative emotional reactions and HPV-stigma related beliefs was computed for men and women and compared using Pearson's chi-square test. The degree to which participants experienced negative emotions and HPV-related stigma following receipt of test results was operationalized as the total sum of negative emotions and stigma beliefs reported, respectively. The Wilcoxon rank sum test (normal approximation) was used to examine gender differences in the distribution of the number of negative emotions and stigma beliefs. The robustness of gender differences in these outcomes was further evaluated in regression analysis controlling for individual characteristics. Summative scores for negative emotional response and stigma beliefs were analyzed as ordinal outcomes using proportional odds models for logistic regression. All statistical analyses were conducted with SAS version 9.2. Institutional Review Board approval was received prior to commencing both studies.

## Results

As demonstrated in Table 1, the pooled sample (men and women) had an average age of 27 years (standard deviation (SD) = 10 years) and were mostly White (69%) and non-Hispanic (85%). Most participants reported completing a college degree or at least some college (42% and 44%, respectively) and were single (76%). Men and women differed with regards to age, education, and relationship status. Men were significantly older (mean = 31 years, SD = 12 years, range = 18–66 years) than women (mean = 24 years, SD = 5 years, range = 18–45 years). In addition, a greater proportion of men compared to women had a college degree (46% versus 36%) and were married (14% versus 5%).

**Table 1.** Demographic characteristics of HPV-positive men and women.

| | Total | Men | Women | *p* |
|---|---|---|---|---|
| | Mean (SD) | Mean (SD) | Mean (SD) | |
| Age | 27 (10) | 31 (12) | 24 (5) | <.001 |
| Knowledge | 14 (2) | 14 (3) | 14 (2) | .622 |
| | *n* (%) | *n* (%) | *n* (%) | |
| *Race* | | | | .279 |
| White | 235 (69) | 129 (68) | 106 (69) | |
| African American | 53 (15) | 34 (18) | 19 (12) | |
| Other | 55 (16) | 27 (14) | 28 (18) | |
| *Hispanic* | | | | .914 |
| Yes | 53 (15) | 29 (15) | 24 (16) | |
| No | 290 (85) | 161 (85) | 129 (84) | |
| *Education* | | | | .045 |
| High school or less | 49 (14) | 30 (16) | 19 (12) | |
| Some college | 151 (44) | 72 (38) | 79 (51) | |
| College graduate | 144 (42) | 88 (46) | 56 (36) | |
| *Relationship status* | | | | .004 |
| Single | 262 (76) | 144 (76) | 118 (77) | |
| Cohabitating | 47 (14) | 19 (10) | 28 (18) | |
| Married | 35 (10) | 27 (14) | 8 (5) | |

HPV: human papillomavirus; SD: standard deviation.

Overall, a greater proportion of women reported feeling each of the five negative emotions measured (see Table 2) and had a higher median number of negative emotions compared to men (4 versus 1, $p < .001$). As seen in Figure 1, the majority of men reported none or one negative emotion, whereas the majority of women reported four or five negative emotions.

The results of the Wilcoxon test indicated a significant difference between the distribution of negative emotional responses between men and women ($z = 8.95$, $p < .0001$). The two most common emotions reported by both men and women were "worry" and "confusion." However, less than a quarter of the men reported feeling "angry" or "depressed," which were feelings expressed by more than half of the women.

Overall, more women than men reported HPV-related stigma beliefs. The distribution of stigma beliefs was similar to that of negative emotional responses. The majority of men were at the lower end of the distribution compared to women who were at the higher end (see Figure 2). These differences were statistically significant as indicated by the Wilcoxon test ($z = 4.65$, $p < .0001$). The largest differences between women and men were related to feelings of guilt: a significantly larger proportion of women than men reported feeling guilty as a result of being HPV-positive (66% versus 37%, $p < .001$). In addition, the majority of both men and women reported that having HPV made them feel like "they were paying for past behaviors."

Demographic correlates of the degree to which participants experienced negative emotions or reported stigma beliefs differed between men and women (see Table 3). For men, being single (compared to being married or cohabiting with a non-married partner) was significantly associated with a greater degree of negative emotions (odds ratio (OR) = 2.71; 95% confidence interval (CI) = 1.46–5.03) and

**Table 2.** Comparison of negative emotions and HPV-related stigma beliefs between HPV-positive men and women.

| | Total | Men | Women | *p* |
|---|---|---|---|---|
| | *n* (%) | *n* (%) | *n* (%) | |
| *Negative emotions* | | | | |
| Angry | 143 (43) | 41 (22) | 102 (70) | <.001 |
| Worried | 253 (76) | 115 (62) | 138 (94) | <.001 |
| Confused | 173 (52) | 68 (37) | 105 (71) | <.001 |
| Depressed | 121 (36) | 45 (24) | 76 (52) | <.001 |
| Shocked | 164 (49) | 61 (33) | 103 (70) | <.001 |
| *HPV-related stigma beliefs* | | | | |
| Disclosing is risky | 184 (54) | 94 (50) | 90 (60) | .051 |
| People will judge me | 234 (69) | 127 (67) | 107 (71) | .427 |
| I feel unclean | 162 (48) | 75 (39) | 87 (59) | <.001 |
| I feel I'm paying for past behaviors | 193 (57) | 91 (48) | 102 (68) | <.001 |
| I feel ashamed | 186 (55) | 83 (44) | 103 (68) | <.001 |
| I feel guilty | 169 (50) | 70 (37) | 99 (66) | <.001 |

HPV: human papillomavirus.

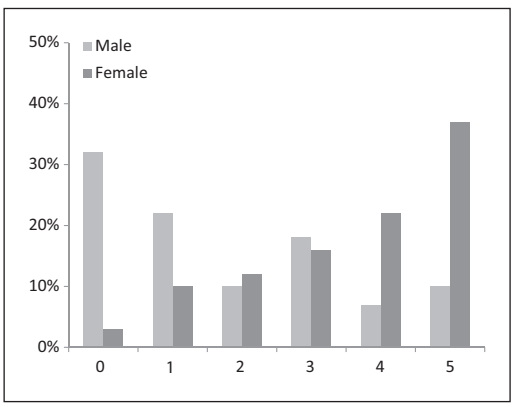


**Figure 1.** Distribution of the number of HPV-related negative emotions reported after testing positive for HPV among men (*n* = 187) and women (*n* = 147).
HPV: human papillomavirus.

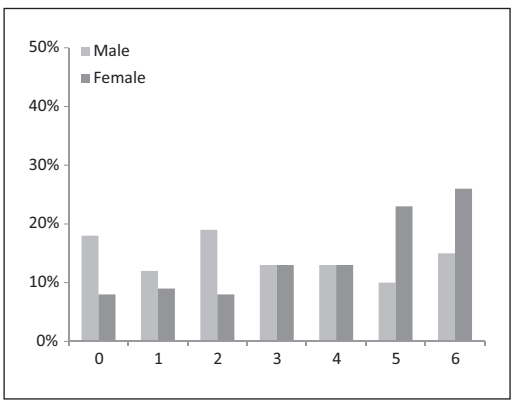


**Figure 2.** Distribution of the number of HPV-related stigma beliefs reported after testing positive for HPV among men (*n* = 190) and women (*n* = 151).
HPV: human papillomavirus.

stigma beliefs (OR = 3.14; 95% CI = 1.72–5.75). For women, increasing age was associated with fewer negative emotions (OR = 0.89; 95% CI = 0.83–0.95). Women with lower educational attainment (having a high school degree or less compared to a college graduate) were found to have a greater degree of negative emotions (OR = 3.68; 95% CI = 1.30–10.38); however, in an additional model controlling for age, educational attainment was no longer significantly associated with negative emotional response (adjusted odds ratio (AOR) = 2.87;

**Table 3.** Bivariate correlates of the number of negative emotional responses and HPV-related stigma beliefs reported by HPV-positive men and women.

| | Negative emotional response | | HPV-related stigma beliefs | |
|---|---|---|---|---|
| | Men | Women | Men | Women |
| | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Age | 1.00 (0.98–1.02) | 0.89 (0.83–0.95)* | 1.01 (0.99–1.03) | 0.96 (0.90–1.02) |
| HPV knowledge | 1.04 (0.93–1.16) | 0.92 (0.77–1.01) | 1.00 (0.90–1.01) | 1.10 (0.93–1.29) |
| *Race* | | | | |
| White | 1.00 | 1.00 | 1.00 | 1.00 |
| African American | 1.56 (0.79–3.07) | 1.38 (0.56–3.40) | 1.75 (0.90–3.41) | 1.37 (0.57–3.32) |
| Other | 1.26 (0.60–2.67) | 1.92 (0.83–4.42) | 0.90 (0.44–1.87) | 1.82 (0.84–3.94) |
| *Hispanic* | | | | |
| No | 1.00 | 1.00 | 1.00 | 1.00 |
| Yes | 1.67 (0.82–3.41) | 1.87 (0.78–4.49) | 1.13 (0.56–2.25) | 1.15 (0.51–2.60) |
| *Education* | | | | |
| College graduate | 1.00 | 1.00 | 1.00 | 1.00 |
| Some college | 0.85 (0.49–1.49) | 1.41 (0.75–2.63) | 0.83 (0.48–1.44) | 0.97 (0.52–1.78) |
| High school or less | 1.45 (0.68–3.08) | 3.68 (1.30–10.38)* | 1.61 (0.78–3.34) | 2.25 (0.86–5.93) |
| *Relationship status* | | | | |
| Cohabitating/married | 1.00 | 1.00 | 1.00 | 1.00 |
| Single | 2.71 (1.46–5.03)* | 1.63 (0.83–3.21) | 3.14 (1.72–5.75)* | 1.41 (0.73–2.73) |

HPV: human papillomavirus; OR: odds ratio; CI: confidence interval.
*$p < .05$.

95% CI = 0.99–8.35). None of the demographic characteristics was associated with HPV-related stigma beliefs in women.

## Discussion

Previous studies reported negative emotional responses to HPV diagnoses among women (Daley et al., 2010); however, little research has been conducted on the same reactions among men, largely due to the fact that men are not routinely tested for HPV. The original psychosocial study of HPV in women was initiated prior to the 2006 licensure of the quadrivalent HPV vaccine for females. Gaining a greater understanding of the complex emotional impact of a positive HPV test result has been a critical addition to the development of educational messages and programs. When an opportunity presented itself, through a large natural history study of HPV in men, the authors were eager to ascertain whether comparable expressions of negative emotions and stigma would be present among men who test positive for HPV. Thus, the psychosocial arm of the larger natural history study was undertaken. While these two samples are not identical, nonetheless, this opportunity to identify and compare similar psychosocial constructs among both genders was a unique and exciting prospect.

This report compared two psychosocial studies among women and men who received a positive HPV test result. Both groups self-reported negative emotional responses and perceived stigma. Findings suggest that the gender gap was larger with regard to negative emotions than stigma, with women reporting higher negative emotions overall. With regards to negative emotions, both groups reported being worried and confused over their positive HPV test results; however, more women reported feeling angry or depressed in comparison with men.

Among the findings related to stigma, there was a notable difference in feelings of guilt, which was significantly higher among women.

Findings also suggest that sociodemographic variables may account for differences between genders. For instance, among women, being younger and having less education were associated with higher levels of negative emotions. However, among men, being single was associated with greater expressions of negative emotions and stigma. This somewhat intuitive finding among women could be related to life experience and maturity. Thus, developing and implementing targeted educational messages to young women, given their stage of development, may assist in counteracting misconceptions and negative emotions. Whereas among men, the finding of being single and its association with negative emotions and stigma may be associated with interpersonal factors. For instance, single men may lack social support from a partner and may not receive the same level of information, emotional, or appraisal reinforcements compared to men with a partner (Heaney and Isreal, 2002). However, these findings merit further exploration, possibly through qualitative approaches. Furthermore, health messages for both genders should be developed and pretested carefully as adverse effects of presenting high-risk information about HPV, and the vaccines have been shown to decrease women's motivation to be vaccinated (Gainforth and Latimer, 2012).

These results are not without limitations. First, findings are derived from different sampling approaches. Women with abnormal Pap smears and positive HPV test results were compared to men participating in a natural history study where HPV testing was performed for research purposes only. In addition, differences were found among the two samples with regards to age, education, and relationship status. Moreover, the two studies compared in this report reflect different time periods in the progression of HPV testing and vaccine status. However, both studies were initiated prior to approval of the HPV vaccine as associated with the respective gender. Finally, as noted previously, women have access to routine cervical cancer screening with reflexive HPV testing, whereas HPV testing is not approved for routine use among men. Although some high-risk men in some clinical settings may receive anal Pap smears and HPV testing, this is not routine for men and thus limits the generalizability of these findings among men.

Several results in this report warrant further exploration and may have practice implications. Despite the limitations stated above, we had an opportunity to explore men's emotional reactions to an HPV test result, an area that until recently was focused exclusively among women. Our findings indicate that women self-report greater negative emotions and stigma. The question remains, why do men not self-report the same level of anger, depression, or shock? Additionally, more women expressed feelings of guilt, shame, and paying for past behaviors—a finding far less common among men. This discrepancy could be a result of the structure of cathexis as noted in the Theory of Gender and Power (Connell, 1987), where gender-based sexual beliefs about female and male sexuality, expectations, and acceptance differ.

Furthermore, differences in negative emotions and stigma might be reflective of the fact that not only does the epidemiological burden fall on women but also they are more likely to experience the psychosocial burden. This disparity has led us to conceptualize the epidemiological and psychosocial burden as the "feminization of HPV." This uneven perception that HPV is only a woman's concern has done a disservice to both genders, which may be reflective in these emotional responses for women and the lack of concern among men. This has also led to research, policy, and practice disparities which place a greater emphasis of providing information and prevention efforts (i.e. vaccination) among women. However, research has shown that HPV knowledge and self-efficacy are important independent predictors of vaccine acceptance among men, highlighting the potential of health messages in influencing

men's vaccine decision-making (Petrovic et al., 2011). Moreover, cultural relevant theories are seldom applied to HPV vaccine-related research and could assist in our understanding of HPV vaccine acceptability among both genders (Bynum et al., 2012).

These findings suggest the need to re-frame information that both men and women receive regarding HPV prevalence, transmission, and prevention. Furthermore, this study extends the body of research which has found that an STI diagnosis can impact stigma, mood, fear, anxiety, and negative reactions to disclosures, which can have significant public health implications (Newton and McCabe, 2008b). Gender-neutral messages and targeted interventions aimed at both patients and providers may be beneficial in reducing psychosocial disparities, while acknowledging men's legitimate responses to the impact of an STI. Because worry and confusion remain high concerns for both genders, health efforts should focus on effective educational efforts and balance the recognition of emotional needs to destigmatize and minimize psychosocial impacts related to HPV.

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## References

Allen J, Fantasia H, Fontenot H, et al. (2009) College men's knowledge, attitudes, and beliefs about human papillomavirus infection and vaccine. *Journal of Adolescent Health* 45: 535–537.

Bynum SA, Brandt HM, Annang L, et al. (2012) Do health beliefs, health care system distrust, and racial pride influence HPV vaccine acceptability among African American college females? *Journal of Healthy Psychology* 17(2): 217–226.

Casper M and Carpenter L (2008) Sex, drugs, and politics: The HPV vaccine for cervical cancer. *Sociology of Health & Illness* 30: 886–899.

Centers for Disease Control and Prevention (2012) HPV vaccine information for clinicians—Fact sheet. Available at: http://www.cdc.gov/std/HPV/STDFact-HPV-vaccine-hcp.htm (accessed 9 August 2012).

Centers for Disease Control and Prevention (2013) Genital HPV infection - fact sheet. Available at: http://www.cdc.gov/std/HPV/STDFact-HPV.htm (accessed 7 September 2012).

Connell R (1987) *Gender and Power*. Stanford, CA: Stanford University Press.

Daley E, Buhi E, Baldwin J, et al. (2009) Men's responses to HPV test results: Development of a theory-based survey. *American Journal of Health Behavior* 33(6): 728–744.

Daley E, Buhi E, Vamos C, et al. (2012) Deconstructing the feminization of HPV: Why HPV should matter to men. Paper presented at the APHA 140th Annual Meeting & Expo, San Francisco, CA, 29 October 2012.

Daley E, Perrin K, McDermott R, et al. (2010) The psychosocial burden of HPV: A mixed-method study of knowledge, attitudes and behaviors among HPV+ women. *Journal of Health Psychology* 15(2): 279–290.

Daley E, Perrin K, Vamos C, et al. (2008) HPV knowledge among HPV+ women. *American Journal of Health Behavior* 32(5): 477–487.

Fontenot H and Morelock N (2012) HPV in men is a women's health issue. *Nursing for Women's Health* 16(1): 57–65.

Gainforth H and Latimer A (2012) Risky business: Risk information and the moderating effect of message frame and past behaviour on women's perceptions of the Human Papillomavirus vaccine. *Journal of Healthy Psychology* 17(6): 896–906.

Garland S, Hernandez-Avila M, Wheeler C, et al. (2007) Quadrivalent vaccine against human papillomavirus to prevent anogenital diseases. *New England Journal of Medicine* 356(19): 1928–1943.

Giuliano A, Lazcano-Ponce E, Villa L, et al. (2008) The human papillomavirus infection in men study: Human papillomavirus prevalence and type distribution among men residing in Brazil, Mexico, and the United States. *Cancer Epidemiology, Biomarkers & Prevention* 17(8): 2036–2043.

Habel M, Liddon N and Stryker J (2009) The HPV vaccine: A content analysis of online news stories. *Journal of Women's Health* 18: 401–407.

Heaney CA and Isreal BA (2002) Social networks and social support. In: Glanz K, Rimer B and Lewis FM (eds) *Health Behavior and Health Education: Theory, Research, and Practice*

(3rd edn). San Francisco, CA: Jossey-Bass, pp. 185–209.

McCaffery K, Waller J, Nazroo J, et al. (2006) Social and psychological impact of HPV testing in cervical screening: A qualitative study. *Sexually Transmitted Infections* 82: 169–174.

McPartland T, Weaver B, Lee S, et al. (2005) Men's perceptions and knowledge of human papillomavirus (HPV) infection and cervical cancer. *Journal of American College Health* 53(5): 225–230.

Nack A (2002) Bad girls and fallen women: Chronic STD diagnoses as gateways to tribal stigma. *Symbolic Interaction* 25: 463–485.

Newton DC and McCabe MP (2008a) Effects of sexually transmitted infection status, relationship status, and disclosure status on sexual self-concept. *Journal of Sex Research* 45(2): 187–192.

Newton DC and McCabe MP (2008b) Sexually transmitted infections: Impact on individuals and their relationships. *Journal of Health Psychology* 13(7): 864–869.

Perrin K, Daley E, Naoom S, et al. (2006) Women's reactions to HPV diagnosis: Insights from in-depth interviews. *Women & Health* 43(2): 93–110.

Petrovic K, Burney S and Fletcher J (2011) The relationship of knowledge, health value and health self-efficacy with men's intentions to receive the Human Papillomavirus (HPV) vaccine. *Journal of Healthy Psychology* 16(8): 1198–1207.

Smith R and Parrott R (2012) Mental representations of HPV in Appalachia: Gender, semantic network analysis, and knowledge gaps. *Journal of Health Psychology* 17: 917–928.

Waller J, McCaffery K, Kitchener H, et al. (2007) Women's experiences of repeated HPV testing in context of cervical cancer screening: A qualitative study. *Psycho-Onocology* 16: 196–204.