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RISK PORTRAYAL AND ACTIONABILITY OF HUMAN PAPILLOMAVIRUS COVERAGE IN POPULAR MAGAZINES

by

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List of Abbreviations

ACA	Affordable Care Act
CDC	Centers for Disease Control and Prevention
DNA	Deoxyribonucleic acid
FDA	Food and Drug Administration
HIV	Human immunodeficiency virus
HPV	Human papillomavirus
MMR	Measles, mumps, rubella (vaccine)
MSM	Men who have sex with men
Pap	Papanicolaou test
PCR	Polymerase chain reaction
QR	Quick Response code
STD	Sexually transmitted disease (outdated term)
STI	Sexually transmitted infection
US	United States
VAERS	Vaccine Adverse Event Reporting System
WSW	Women who have sex with women

RISK PORTRAYAL AND ACTIONABILITY OF HUMAN PAPILLOMAVIRUS COVERAGE IN POPULAR MAGAZINES

Thesis Abstract—Idaho State University (2021)

Genital human papillomavirus (HPV) is a highly prevalent sexually transmitted infection that can lead to several anogenital and oropharyngeal cancers. A content analysis was performed on magazine articles between September 2005 and August 2017, a timeframe that encompasses four highly publicized changes to the prevention, diagnosis, and treatment of HPV and its related cancers—a controversial vaccine, a new HPV test, revisions to current Pap testing, and the enaction of the Affordable Care Act—to assess the accuracy of risk portrayal and factors that may influence HPV prevention behavior and cancer screening. Findings suggest these magazines present fragmented, incomplete information about HPV that often inaccurately portrays the reader's risk of serious illness, which may prevent proper prevention and diagnostic seeking behavior.

Keywords: human papillomavirus, cancer prevention, risk perception, agency assignment, anticipated regret

Chapter I: Introduction

Genital human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the United States (US), and certain strains can cause genital warts as well as most cervical, vulvar, vaginal, penile, anal, and oropharyngeal cancers (Saraiya et al., 2015). An estimated 24.2% of men and 19.9% of women are currently infected with one such disease-associated type of HPV (Lewis et al., 2021).

Widespread use of the Pap test has resulted in a significant decrease in mortality from cervical cancer and continues to be highly effective (Meggiolaro, 2016), which may be why in 2005, news coverage was low. A study of newspaper articles about cancer screenings from June through September 2005 found that nearly all were about breast cancer, prostate cancer, lung cancer, and ovarian cancer. Of 79 articles, only one was about cervical cancer (Smith et al., 2010).

Just as that study was ending, however, cervical cancer was making its way back into the news due to HPV cancer awareness advertisements from pharmaceutical company Merck, in which they set out to help consumers "Make the Connection" between HPV and cervical cancer and to have consumers "Tell Someone" about said link (Mamo et al., 2010). This non-branded campaign sought to familiarize the public with HPV's link to cervical cancer, which became a vaccine-preventable illness on June 8, 2006, when the FDA approved Merck's HPV vaccine, Gardasil (Baylor, 2006).

Gardasil was strategically marketed primarily as an anti-cancer vaccine, but the fact HPV is an STI made it socially controversial, with individuals raising concerns about it promoting promiscuity (Grimes, 2006), concerns which were covered so frequently in the media that some researchers question whether Gardasil was truly as controversial as reported (Casciotti et al., 2014).

Many of these articles also exaggerated the medical importance of the HPV vaccine, which was portrayed as a "lifesaving" method of preventing cancer and/or death, with articles often omitting or underemphasizing the importance of Pap testing in prevention of cervical cancer (Casciotti et al., 2014), which was portrayed as "nearly inescapable" (Abdelmutti & Hoffman-Goetz, 2010).

In the decade following Gardasil's approval, there were several important changes to the prevention, diagnosis, and treatment of HPV and its related cancers, including additional vaccine approvals, a new method of testing for HPV (Hojvat, 2011), updated guidelines for frequency of Pap testing (Moyer, 2012), and expanded access to women's preventive health care due to the Affordable Care Act (ACA), which made HPV vaccination, Pap testing, and HPV testing free for many women (HRSA, 2020). All these events brought HPV and its associated cancers back into the news.

Before Merck told Americans to "Make the Connection," news articles about HPV failed to do just that, often providing incomplete information on transmission and prevention or inaccurately explaining cancer risk (Anhang et al., 2004). Since then, have

Americans received higher quality information about HPV, or have there simply been more articles?

This study examines articles in popular magazine reporting on HPV from September 2005 to August 2017 for actionable content and factors known to affect health behavior, namely risk perception and anticipated regret. Individuals are most likely to change their behavior when they perceive themselves to be at risk of severe illness if they do not take action (Brewer et al., 2007) and/or if they anticipate they will regret one choice more than another (Brewer et al., 2016).

Chapter II: Literature Review

Genital HPV is the most common STI in the US. Most people with HPV are not even aware they have it because HPV infections are asymptomatic in approximately 70% to 90% of cases and often resolve on their own within approximately two years (Serrano et al., 2017); however, HPV can also cause genital warts or, more importantly, cancer.

While approximately 40% of adults 15 to 59 currently have some form of HPV, approximately 22% have a form of HPV associated with genital warts or cancer, with more men (24.2%) than women (19.9%) being affected (Lewis et al., 2021).

HPV and Cancer

Twelve types of HPV have been declared "carcinogenic to humans" with several others being monitored as possible carcinogens (Bouvard et al., 2009). Most HPV infections are cleared by the immune system before any symptoms develop, but long-term infection with high-risk strains is the primary risk factor for many anogenital and oropharyngeal cancers, with HPV DNA being identified in most cervical, vulvar, vaginal, penile, anal, and oropharyngeal cancers (Saraiya et al., 2015).

The Papanicolaou test

The Papanicolaou test, commonly known as the Pap test or a Pap smear, is a cytological examination used to screen for cancer and precancerous changes. Routine Pap testing allows health care workers to diagnose cervical cancer in its early stages.

Widespread use of Pap testing has been linked to over 70% reduction in cervical cancer mortality between 1955 and 1992. A 2016 meta-analysis confirmed that Pap testing is still effective and that while there is some disagreement about how often tests should be performed, they are most reliable when done at regular intervals (Meggiolaro, 2016).

HPV Cancer Disparities

HPV and related cancers do not affect everyone equally. Disparities in these cancers are not only related to physiology—access to and utilization of health care services and other contributing lifestyle factors also vary between groups.

Black Women. Black women historically have a cervical cancer mortality three times that of white women, which has been widely attributed to both infection with high-risk HPV types and less access to screening and post-diagnosis follow-up.

A 2017 study of high-risk HPV infection in black and white women found no statistical difference, whereas the disparity had been present in their 2011 group, a finding they tentatively attributed to the HPV vaccine (Miller et al., 2020). Another study indicates that improved access to care in younger generations has functionally eliminated the cervical cancer disparity for black women under 50, but the disparity remains clear for older black women (Simard et al., 2012).

Women Who Have Sex with Women. Women who have sex with women (WSW) have higher overall rates of HPV infection compared to heterosexual women (49.7% vs. 41.1%) but are even more disproportionately infected with high-risk strains

(37.0% vs. 27.9%) (Reiter & McRee, 2017). These rates may be because many WSW perceive themselves to have a lower risk of HPV infection than heterosexual women due to a belief that HPV transmission happens most frequently during penis-vagina sex or through exchange of bodily fluids. For some WSW, this misconception was a result of health care providers stating or implying that their risk was low (Agénor et al., 2019).

Lesbian women are less likely to receive Pap testing, likely because the test is normally conducted in conjunction with a visit for contraception. A 2014 study found that only 43.3% of lesbian women had a Pap within the last year compared with 64.5% of bisexual women and 68.5% of heterosexual women. This is inversely correlated with receipt of medical contraceptives. Only 11.3% of lesbian women received this service, whereas 35.7% of bisexual and 34.0% of heterosexual women did (Agénor et al., 2014).

Men. Men have rates of oropharyngeal cancer much higher than women, with high-risk oral HPV rates six times that of women (Sonawane et al., 2017). This is suspected to be a result of both sexual behavior and biology. A 2016 study of men and women with oral HPV found that performing oral sex on a woman (cunnilingus) was linked to increased oral HPV infection in men, but not in women who performed cunnilingus. Performing oral sex on a man (fellatio) was not linked to an increased risk of oral HPV infection in men or women. Follow-up with the same group of participants showed that it took men nearly twice as long to clear their infection. Researchers believe

that HPV may be more easily transmissible through cunnilingus than fellatio but that women have higher natural immunity (D'Souza et al., 2016).

Men Who Have Sex with Men. Men who have sex with men (MSM) continue to be disproportionately affected by human immunodeficiency virus (HIV), which in turn predisposes them to HPV infection. One meta-analysis found that 35% of HIV-positive men were also infected with the highest risk HPV strain compared to 13% of HIV-negative men (Machalek et al., 2012). Coinfection with HIV and HPV is so devastating that before Gardasil was approved for use in males, there were advocates for MSM to be vaccinated even though they would have to pay full price since most insurance does not cover off-label use (Tuller, 2007; Roan, 2007).

Diagnosing anal cancer can be confusing and further stigmatizing to MSM. The term "pap smear" has become synonymous with women's health care to the extent that "One participant initially thought that his provider, a Physician Assistant, was being 'condescending' when she first 'said Pap smear' to him, stating that 'just because I'm gay, doesn't mean I'm a woman'" (Finneran et al., 2021). The study authors recommend using the term "anal Pap" or "anal Pap smear" to improve accuracy of communication as well as reduce stigma.

HPV Vaccination

As HPV is one of the few definitive causes of cancer, vaccination against HPV is therefore one of the few reliable cancer prevention strategies (Grimes, 2006). While early

diagnosis with Pap and HPV testing is still critical in the prevention and treatment of cervical cancer (Meggiolaro, 2016), vaccination is even more important in individuals who are unable to have those tests at the recommended frequency.

The following vaccines are or were available in the US:

Gardasil

Gardasil is a quadrivalent HPV vaccine manufactured by Merck that protects against four HPV types. While its approval was updated several times, three are of most interest regarding public perspective of who is affected by HPV:

June 8, 2006. Gardasil was initially approved for use in females 9 to 26 years of age to prevent cervical cancer, other precancerous conditions, and genital warts (Baylor, 2006).

October 9, 2009. Gardasil was approved for use in males 9 to 26 years of age for prevention of genital warts (Sun, 2009).

December 26, 2010. Gardasil was approved for use in in males and females 9 to 26 years of age for prevention of anal cancer (Sun, 2010).

Cervarix

Cervarix is a bivalent HPV vaccine manufactured by GlaxoSmithKline that protects against two HPV types. Cervarix was never licensed for use in males, which is likely the reason the manufacturer stopped supplying Cervarix in the US in 2016, attributing the decision to "very low market demand" (Sagonowsky, 2016).

October 9, 2009. Cervarix was approved for use in females 10 to 25 years of age to prevent cervical cancer (Baylor, 2009).

Gardasil 9

Gardasil 9 is a nine-valent HPV vaccine manufactured by Merck that protects against nine HPV types, including the four prevented by Gardasil, which eventually replaced its predecessor in the US market.

December 10, 2014. Gardasil 9 was approved for use in females 9 to 26 years of age for various cancers and genital warts (Gruber, 2014).

December 19, 2015. Gardasil 9 was approved for use in males 9 to 26 years of age for various cancers and genital warts (Sun, 2015).

Public Response to Gardasil

The public's response to Gardasil was polarized. Some saw it as a major medical breakthrough with promise for personal and public health, but others perceived it as dangerous and controversial.

The fact that Gardasil received a Fast Track approval from the FDA, which is only granted to drugs that fill an unmet medical need, implied to some that Gardasil was the only means of cervical cancer prevention, a concept amplified by the way it was framed in the media. Many articles focused on cervical cancer as a nearly inescapable illness leading to irreversible damage or death, exaggerating the average individual's actual risk (Abdelmutti & Hoffman-Goetz, 2010).

While newspaper articles about HPV doubled after Gardasil's introduction, media portrayal began to focus even more on the negatives, with fewer statements about HPV's prevalence and tendency to resolve on its own (Braun & Phoun, 2010). Articles in favor of HPV vaccination for prevention of cervical cancer often overstated its importance without discussing the importance of continued diagnostic measures such as the Pap test. Opinion pieces were even more likely to overemphasize the effect of the vaccine with terms like "lifesaving" (Casciotti et al., 2014).

Safety Concerns

Gardasil was introduced during a time when the safety of vaccines was widely questioned. While some individuals always have and will be mistrustful of vaccines and other medical treatments, the current anti-vaccine movement can be directly traced to a fraudulent study published by Wakefield et al. in 1998, which linked autism to the measles, mumps, rubella (MMR) vaccine (Colgrove, 2006). Even as late as 2011, a poll found that only 52% of Americans believed that vaccines do not cause autism (Gardner 2011).

Beyond what could be considered healthy skepticism, other anti-vaccine advocates appear to have exaggerated or even fabricated accounts of adverse reactions. In 2011, Republican presidential candidate Michele Bachmann famously claimed repeatedly, without proof, that the HPV vaccine causes mental retardation and that

there were "dangerous consequences" and that "little children's lives are at risk," prompting The American Academy of Pediatrics to issue the following response:

> The American Academy of Pediatrics would like to correct false statements made in the Republican presidential campaign that HPV vaccine is dangerous and can cause mental retardation. There is absolutely no scientific validity to this statement. Since the vaccine has been introduced, more than 35 million doses have been administered, and it has an excellent safety record. (AAP, 2011)

The way vaccine safety information is presented is critical to public perception. One study found that when the Vaccine Adverse Event Reporting System (VAERS) is explained as a passive reporting system intended to both identify adverse reactions and increase transparency to the public, vaccine acceptance and trust in the CDC increased; however, providing specific adverse event information from VAERS had a negative effect on the same values (Scherer et al., 2016).

Social Concerns

Despite being marketed primarily as a cancer vaccine, the fact that HPV is sexually transmitted created controversy. Even before HPV vaccination was approved by the FDA, some advocacy groups expressed concern that it could cause further adolescent promiscuity (Grimes, 2006).

The idea that the HPV vaccine could increase adolescent promiscuity is likely erroneous; in fact, fear of STIs does not seem to be a significant deterrent to sexual

activity among adolescents to begin with (Martinez et al., 2011), so it is unlikely that reducing the risk of contracting HPV—a single and highly misunderstood STI—would result in significant change in sexual activity.

Media coverage of the HPV vaccine seemed to place excessive focus on the issue and often painted a picture of conservatives versus medical professionals, likely giving a sense that the HPV vaccine controversy was wider than it really was. This exaggerated level of controversy was then used as a basis from which to argue against the idea that HPV vaccination could impact sexual behavior (Casciotti et al., 2014).

An analysis of 250 online news stories found that 38% mentioned concern about sexual risk factors (Habel et al., 2009), and a print news analysis found that over 30% mentioned the possibility that the vaccine could lead to promiscuity (Casciotti et al., 2014).

Gender Bias. Some have questioned whether the vaccine would have been as controversial had it been approved for use in both sexes rather than just for girls. Adolescent sexuality is controversial itself, but female adolescent sexuality is more so. Parents are more likely to tell their daughters that premarital sex is unacceptable or that they should wait until marriage, until they are in love, or until they have found someone special. Parents are also significantly more likely to tell their daughters that it is their responsibility to say "no" (Kuhle et al., 2005).

Some news articles tried to combat the opinion that vaccination was unnecessary when girls could practice abstinence. These articles expressed that even if a woman was abstinent until marriage, her partner could be infected or she could become a victim of rape (Casciotti et al., 2014).

Political Concerns

Individual protection is only one aspect of vaccine coverage. Herd immunity is a critical public health measure, and mandatory school vaccination is the primary tool to achieve sufficient levels to protect the general population both because it makes tracking easier and allows funds spent on education about vaccines to be diverted to other public health programs. Such policies are controversial both because of fears regarding vaccine safety but also the interference of "big government" in parental choice (Colgrove, 2006).

The HPV vaccine became even more controversial when Michigan legislator Beverly Hammerstrom introduced the first bill to mandate HPV vaccination in September 2006 and Texas Governor Rick Perry issued the first executive order requiring HPV vaccination for school. The motives behind HPV vaccine mandates were called into question as possible financial conflicts were uncovered. Women In Government, a group of legislators who focus on advancing women's issues, of which Hammerstrom was a member, received substantial funding from Merck (Peterson, 2007), and Governor Perry's former chief of staff was a Merck lobbyist. Spurred by

suspicions that this relationship had influenced Governor Perry's executive order, the Texas legislature passed a bill prohibiting mandatory HPV vaccination for school (Blumenthal, 2007).

Many also criticized the aggressive push for vaccine mandates for further undermining the public's trust in vaccines and those who advocate for them:

> The success of US vaccination efforts—for Gardasil or any vaccine—depends on maintaining public confidence in the fundamental value of vaccination and trust in the individuals responsible for the design and implementation of vaccination programs. (Schwartz et al., 2007)

Feminization

Initial articles about Gardasil also elected to present it as a cervical cancer vaccine rather than an STI vaccine (Casciotti et al., 2014). While this may have made their articles less controversial, it also may have contributed to a public misconception that HPV is primarily a women's health issue rather than a disease that affects both sexes. A 2009 review of online articles about HPV found that 75% mentioned vaccinating females but only 25% mentioned vaccinating males (Habel et al., 2009). When HPV was discussed in the context of men, it was often reinforced with concepts of hegemonic masculinity, such as recommending men get vaccinated to protect women (Carpenter & Casper, 2009).

Health Care Professionals

This feminization is not only at the consumer end—health care professionals even recommend it less for their male patients. One survey published in 2014 found that many health care providers, by their own admission, were less likely to recommend the HPV vaccine to males than females. Only 10% to 13% of physicians said they "always" (>75% of the time) recommend HPV vaccines for male patients. Contrary to guidelines, they were also more likely to recommend the vaccine to males ages 18 to 26 rather than 11 to 12 (Mamo et al., 2014).

Physician recommendations are critical in vaccination of male patients in particular. In 2012 and 2013, parents/guardians cited lack of recommendation as the primary reason for non-vaccination of adolescent males (Thompson et al., 2017). In 2015, while 62.8% of adolescent females had received at least one dose of the vaccine, only 49.8% of males had (Raegan-Steiner et al., 2015).

Vaccine Coverage.

Despite multiple advertising campaigns and vast media coverage, including after Gardasil was approved for use in males in 2009 and 2010, vaccine uptake has increased slowly. The feminization of HPV and controversy surrounding the vaccine likely contribute to slow uptake of vaccines, especially in males. Although rates are improving, vaccination rates did not meet the Healthy People 2020 goal of 80% vaccine

completion of 13-15 year olds. In 2020, 61.4% of female juveniles and 56.0% of male juveniles were up-to-date on HPV vaccination (Pignali et al., 2021).

Health Content in Media

Health coverage in mass media is often limited to topics that are dramatic or novel, such as emerging or worsening diseases, groundbreaking research, and newly approved tests, treatments, and pharmaceuticals.

One study of newspaper articles about cancer found that when new technology was discussed, messages regarding current procedures and their effectiveness were unclear, and the information provided was inadequate for a reader to make an informed decision regarding screening, potentially contributing to a fatalistic view of cancer prevention (Smith et al., 2010).

Reliability

As medical information sources are abundant, it is critical to know where the information presented originated. As 94.6% of Americans have high trust in doctors, 74.9% have high trust in government health agencies, and 40.4% have high trust in charitable health organizations (Jackson et al., 2019), information attributed to these sources are likely perceived as more trustworthy than those without sources or with less trusted ones.

Fraudulent Studies

A highly publicized study published in *The Lancet* is the origin of the anti-vaccine movement and belief that the MMR vaccine causes autism (Wakefield et al., 1998). In addition to unethical treatment of his test subjects, this study was later determined to be falsified in a deliberate attempt to defraud vaccine manufacturers. This study has since been retracted (Murch, 2004) and the study's primary author, Andrew Wakefield, was stricken from the United Kingdom General Medical Council's register in 2010 (Stoddard, 2010). Many subsequent studies have shown the claim to be baseless; however, many Americans continue to believe that vaccines cause autism (Gardner, 2011).

Many anti-vaccine advocates consider Wakefield to be a martyr to their cause. J.B. Handler, co-founder of the anti-vaccine organization Generation Rescue, told the New York Times, "To our community, Andrew Wakefield is Nelson Mandela and Jesus Christ rolled up into one" (Dominus, 2011).

Media Fact-Checking

In 2015, journalist John Bohannon, who holds a PhD in molecular biology, published a fraudulent study just to highlight how easy it was to exploit open access journals. Frustrated by his peers' irresponsibility and questionable journalistic integrity with science reporting, he fabricated a study as Johannes Bohannon from the nonexistent Institute of Diet and Health, claiming that chocolate aids weight loss.

Bohannon designed the study with as many "red flags" as he could and "cherry picked" the data that supported his claim. With zero peer review, the study was published in *The International Archives of Medicine*—for a price of 600 Euros. Bohannon then put out a press release, resulting in the study making headlines in more than 20 countries and 12 languages with almost no fact-checking from those journalists (Bohannon, 2015).

Once Bohannon revealed what he had done, his paper was retracted, and *The International Archives of Medicine* was removed from The Directory of Open Access Journals (DOAJ). The publisher issued the following statement to Retraction Watch, a blog dedicated to documenting retracted studies:

> We just respect the decision of DOAJ since we understand this is an independent database and they have communicated with us in a proper way.
>
> We are paying a high price for a mistake we made (a paper we published by mistake) and we have taken measures to prevent these mistakes from happening again.
>
> We are completely committed to serious publishing. We adhere the Principles of Transparency and Best Practice in Scholarly Publishing, the joint statement of DOAJ with COPE, OASPA and WAME and WAME's Publication Ethics Policies for Medical Journals.
>
> We hope we can be listed again in DOAJ in 12 months. (McCook, 2015)

It is worth noting that the publication in question was at the time listed in The Directory of Open Access Journals (DOAJ), which is self-described a "community-curated online directory that indexes and provides access to high quality, open access, peer-reviewed journals" (DOAJ, n.d.).

Bohannon's actions highlight another key problem in the way information makes it to the public: If it is this difficult for scientists to determine the legitimacy of these publishers and, consequently, the papers they publish, it is likely more difficult for mainstream journalists and the average American—especially those with low health literacy—who may wish to fact check the information presented.

Quality Of Content

Availability of health information alone does not affect health outcomes. An individual's ability to make proper health decisions as a result of the information presented to them is due to their health literacy, which is defined as "the degree to which individuals have the capacity to obtain, process, and understand basic information and services needed to make appropriate decisions regarding their health" (Selden et al., 2000).

Individuals with higher health literacy are also more likely to seek health information from sources such as medical websites, whereas individuals with lower health literacy are more likely to obtain their information from television, social media, and non-medical websites such as blogs and celebrity websites (Chen et al., 2018).

Promoting Behavioral Change

The aim of this study is to examine media coverage of HPV and the related topics of cancer, testing, treatment, and prevention to determine whether information was presented in a way that could promote positive health behaviors.

Theory Of Planned Behavior

Most behaviors to prevent HPV transmission and cancer development require a significant amount of planning, such as scheduling an appointment and arranging transportation, as well as effort to obtain condoms or dental dams, be seen by a healthcare provider, obtain diagnostic services, and follow up as necessary. Thus, media content about HPV is best considered through the theory of planned behavior, in which Ajzen defines intention as a result of one's attitude toward a behavior as well as perceived control of that behavior:

> These control beliefs may be based in part on past experience with the behavior, but they will usually also be influenced by second-hand information about the behavior, by the experiences of acquaintances and friends, and by other factors that increase or reduce the perceived difficulty of performing the behavior in question. (Ajzen, 1991)

Risk Perception

Being aware of a health concern is typically not enough to motivate behavior change, even if the concern is severe. Individuals must believe that they personally are

somehow at risk. One meta-analysis found that perceptions of being more susceptible to a disease, more likely to catch it, and/or more likely to have severe illness as a result all increased the likelihood that an individual would be vaccinated for that disease (Brewer et al., 2007).

Perceived outcome certainty is also a strong indicator of choice. When one group of college students was told a vaccine was 100% effective against the viruses that cause 70% of cancer and the other group was told the vaccine was 70% effective against the viruses that cause 100% of that type of cancer, which are mathematically equivalent, the first group was more willing to get vaccinated (Li & Chapman, 2009).

Anticipated Regret

The risks associated with health behavior are not always physical. Negative emotions can also be a risk. Regret is typically thought of as a response to behavior that resulted in an outcome less favorable than the alternative, but it can also be experienced when pondering the potential outcomes of a choice before it is made. This is known as anticipated regret (Brewer et al., 2016).

Anticipated regret can be experienced for both action and inaction. Many health behaviors are not purely beneficial. For example, vaccines are an invaluable tool in disease prevention, but many individuals experience side effects. Thus, an individual can simultaneously anticipate that they will regret not getting vaccinated should they become seriously ill, but also anticipate that they will regret getting vaccinated if they

experience side effects. Unfortunately, according to Brewer et al.'s action regret enhancement hypothesis, when both are present, anticipated action regret is felt more strongly (Brewer et al., 2016).

Due to the moral controversy, some parents experienced a third source of anticipated regret regarding the HPV vaccine: the belief that their choice to vaccinate their child could make them become promiscuous. When considering health outcomes alone, anticipated regret associated with the HPV vaccine and its reported side effects was similar to that of other vaccines. Parents who believed vaccination could lead to sexual disinhibition, however, were less likely to vaccinate their daughters because they believed they would regret their action's influence on their daughters' sexual behavior (Ziarnowski et al., 2008).

Agency Assignment

Emotional responses can also be affected based on the concept of agency assignment, in which consequences can be perceived as either resulting from one's own actions or being attributed to an outside, often antagonistic force. During the H1N1 influenza pandemic, researchers prepared two nearly identical information sheets about the virus. One version portrayed the virus as actively transmitting itself and causing harm with statements like, "H1N1 spreads itself from person to person" and "H1N1 may kill thousands of Americans." This version elicited a stronger intention to vaccinate than the version that attributed the spread to human action, such as "H1N1 is a [...]

virus that people spread" and "Thousands of Americans may die from H1N1" (McGlone et al., 2014).

Building on this research, students were provided an editorial with agency language manipulated for both HPV and the vaccine. When agency was assigned to the virus, HPV was perceived as more severe. When agency was assigned to the vaccine, it was perceived as more effective (Bell et al., 2014).

When text message vaccine reminders were written for mothers, assigning transmission agency to the virus rather than their daughter's actions still evoked higher perceptions of virus severity; however, this effect was stronger when protection agency was assigned to the mother rather than the vaccine, likely because this reaffirmed their role as guardian of their children's health (McGlone et al., 2017).

"Guilt-Tripping" Advertising

Although media coverage of initial controversies naturally diminished, a new controversy arose a decade later as a result of a 2016 Merck reminder advertising campaign in which Gardasil was not specifically named, which featured children making statements such as, "Who knew HPV could lead to certain cancers? Who knew there was something that could have helped protect me from HPV when I was 11 or 12, way before I would even be exposed to it? Did you know—Mom, Dad?" or "Maybe they didn't know I would end up with cancer because of HPV. Maybe if they'd known

there was a vaccine to help protect me when I was 11 or 12. Maybe my parents just didn't know, right Mom? Dad?" (McGinley, 2016).

These ads, which contained clear elements of anticipated regret, were perceived by many as emotionally manipulative or "guilt-tripping" parents, garnering headlines ranging from "A shocking new ad is shaming parents for not giving their children this unpopular vaccine" (Ramsey, 2016) to "Do the new Merck HPV ads guilt-trip parents or tell hard truths? Both" (McGinley, 2016) to "Merck holds parents accountable in new Gardasil ad campaign" (Bulik, 2016).

A Merck spokeswoman responded to the criticism by explaining the advertisements were simply intended to fill a critical knowledge gap amongst parents:

> In a 2015 internet survey conducted by Merck, many parents were unaware of the link between HPV and certain cancers. In fact, in the survey of 858 parents, about 85% were familiar with HPV, but only about 50% knew about the link between the virus and cancer. (Ramsey, 2016)

Public Awareness

A study conducted before Gardasil's development found that while 95% of first-year college students had heard of genital warts, most did not know they were caused by HPV. Only around a third knew HPV could infect the cervix and penis. 82.6% of men and 45.6% of women did not know how HPV was transmitted. Many believed it was transmitted through exchange of bodily fluids, which the researchers theorized

may be from confusing HPV with HIV. This group of students erroneously believed that herpes and HIV were the most common STIs (Baer et al., 2000).

A similar study conducted in 2016 with male students at a two-year college found that 74.8% had heard of HPV prior to the survey. Out of 16 questions, which covered risk factors, symptoms, consequences, and whether there was a vaccine, 81.9% of participants answered fewer than ten correctly (Grace-Leitch & Shneyderman, 2016), indicating that college students' HPV knowledge remains low despite public attention to the HPV vaccine and other HPV-related topics.

A survey of general adults focused on HPV-related cancers found that while over three quarters of both men and women had heard that HPV causes cervical cancer, fewer than a third were aware that it can also cause oral, anal, or penile cancer (Osazuwa-Peters et al., 2017). These findings are similar to those reported by Merck (Ramsey, 2016), supporting their opinion that public knowledge of HPV needs improvement.

Summary

In the US, approximately 24.2% women and 19.9% of men are currently affected with a disease-associated strain of genital HPV (Lewis et al., 2021) that can result in several anogenital and oropharyngeal cancers (Saraiya et al., 2015). The first HPV vaccine was introduced in 2006 (Baylor, 2006), resulting in significant media attention

due to both its medical importance and the controversies surrounding it (Casciotti et al., 2014).

Health behavior is influenced largely by individuals' beliefs, including risk perception (Brewer et al., 2007) and any anticipated regret related to their choice of whether to engage in the behavior (Brewer et al., 2016). Individuals must also be properly informed, but basic HPV knowledge and cancer knowledge remain low (Grace-Leitch & Shneyderman, 2016; Osazuwa-Peters et al., 2017).

This study analyzes continued media coverage of HPV-related topics for the information completeness as well as portrayals that may influence health beliefs.

Chapter III: Methodology

A critical content analysis was conducted on articles in popular US magazines mentioning "HPV" or "human papillomavirus" from September 2005 to August 2017. This timeframe begins with Merck's awareness ad campaign prior to Gardasil's initial approval and ends one year after the controversial ad campaign in the summer of 2016.

Although the world is becoming increasingly digital, magazine readership remains high. In 2020, 91% of US adults reported having read a magazine within the last six months. While magazines are adapting to digital formats, the majority (73%) of adults still prefer to read paper magazines, including 63% of readers under 35 (MPA, 2020).

Some magazines are specifically related to health, but even those that are not focused on health typically have sections or columns related to health and/or sexuality. Articles in magazines are easier to collect for analysis than non-print sources as many are indexed in academic databases or are available in entirely online format.

Attitudes toward sexual health and behavior are continually changing, so this study examined changes in content of articles over time, particularly compared to milestones in the Gardasil approval timeline. The Cervarix timeline was not assessed separately as its approval allowed for consumer choice between the two vaccines approved for females rather than a new application for its use, and its approval occurred at the same time as Gardasil's approval for limited use in males.

Timeframe

There are several key developments in the way HPV is prevented and diagnosed that are of particular interest in this study. The initial focus was on the Gardasil FDA approval dates; however, changes in testing procedures and the passage of the ACA were later identified as variables that could have similar effects on the quantity and frequency of articles.

cobas HPV Test

The FDA approved the Roche Molecular Systems cobas (later renamed cobas 4800 System) HPV DNA test on April 19, 2011. This polymerase chain reaction (PCR) test detects 14 high-risk strains of HPV and was approved for use as a routine screening alongside a Pap test in women 30 and older, or for diagnostic testing in younger women with abnormal Pap results (Hojvat, 2011).

Cervical Cancer Screening Frequency

When Gardasil was approved, the U.S. Preventive Services Task Force (USPSTF) recommended Pap testing begin "3 years after onset of sexual activity or until age 21, whichever comes first" and reported that routine screening every three years after that would be just as effective for most women as annual Paps and that women with a history of normal Paps could discontinue testing after age 65 (Berg, 2003).

The USPSTF updated their recommendations in 2012 that Pap testing should not begin before 21 and that all women 21 to 65 receive a Pap every three years or, for women over 30, every five years if done in conjunction with an HPV test (Moyer, 2012).

The Affordable Care Act

The ACA was signed on March 23, 2010. While this improved overall health care access to many Americans, it was expected that most media coverage would center on the changes implemented on August 1, 2021. At that time, health plans were required to begin covering women's preventive health services with no copay. This included annual well-woman visits, Pap tests, and HPV DNA tests as recommended (HRSA, 2020).

Media Coverage Prior to This Timeframe

A 2004 review of news articles about HPV found incomplete information on prevention, transmission, and symptoms. Many articles indicated condoms were a preventive measure without explaining they are only partially effective. Few explained that HPV is often asymptomatic and often regresses without treatment, that there are low and high-risk strains, and that the majority of women with HPV do not develop cervical cancer. Stories about screening tests often lacked information about prevention and transmission, with some omitting the fact that HPV is transmitted sexually (Anhang et al., 2004).

Of the 79 newspaper articles about cancer screenings Smith et al. (2010) studied in June through September of 2005, only one mentioned cervical cancer screening. This indicates that at the time Merck initiated their first advertising campaign in September 2005, cervical cancer was not considered particularly newsworthy and supports the likelihood of an increase in HPV articles during the timeframe of this study resulting from the novelty of Gardasil.

Data Selection

Readership data from the Alliance for Audited Media was used to identify popular magazines in circulation in the US during the timeframe of interest as well as their relative popularity. This study focuses on magazines read primarily for entertainment value, so while newsmagazines (e.g. *Time* and *Newsweek*) are widely read, they were excluded, as were special-interest (e.g. cooking or hunting) magazines. Health-focused magazines were included, however, as they are widely read by many demographics and could provide a useful comparison to articles and columns in magazines without health as the primary focus.

Inclusion Criteria

Most magazines in the US are targeted to adult women, so magazines for that demographic were selected from those with highest circulation. However, as HPV is a disease that affects nearly everyone who is sexually active but HPV-related cancers affect certain groups disproportionately, additional efforts were made to specifically

include magazines targeted to men, juveniles, black women, and LGBTQ+ individuals, which due to their smaller readership demographic, often had significantly lower overall circulation. As the HPV vaccine is most efficient when administered to juveniles before they engage in sexual activity, parenting-focused magazines were also specifically sought.

Men. Magazines sought for men consisted of *Playboy*, *Men's Health*, *GQ*, *Men's Fitness*, *Esquire*, and *Men's Journal.*

Juveniles. Magazines sought for teen girls consisted of *Seventeen*, *Teen Vogue*, and *Girl's Life*. The only magazine for juvenile males was *Boy's Life*.

Black Women. Magazines sought for black women consisted of *Essence* and *Ebony* (a general lifestyle magazine with 45% male readership).

Sexual minorities. Magazines sought for LGBTQ+ individuals consisted of the general interest magazines *Out* and *The Advocate*, lesbian magazine *Curve*, and gay men's magazine *Instinct.*

Parents. Magazines sought for parents consisted of *Family Circle*, *Parents*, and *Parenting*.

Sources

Many popular magazines were available in full-page digital format through the mobile app Texture (which has since become Apple News+); however, the earliest available issue of any magazine in the app was January 2012. An app-wide search

returned articles mentioning "human papillomavirus" or "HPV" from *Allure*; *Cosmopolitan*; *Elle*; *Essence*; *Family Circle*; *Girl's Life*; *Glamour*; *Good Housekeeping*; *Health*; *Marie Claire*; *Men's Health*; *O, The Oprah Magazine*; *People*; *Prevention*; *Redbook*; *Seventeen*; *Shape*; *Vogue*; *Woman's Day*; and *Women's Health*.

Magazine articles were also located through EBSCO OneSearch, which allowed simultaneous searching of multiple databases, including *Academic Search Complete*, *Alt HealthWatch, Complementary Index*, *Health Source - Consumer Edition*, *MAS Ultra - School Edition, MasterFILE Premier, Middle Search Plus, Psychology and Behavioral Sciences Collection, Supplemental Index,* and *TOPICsearch*, while at the same time restricting results to articles originating from a single magazine.

Two searches were performed for each magazine of interest. The first search was for "HPV" as more articles were expected from this search. Many of the articles located in the search were indexed in more than one database, and EBSCO OneSearch automatically removed exact duplicates from those databases. All matching articles were collected. A second search was conducted for the same magazine with "human papillomavirus," and any articles that had not been located in the previous search were also collected.

Through these databases, articles were located from *Cosmopolitan*, *Ebony*, *Entertainment Weekly*, *Esquire*, *Essence*, *Girl's Life*, *Good Housekeeping*, *Harper's Bazaar*,

InStyle, *Marie Claire*, *Men's Health*, *Parenting*, *Parents*, *People*, *Prevention*, *Real Simple*, *Redbook*, *Seventeen*, *Teen Vogue*, *Woman's Day*, and *Women's Health*.

Full text could not be located for magazines for some demographics of interest, particularly LGBTQ+ magazines *The Advocate*, *Out*, *Curve*, or *Instinct*; however, a few articles were located within the other top publications that did include discussions about LGBTQ+ health issues. While articles for female juveniles were located, there were no articles regarding HPV located in *Boy's Life*.

Format

While the articles located via the Texture app were in full-page format, most articles located through the academic databases consisted solely of the article text. Some were scanned versions of the entire article, typically in black and white. Those that were only text often indicated that there had been an accompanying image. Photograph captions were included in analysis of article content even when the photograph itself was not available.

Some copies of *Esquire*, *Good Housekeeping*, *Harper's Bazaar*, *Parents*, *Prevention*, *Reader's Digest*, and *Woman's Day* were available in physical form in the ISU library. When the database searches returned only free text, the physical copies were scanned and retained for verification of article content.

Article Collection

All articles with at least one mention of HPV were collected, including Q&A sections and letters to the editor. Each article was initially saved under the name of the publication and the issue. From the Texture app, 49 articles were located in full page form; from the academic databases, 55 articles were located in PDF form and 241 articles were located in text form; from physical copies in the ISU library, 36 articles were located in original form and scanned as PDFs, for a total collection of 380 articles collected.

Once all articles were collected, articles that had been located in more than one source were identified: 32 articles had been located in both the Texture app and the academic databases, 28 articles had been located in both the academic databases and print form and one article had been found in all three sources. Only one copy of each article was included for coding, yielding a total of 319 unique articles with at least one mention of HPV.

Magazine Categories

The 29 available magazines were categorized as following for demographic analysis purposes. As significantly more women's magazines were located, those focused on health were assessed as their own category to see whether the content was different between women's health-focused magazines and women's general interest magazines.

Black. *Ebony* and *Essence.*

General Interest. *Entertainment Weekly*, *People*, and *Reader's Digest.*

Men. *Esquire* and *Men's Health*.

Parents. *Family Circle*, *Parenting* and *Parents*.

Teen Girls. *Girl's Life*, *Seventeen*, and *Teen Vogue.*

Women's General Interest. *Allure*; *Cosmopolitan*; *Elle*, *Glamour*; *Good Housekeeping*; *Harper's Bazaar*; *Marie Claire*; *O*, *the Oprah Magazine*; *Real Simple*; *Redbook*; *Vogue*; and *Woman's Day.*

Women's Health. *Health*, *Prevention*, *Shape*, and *Women's Health*.

While approximately half of all articles located (154) were in women's general interest magazines, once adjusted by the number of articles in each category, magazines marketed to black individuals had the highest percentage of articles (Figure 1).

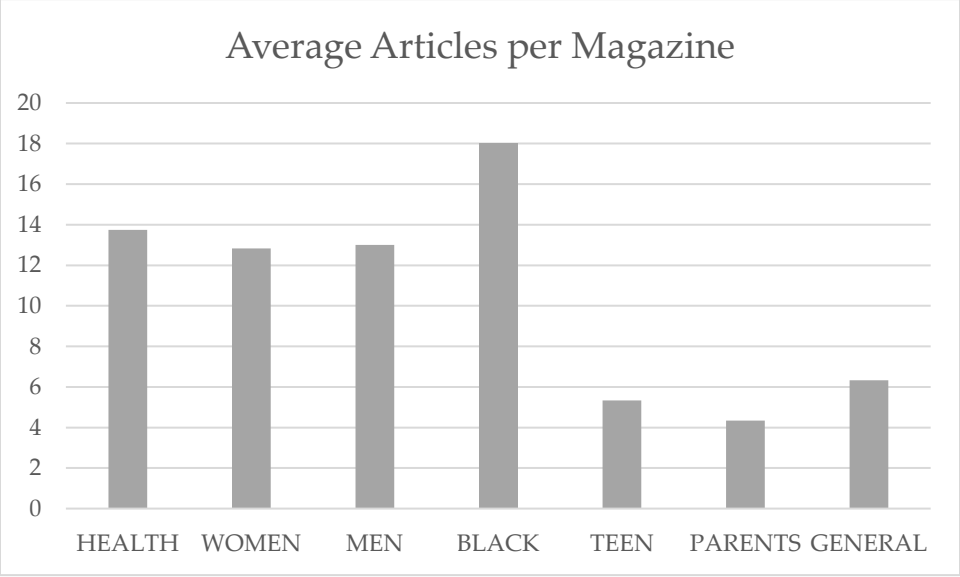


Figure 1

Article Descriptions

HPV was mentioned in many different contexts, such as:

Q&A and Multi-Topic News Columns. These articles were more likely to be short form, typically a few sentences or less. HPV was mentioned in sections focused on sexual health topics, general health topics, and general interest (not limited to health topics).

Full Articles About Cancer. HPV was mentioned in articles about cervical cancer only; oropharyngeal cancer only; gynecologic, anogenital, and/or oropharyngeal cancers; general cancer topics; and cancer screening recommendations only.

Full Articles About Sexual Health. There were several articles specifically about HPV as well as mentions of HPV in articles about sexually transmitted infections, sexual health, the ACA and its effect on women's health care coverage, and sexual health screening recommendations only.

Full Articles About Vaccination. There were articles about the HPV vaccine only, the HPV vaccine controversy, and general vaccine recommendations and schedules.

Full Articles About General Health. HPV was mentioned in articles about general health testing recommendations and articles about non-sexual forms of HPV.

Non-Codable Content. As this study focuses on journalism, letters to the editor that were in response to previous articles about HPV were not included in the

quantitative analysis; however, those including a personal narrative are discussed as a separate section in the qualitative analysis. Other articles omitted from qualitative analysis were celebrity-focused articles and mentions of HPV without relevant context or facts.

Article Preparation.

As they were collected, each article was logged into a spreadsheet with the article title, publication, issue, and a brief description of the type of article (HPV-focused, STIs, sexual health, vaccines in general, etc.). All articles were saved in their original format; however, those that were available only as images, PDFs, or physical copies were transcribed into text, so every article was in the same format for coding.

To facilitate faster coding, as the articles were collected and transcribed, information irrelevant to HPV (e.g., blood pressure testing in an article listing all health tests that one in their 30s needs) was removed. Information that was at least partially relevant (e.g., general safe sex practices or modes of STI transmission) was retained. As the articles were briefly reviewed as they were collected, it was not possible to fully blind them; however, if the article contained the name of the publication in the body, it was replaced with a blank.

Once all articles were obtained, they were assigned a random number. A duplicate copy of the text document was renamed with the number only and saved in a separate folder. The articles were then coded in numerical order.

Data Analysis

A Microsoft Access database was created with the following a priori codes in yes/no format for each topic. Notable quotes were collected for qualitative analysis purposes, including both those that provided information in a notably accessible way and those that contained information that was inaccurate or potentially confusing.

Target Audience

While basic magazine readership demographics such as sex, age, and sometimes parental status are available, not every article in each magazine is aimed at one specific type of reader. As HPV affects people of all ages and the vaccine was initially approved only for juveniles, articles were to be analyzed for word choice (e.g., child, daughter, son, you, yourself, parent, mother, and father).

Information Completeness

HPV and its related cancers are a complicated topic which many Americans are not familiar with, so articles were assessed for general information about HPV including transmission, cancer, vaccine, other prevention methods, testing, and treatment. Articles without such foundational information may have less effect on health behavior.

Agency Assignment

Articles mentioning the link between HPV and cancer were coded based on whether they stated or implied that such cancers are caused by HPV alone, human

action/inaction alone, or both. Articles that mentioned cancer were coded based on whether they stated or implied that cancer is prevented by vaccine alone, human (parental and/or self) action alone, or both.

Risk Perception

Perceived risk was coded for developing cancer and for having side effects from the vaccine. This was coded by statements using the word "risk" or similar words such as "danger." Each was coded as whether the risk was portrayed as higher, low, or accurate.

Anticipated Regret

Anticipated regret was coded for action (would regret the action) or inaction (would regret not acting). This was coded whenever a consequence was stated along with the word "regret" or similar statements such as "wish I had."

Resources

Resources were coded as mentions of a study, researcher, physician, and/or organization. Articles were also coded for whether the reader was referred to a resource for further information.

Sample Coding and Revision

A random sample of 31 articles (10% of total articles) was coded based on the aforementioned a priori codes. Based on the findings, the a priori codes were adjusted prior to beginning the full analysis.

Target Audience

As most of the articles were difficult to determine whether they were targeted to men or women and that information was available elsewhere, target audience was reduced to just self and/or parent.

Information Completeness

Enough information was located to justify more detailed coding for the general information included. The following categories were broken down: general information about HPV, transmission modes, behavioral risks, prevention methods, specific types of cancer, diagnostic options, types of treatment, costs, disparities, and narrative. Three of these factors changed during the timeframe: recommendations for frequency of Pap testing (2012), FDA approval of the HPV DNA test (2011), and cost changes related to the ACA, which was signed into law on March 23, 2010.

Source Validity.

Additional information was collected on whether the study was named, physician affiliation (private practice, university, or organization), and whether the article referred the reader to another source of information, such as a book or website.

Agency Assignment.

This was expanded to separately code agency for prevention of HPV itself in addition to prevention of HPV-related cancers as some articles discussed the vaccine as a way to prevent HPV-related cancers without discussing how to prevent HPV

contraction or discussed HPV prevention without addressing other factors in cancer development.

Risk Perception.

Wording associated with risk was generally too vague and subjective for the researcher to feel confident in the assessment. Strongly emotional statements were instead collected for qualitative analysis as they were generally part of narratives.

Temporal Analysis

This study originally sought to calculate whether the number of articles mentioning HPV topics increased after each of the points of interest on the timeline; however, the breadth of the timeline (319 articles in 144 months) made each month's total number of articles (an average of 2.22 articles per month) inadequate to determine statistical significance for the total number of articles located, let alone to assess mentions of individual topics.

First Coding and Revisions

During the first coding, additional topics were identified as of interest for qualitative purposes.

Gender Roles

Two factors were identified. In conjunction with feminization, men were sometimes framed as a sort of "white knight," with the ability to protect women. Some articles also addressed the gender expectations in which the man should persistently

pursue sexual contact while the woman resists his advances and/or participates in sexual behaviors she is not comfortable with to appease him.

Social Script

Articles that mentioned partner discussion as a means of transmission reduction sometimes provided a social script the reader could use to discuss HPV status and/or testing with romantic partners. These ranged from general recommendations to actual scripts. A few articles also provided scripts for how to talk to parents and medical professionals.

Chapter IV: Results

Results have been categorized based on the role each topic could play in behavior induction. To effectively influence health behavior, articles should 1) portray HPV as a serious health concern, 2) communicate a sense of personal risk to the reader, and 3) provide adequate information for the reader to mitigate that risk.

1) The Cancer Virus

As expected, most articles mentioned HPV in connection with cervical cancer (82.8%), with only men's magazines mentioning cervical cancer in fewer than half (42.9%) of all articles. Other cancers affecting women were almost always mentioned in the context of the vaccine, such as, "The FDA recently approved a new, more comprehensive shot called Gardasil 9. It prevents about 90% of cervical, vulvar, vaginal, and anal cancers" (*Family Circle*, April 2015) without further details about these cancers or their prevention.

Cancers affecting men were mentioned frequently in most men's magazines (71.4%) but only in 9.4% of all articles. Men's magazines tended to focus on oral cancer (42.9%) and anal cancer (28.6%) affecting men, with only half of those articles (14.3%) stating that women are also affected by oral cancer.

General interest magazines were most likely to discuss oral cancer as a condition that affects both men and women (30.0%), compared to only 8.9% of all articles stating

such. Even fewer articles mentioned that anal cancer affects both sexes, with only 2.2% of all articles.

Unclear Link

Some articles covering multiple topics listed multiple sexually transmitted infections and outcomes without differentiating the individual causes, such as "infections like chlamydia, gonorrhea, syphilis, genital herpes, and HPV can cause everything from painful sores and genital warts to infertility, pelvic inflammatory disease, and cancer" (*Teen Vogue*, December 2009).

Agency Assignment

While cancer was attributed to HPV in all articles that mentioned the link (76.1% of all articles), agency was never assigned to behavior. Having multiple partners (10.6%) and unprotected sex (8.3%) were mentioned as factors in contraction of HPV and/or development of cancer but not framed in a way that implied readers should blame themselves for getting cancer. The closest any articles came to stating that cancer is a result of human action was, "The Human Papilloma Virus (HPV) is considered to be a major cause of cervical cancer, which is related to a woman's sexual behavior" (*Ebony*, October 2006).

Additional lifestyle factors (diet, exercise, weight, alcohol and tobacco use) were mentioned as potentially contributing to HPV-related cancers in 11.1% of articles;

however, these were still not construed as the reader's actions directly resulting in cancer.

Source Validity

Perceived trustworthiness of the source influences a reader's perception of validity. Medical doctors were the most cited source of information (58.3%), followed by organizations (23.3%) and studies (19.4%). Several articles quoted statistics as presented by the physicians without explaining where those figures originated or whether the article's author validated the accuracy of those statistics.

Studies were often cited, but never by the title. Nearly all articles citing a study included only one of the following: the university at which the study was conducted, the journal it was published in, the country where it was conducted, or the year in which it was published. Some were even more vague, simply referring to a "recent" study or providing the number of study participants with no additional context:

- "a study from Dartmouth Medical School" (*Cosmopolitan*, May 2008)
- "a study in Cancer Prevention Research" (*Cosmopolitan*, February 2014)
- "a large Danish study" (*Good Housekeeping*, May 2007)
- "a 2011 study" (*Cosmopolitan*, August 2013)
- "a recent study" (*Cosmopolitan*, July 2008)
- "a study of 3,400 adults" (*Good Housekeeping*, January 2014)

2) Risk Perception

None of the articles in this study mentioned individual odds of developing HPV-related cancers, nor did they present prevalence in a sufficient detail for the reader to infer their own personal risk. HPV was usually described as the "most common sexually transmitted infection" (*Redbook*, December 2011), sometimes with sensationalized language such as "shockingly common" (*Men's Health*, April 2017).

HPV was also described as affecting "the vast majority" (*Cosmopolitan*, March 2014) or "nearly all sexually active people" (*Health*, October 2014). There were several references to HPV being "the common cold of sexually acquired infections" (*Marie Claire*, September 2005), perhaps not the best comparison.

When statistics were provided for prevalence, they varied, primarily being variations of "at least 50 percent of people will have genital HPV at some point in their lives" (*Cosmopolitan*, July 2011) and "more than 80 percent of Americans will acquire one by age 50" (*Marie Claire*, January 2008).

Prevalence was also presented as a number, typically that HPV "affects nearly 20 million Americans" (*Essence*, July 2006). Incidence varied between "Each year, more than 6 million Americans are infected with HPV" (*Ebony*, July 2007) and "Cancer-causing HPV infects 14 million Americans a year" (*Men's Health*, April 2017).

Cancer was also presented as a number, such as, "cervical cancer […] leads to the deaths of 3,500 women annually" (*Ebony*, June 2008). No articles mentioned cancer deaths as a percent.

Lack of Routine Care

Failure to get timely Pap tests was a commonly cited risk factor in cervical cancer development, such as, "An estimated 80 percent of cervical cancer deaths could be prevented by regular Pap tests and patient follow-up. Often, in women who die of cervical cancer, diagnosis was not made until the disease had already spread" (*Ebony*, July 2007)

This was presented in several ways, which could certainly affect a reader's risk perception. A statement such as "about 10,000 women in the US are diagnosed with cervical cancer each year, and women who do not have regular gynecological care are up to seven times more likely to be diagnosed [with cervical cancer]" (*Ebony*, October 2006) could certainly make a woman who hasn't been to the gynecologist recently concerned, but what is "regular"? Earlier in the article, it stated that "Annual pap smears are especially important during a woman's reproductive years," making it probable for a reader to draw the conclusion that not having an annual Pap would increase her cancer risk sevenfold. The USPSTF recommendation at the time was for most women to have a Pap every three years (Berg, 2003).

This risk factor is better communicated with concrete statistics such as, "Most U.S. cases of cervical cancer involve women who haven't had a Pap in over five years" (*People*, April 6, 2009). This also presents a logical course of action to take: if a woman hasn't had a Pap within five years, she should schedule one.

Disparities

Disparities were mentioned in 15.6% of all articles.

Black Women. Half (50%) of the articles in black magazines mentioned disparities in cervical cancer rates. These articles primarily stated the disparity existed, such as "African-American women do develop this cancer about 30 percent more often than Caucasians do" (*Essence*, May 2007) or "African-American women […] are twice as likely as White and Latina women to die from cervical cancer" (*Essence*, July 2006).

Most of these articles did not provide a reason for the disparity. One article framed the disparity as being due to a biological difference: "Black women are not only more likely to test positive for the high-risk HPV strain, but it also takes longer for their bodies to clear the infection" (*Essence*, August 2012). Only one article made it clear that lack of diagnostic testing is a significant factor: "For reasons that are still not fully understood […] African-American women […] have more than twice the incidence and death rate as Caucasian women. Why is there such a disparity? A major factor is due to the lack of regular Pap testing" (*Ebony*, July 2007).

MSM. There were two articles in men's magazines that mentioned disparity by sexual orientation. One article simply stated that "for men who have sex with men, it's a must have" (*Men's Health*, April 2017). The other provided somewhat more explanation: "men who have sex with men are considered at increased risk for HPV and are 17 times as likely as their straight counterparts to develop anal cancer, which may be triggered by HPV" (September 2015).

Men. Oral cancer was mentioned in six men's magazine articles, but none specifically stated that men have higher rates than women. One article acknowledged the wide variety of cancers that can affect men but could be interpreted as cervical cancer being the only concern for women. "Not only is it the main cause of cervical cancer in women, but infected men have increased risks of several types of cancer as well, including oropharyngeal (tongue, tonsils, throat), penile, and anal" (*Men's Health*, June 2012).

Another article provided more detail on the cancer development process: "HPV fuels cancerous growth in a man's mouth much as it does in a woman's cervix: by integrating into his DNA and hindering the function of proteins that are supposed to reduce cellular stress and suppress tumors" (*Men's Health*, September 2011). Specifying that it causes cancer "in a man's mouth" could imply that oral cancer only affects men.

Another article stated, "Researchers say the cancer is starting to appear more in younger men and in nonsmokers: the shift may be associated with high risk behaviors" (*Men's Health*, January/February 2010) without clarifying what those behaviors are.

Feminization

Feminizing language was most common in men's magazines, some to the point of being dismissive, such as "The strains of HPV that cause cervical cancer—these all pose very serious dangers to women, but by and large are not all that dangerous to men's health" (*Men's Health*, October 2008). That article details biological differences between male and female genitalia that make women more likely to contract certain STIs and ends with, "So why should men even care about STDs? […] The reason men should care is really a sense of altruism for their female partners" (*Men's Health*, October 2008).

An article about oral cancer titled "The New Sex Cancer" has the subheading, "Doctors used to think this STD threatened only women. Then the men started dying" (*Men's Health*, September 2011). This is a lengthy and detailed article, yet there is no mention of anal cancer, even though Gardasil had been approved for that indication since the previous December (Sun, 2009).

Asymptomatic

HPV being asymptomatic was presented as a risk. "The reason HPV moves around the way it does has to do with its stealth: In 99 percent of cases, the disease is

symptom-free […] Most people infected with HPV have no idea they have it, who they contracted it from, or that they could be infecting others" (Men's Health, September 2011).

Immunity

Immunity was usually presented as neutral for risk, such as "most people who get HPV will clear the infection without treatment within two to five years" (*Essence*, July 2006), but other statement such as, "Your bod will naturally fend off this virus" (*Cosmopolitan*, November 2011), could sound like an absolute, reducing risk perception.

Dormancy

Dormancy was framed as a potential relationship risk. Several articles addressed fears that an HPV diagnosis during marriage could be an indicator of infidelity. One question from a reader emphasized how distressing a diagnosis could be: "I just tested positive for one of the high-risk strains of HPV. I've been married for 10 years—how could this happen? Did he cheat?" (Redbook, January 2011). This particular article was more thorough than most, also mentioning prevalence, that high-risk strains can cause cervical cancer (although no mention of other cancers), and stressing the importance of regular testing. The article ends with, "That said, simply having a high-risk strain doesn't automatically mean you will get cancer. Just be vigilant and follow doctor's orders!" (*Redbook*, January 2011), an appropriate explanation of risk.

Unlikely Transmission Source

"I just heard you can get HPV without having sex. What?!" (Women's Health, June 2016). This attention-grabbing headline was one of two articles that cited a study claiming that HPV had been found on tools and surfaces in doctors' offices. The answer assured the reader that:

> There isn't enough hard research to know whether humans can contract the virus this way, but the studies in this review found that HPV was present on less than 8 percent of tools. Plus reputable docs' offices protect against this by putting a condom over the probe. If you're still concerned, talk to your doctor." (Women's Health, June 2016)

As there was no further explanation of the implications for this finding, a reader could be left confused as to whether going to the gynecologist is dangerous.

Stigma

Stigma was mentioned in 10% of overall articles, all of which either intended to reduce the reader's fear of stigma, such as "when you consider that half of your co-workers, most of your church and a third of your bowling league likely have or have had an STD [the conversation] becomes easier" (*Ebony*, June 2008).

Other articles addressed the fact that stigma is a self-perpetuating problem in that not having proper discussions about STI transmission can result in more transmission:

> When STDs are presented as nasty, dirty abnormalities, people tend to downplay their own vulnerability. We don't view ourselves as disgusting, and we don't view people we're attracted to that way either. So instead of weighing real probabilities, people adopt an it-can't-happen-to-me mentality that has an effect on their sexual decision-making well into adulthood. (*Women's Health*, July/August 2012)

3) Actionable Information

Some articles provided specific actions to take such as "arm yourself with the facts and walk that arm into your doctor's office—because you've got a serious shot at cutting your cancer *and* STD risk" (*Girl's Life*, April/May 2007) and "Be absolutely sure to get a Pap smear and HPV test annually" (*Redbook*, January 2011).

Other actions were presented as being good things to do, such as "if you're 27 or older, it's worth discussing with your doctor, since many still prescribe it off-label to patients in this age range" (*Cosmopolitan*, October 2008).

General Knowledge

To be able to take appropriate action to prevent HPV infection, it is necessary to have some foundational knowledge (e.g., more than just "HPV causes cervical cancer"); however, few articles explained that there are multiple strains of HPV (32.8%), that HPV also causes genital warts (35.0%), that it can be cleared by the immune system (28.9%), that it can remain dormant (8.3%), and that it can be asymptomatic (17.8%).

Transmission

Articles were frequently vague about how HPV is transmitted. HPV was described solely as sexually transmitted in 20.6% of all articles, primarily in parenting (66.7%) and general (50%) magazines, often even simply by the abbreviation "STD" or "STI" rather than "sexually transmitted disease" or "sexually transmitted infection."

Transmission was sometimes described only as "sexual contact" (7.8%), usually without definition. Teen magazines were more likely to define sexual contact, with statements such as "when you're doing anything beyond kissing" (*Girl's Life*, April/May 2007) and "all intimate behaviors and not just intercourse" (*Teen Vogue*, August 2008). Oral sex was the next most mentioned transmission mode (17.2%), primarily in articles about oropharyngeal cancer as an emerging threat.

Only 13.9% of articles specified that HPV can be spread via skin-to-skin contact. This was sometimes explained as HPV being "contracted when your private parts touch an infected dude down below" (*Cosmopolitan*, December 2005) or that "the virus could linger on some part of your genitalia or your partner's that isn't shielded by a condom" (*Essence*, July 2006). Anal sex was mentioned most infrequently (6.7%).

Contraction Prevention

Contraction prevention methods were mentioned in just over a third (35.6%) of articles, with the highest percentage in teen magazines (83.3%). The articles in teen magazines that mentioned contraction prevention included abstinence (80%), male

condom (80%), partner discussion (40%) and vaccination (30%). Parenting magazines had the lowest mentions of contraction prevention (16.7%), which was only vaccination.

Over a quarter (28.3%) of articles mentioned transmission modes but not contraction prevention.

Condoms. Condoms were the most recommended means of prevention for HPV infection (27.8%), usually without clarifying that condoms are not fully effective. Some articles did contain statements like "condoms don't protect against everything. You're still vulnerable to infections such as […] HPV" (*Cosmopolitan*, July 2007).

Other descriptions such as "while condoms won't entirely prevent it, hazmat suits just might" (*Esquire*, November 2005), while intended to be humorous, could convey a defeatist attitude to the reader, perhaps making them less likely to use one.

A few articles explained how to properly use condoms, with one also suggesting readers learn proper condom application using "The condom Pro app (free, iTunes.com) [which] pretty much earns you a PhD in application as you practice on random objects" (*Cosmopolitan*, November 2014).

Dental Dams. Dental dams were mentioned infrequently (4.4%) but were accompanied by at least some explanation of what dental dams are, how they are used, and alternatives for when one is not available: "You place this thin film of latex or polyurethane over her vagina before you get down to business. It's not weird. It's smart

[…] A cut-up condom or even a piece of plastic wrap can also work" (*Men's Health*, April 2017).

Plastic wrap was recommended several times, but only one article clarified, "Just don't use microwavable wrap, which has very tiny holes that body fluids can leak through" (*Essence*, February 2008).

Discussion. Discussing sexual health with a new partner was cited as a contraction prevention method in only 6.7% of articles but in 33% of articles for teens. The importance of discussion was attributed to the fact that "certain STDs only have periodic flare-ups or often don't show symptoms at all, so a lack of physical signs is never a guarantee of safety" (*Teen Vogue*, December 2012).

Risk language was often used, such as "your life depends on talking openly and honestly about sex before you run into something scary, like an STD" (*Girl's Life*, April/May 2007).

Discussion was also framed as a way to determine whether a relationship was ready to proceed with statements such as "If bringing up the subject is too awkward, it's a sign—the two of you are not ready" (*Girl's Life*, April/May 2007).

Spread *Prevention*

Very few (5.6%) articles discussed how a reader who has HPV can prevent transmission to future partners. Those that did mention spread prevention always mentioned disclosing your HPV status to future partners; however, sometimes

disclosure was a must, such as "If you've already made the mistake of sleeping with the guy, have the talk ASAP (and add in a big apology, since you placed him at risk)" (*Women's Health*, July/August 2012), but sometimes disclosure was optional, albeit with criteria—criteria that was not explained beyond, "If it's HPV that your doctor confirms is no longer a problem, you can keep mum about that" (*Cosmopolitan*, March 2011).

Another article presented an interesting risk perception: "HPV. Who to tell: Current partners. Waiting Period: None, but use protection since the virus can be ping-ponged back and forth" (*Cosmopolitan*, November 2014). This mechanism of HPV being "ping-ponged" back and forth was not explained.

Another decision point provided had the underlying message that discussing exposure status comes with an expectation that one of the parties be blamed for the infection as well as an erroneous perception that testing can confirm who is at fault:

> If your doctor says your strain is high risk for cancer, it's a good idea to tell current hookups, as you both face a health risk. As for your low-risk HPV, to tell or not is really your call--no HPV test for men exists, so even if you alert your male partners, they won't be able to pinpoint if they gave it to you or vice versa. (*Cosmopolitan*, October 2014)

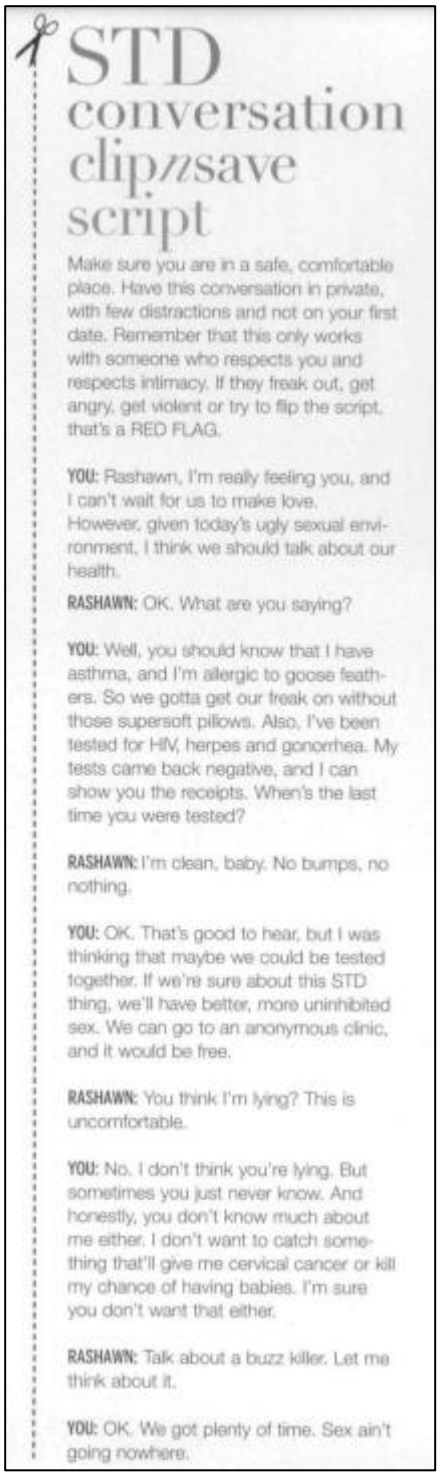
Social Scripts. Social scripts were provided for these conversations, as were personal statements from other individuals who had gone through the process of disclosing their status as a way to reiterate to the reader that their romantic/sexual life would not end as a result.

Social scripts were sometimes given as guidelines, but some gave the reader an actual template to follow, such as:

> Hi, _____. I have some news. I've just been diagnosed with _____. I wanted to tell you ASAP so you can get checked out by your doctor too. (*Cosmopolitan*, April 2018)

One article (*Ebony*, June 2008) even formatted an article so the reader could cut off that portion of the page and carry with them to have the discussion (Figure 2).

Several articles also mentioned dating websites specifically for people with STIs as an alternative because dating someone who already has the same infection means "you won't have to explain yourself" (*Women's Health*, July/August 2007).



STD conversation clip'n'save script

Make sure you are in a safe, comfortable place. Have this conversation in private, with few distractions and not on your first date. Remember that this only works with someone who respects you and respects intimacy. If they freak out, get angry, get violent or try to flip the script, that's a RED FLAG.

YOU: Rashawn, I'm really feeling you, and I can't wait for us to make love. However, given today's ugly sexual environment, I think we should talk about our health.

RASHAWN: OK. What are you saying?

YOU: Well, you should know that I have asthma, and I'm allergic to goose feathers. So we gotta get our freak on without those supersoft pillows. Also, I've been tested for HIV, herpes and gonorrhea. My tests came back negative, and I can show you the receipts. When's the last time you were tested?

RASHAWN: I'm clean, baby. No bumps, no nothing.

YOU: OK. That's good to hear, but I was thinking that maybe we could be tested together. If we're sure about this STD thing, we'll have better, more uninhibited sex. We can go to an anonymous clinic, and it would be free.

RASHAWN: You think I'm lying? This is uncomfortable.

YOU: No. I don't think you're lying. But sometimes you just never know. And honestly, you don't know much about me either. I don't want to catch something that'll give me cervical cancer or kill my chance of having babies. I'm sure you don't want that either.

RASHAWN: Talk about a buzz killer. Let me think about it.

YOU: OK. We got plenty of time. Sex ain't going nowhere.

Figure 2

Cancer Prevention

The vaccine was credited with cancer prevention in 46.7% of articles. Messages commonly portrayed the vaccine as a sole protector with statements like "Ask your doctor if the vaccine can protect you" (*Redbook*, May 2007) but occasionally framed the reader as the protector of their own health with the HPV vaccine as an assistant, such as "Kick HPV's butt with the help of the new vaccine" (*Cosmopolitan*, October 2008).

Only a few articles clarified that "getting vaccinated does not mean the end of Pap tests or visits to the gynecologist" (*Ebony*, July 2007) and that "Strains of HPV that this vaccine does not prevent still account for 30 percent of cervical cancers, so women will need to get screened at least once every three years" (*People*, October 29, 2005)

Honesty With a Gyno. A noteworthy subtheme was identified in which articles advised readers against lying to their gynecologist, framed as anticipated regret. "Your doctor doesn't ask about your sex life to judge your morals [….] Delayed STD treatment can mean a more entrenched pelvic infection, fertility problems—even cervical cancer" (*Redbook*, October 2008) and "Hiding that you had HPV may put you at higher risk for cervical cancer if your gyno doesn't think you need annual Pap tests" (*Redbook*, October 2008).

Referring To Resources

Only 10.6% of coded articles referred the readers to additional sources of information to learn more about the topic presented, even general sources like the CDC

or Planned Parenthood websites. Teen magazines were significantly more likely to provide additional resources (25.0%).

Chapter V: Discussion

Overall, the findings of this study are consistent with those of Anhang et al. in 2004. Most of the articles analyzed did not appear to provide enough information to take appropriate action to protect oneself from contracting HPV or to seek diagnosis or treatment.

Risk messages, which are inherently subjective to a degree, were also inconsistent as the same information could be framed in drastically different ways between publications or sometimes even between articles within the same publication.

Additional Topics of Interest

There were a few issues with individual demographics, topics, and sources that are worth examining as potential focuses for future study or educational efforts.

Juveniles

Although magazines for teen girls did not contain full articles dedicated to HPV as magazines for other demographics did, they more consistently mentioned contraction prevention methods. Teen magazines were more likely to refer the reader to additional resources; however, this still only occurred in 25% of articles.

It is important that juveniles be provided sexual health information from a reliable source they are comfortable with. In the US, the ability of individuals under 18 to make their own health decisions, as well as what types of health decisions they are allowed to make, varies from state to state, especially when it comes to obtaining

contraceptives and STI screening and treatment. Some states grant universal access to these services, some have a minimum age for health service consent, and a few lack thorough legislation. Laws similarly vary on whether and under what circumstances providers can inform parents of the services their child has obtained (Guttmacher Institute, 2021).

While the American Academy of Pediatrics (AAP) recommends that providers offer "private time" with all adolescent patients 13 and older, one study found that only 55% of female and 49% of male juveniles ever had such "private time" with their providers (Grilo et al., 2019). Thus, American's most trusted source of health information, physicians (Jackson et al., 2019), is largely unavailable to this population, and it would be wise for magazines for teen girls to consistently provide reputable sources for these readers.

Sex Toys

Two articles brought up sex toys as a potential transmission factor, and the provided information was consistent with the factual findings of a study where researchers gave HPV-positive women two vibrators (one rubber and one silicone) to use so they could compare cleaning effectiveness on different materials. The researchers located HPV on at least one of the two vibrators used by each woman immediately after use, sometimes immediately after cleaning, and in the case of the rubber toy, occasionally 24 hours after use (Anderson et al., 2014).

The first article did properly explain the importance of material choice. “Soft rubber or jelly-based sex toys often carry HPV even after they’re washed […] Choose vibrators and other toys made of the materials below [and] clean them after use in the following ways” (*Cosmopolitan*, October 2014).

The other article specifically addressed sharing of sex toys between women mid-sexual contact, which is even riskier. “Clean sex toys before and after each use. Don't want to kill the mood by clearing mid-romp? Get a toy for both of you, or use a fresh condom for each of you” (*Cosmopolitan*, November 2014). This is an important message as WSW are more likely to have high-risk HPV (Reiter & McRee, 2017).

Inappropriate Risk Messages

Some topics that were ultimately of lower importance were covered because they were shocking and deemed newsworthy; however, momentary attention-grabbing should be weighed about possible long-term consequences. Remarking on the possibility of HPV living on surfaces in a gynecologist’s office likely will not protect anyone from infection via an unproven mode; however, women do not need another reason to fear and/or avoid going to the gynecologist.

Inconsistent Expert

As most Americans have high trust in health information from physicians (Jackson et al., 2019), they likely also have similarly high trust in magazine articles that quote physicians. One often-cited physician was Diane Harper, M.D., who was cited as

being "involved in the key clinical trials of both Gardasil and Cervarix" (*Cosmopolitan*, March 2014), "coauthor of the vaccine research" (Cosmopolitan, October 2008), and described with phrases like "Internationally recognized HPV expert" (*Ebony*, 2009) and "Health Hero" (*Prevention*, April 2007).

As a result of her augmented authority on the subject, her statements regarding HPV vaccination likely held more weight to the reader. Her statements regarding the vaccine's importance and efficacy, however, varied notably.

Some of her statements were straight-forward interpretations of current evidence, such as, "even if you have or you've already had HPV […] data show that the vaccine will still prevent subsequent infections" (in *Cosmopolitan*, October 2008). Another statement gave readers an appropriate risk perception of the HPV vaccine's effectiveness:

> No one who's had the vaccine should feel as if she's totally protected. Less common HPVs—ones that are not targeted by the vaccine—can also cause cancer. Being vaccinated just means you've taken more steps toward prevention. (in *Women's Health*, November 2010)

While these quotes had been noted as of interest for analysis, there was initially no intent to analyze statements provided by individual researchers across articles until two particularly concerning statements were collected. The first statement begins with a less common argument, yet still presented factual context for the reader:

> Is it necessary for girls to have the vaccine? No. Most HPV infections go away by themselves. HPV infections are not lethal. The Pap system has worked very well at detecting early changes that are then 100 percent curable prior to cancer developing. (in *Ebony*, 2009)

The end of her statement, however, was a bit problematic:

> Gardasil is likely to wear off before there is any good done from the vaccination. [According to] the studies currently done, Gardasil lasts five years. [But if it] does not last at least 15 years, then it has done nothing to reduce the cancer burden. (in *Ebony*, 2009)

This was easily read as "Gardasil wears off after five years" rather than a more risk-appropriate statement such as "We know Gardasil lasts at least five years. To be most effective at preventing cancer, its protection will need to last at least 15 years, but it has not yet been studied that long."

For individuals who are less knowledgeable about HPV and/or are anti-vaccine or vaccine hesitant, statements like this were probably interpreted as an admission that the vaccine does not work, causing them to further question the motivation behind the vaccine's development.

This final passage is even less supportive of the vaccine, although this one is not a direct quote and could have some artistic interpretation by the journalist:

> Her enthusiasm dampened as she began to question whether the vaccine would offer protection that would last long enough to prevent an infection that comes and goes over a lifetime and leads to cancer in only a small fraction of cases. Today, she encourages women to get regular Pap tests, look at the data, talk to a doctor, and make an educated decision. (According to CDC officials, there's no evidence to support Dr. Harper's claims that the vaccine's protection wears off.) (Cosmopolitan, March 2014)

Of course, there is nothing wrong with an expert changing their opinion on a matter, provided there is evidence to support their new views—after all, that is the foundation of science. But experts do not exist in a vacuum, and any information that is inconsistent with the consensus merits more explanation. While word limits can be a constraint, both problematic statements were in long-form articles that could arguably spare some space for clarification—the journalist in the last example did, in fact, allot space to fact-checking.

Feminization

The persistent feminization of HPV in some of the studied articles likely contributes to poorer HPV-related cancer outcomes in males. Readers of both men's and women's magazines received messages that HPV was less of a threat to men and that as a result, women only needed to disclose their HPV status to male partners to prevent his future female sexual partners.

Most of this advice centered around there being no FDA-approved HPV test for men, including statements like, "There's no clear health benefit to a man knowing he has this virus, since it's unlikely to affect his health and can't be treated" (Cunningham in *Cosmopolitan*, December 2006).

Some articles maintained the perspective that HPV is not important to men's health but advocated for disclosure as a way to benefit his future female partners: "Should I tell my sex partner that I have HPV? You owe it to your fellow women! 'The first time you're having sex with someone, you're not thinking about his next partner, but he can pass it on to her'" (Katharine O'Connell White, MD, in *Glamour*, May 2012).

This argument was also present in men's magazines: "Until her next test, Mary faces a dilemma: Should she tell future partners she has HPV? Mary's doctor says no. She might not transmit HPV, and even if she does, her partner might clear it quickly" (*Men's Health*, April 2017).

Limitations

The main limitations of this study relate to the availability of magazine articles as well as the format in which they were located.

Magazine Availability

Magazines targeted specifically to minority populations were underrepresented in this study. Only two magazines marketed to black individuals were included. While *Essence* is marketed to black women, *Ebony* is a general-interest magazine for the black

community with 45% male and 55% female readership. No magazines marketed primarily to black men or black juveniles, individuals of other racial minorities, or LGBTQ+ individuals were included.

As the articles in *Ebony* and *Essence* often included information about the health disparities affecting that demographic, it is probable that magazines marketed to other minority populations would have information more relevant to them.

A few of the articles located in this study did include information about LGBTQ+ individuals' risk for HPV; however, most articles were written for and about the heterosexual population.

The number of magazines marketed to men and juvenile females were also low, and there were no articles about HPV in the single available magazine marketed to juvenile males (*Boy's Life*). While health decisions for juveniles are typically made by parents, juveniles do have some degree of medical autonomy as well as the ability to choose their own sexual behaviors. As abstinence-only education is still common in the US and many parents choose not to discuss safe sex practices with their children, mass media sources such as magazines could fill gaps in juveniles' sexual health knowledge.

Format

Most of the articles were located as text only rather than PDF or full image of the page on which the article was published. Several articles contained obvious typos, causing some concern about the accuracy of the remainder of the transcription.

Misspelled words could be confidently corrected through context, but in the absence of full-page sources, there is no way to determine whether any of the numbers presented contained typos. There could also be entire sentences or paragraphs missing. If facts or numbers were contained within an image, those may not have been transcribed with the main text of the article.

Future Research

The same articles could be further analyzed by visual context, such as presence of images, location on the page, and font styles for headlines, subheads, and body can affect whether a reader is drawn to the article and whether they read it in full. Additional analysis of the same articles with these visual context factors could provide further insight on how the article would likely be perceived by the reader.

Americans are turning more and more to digital sources of information. To remain relevant, many magazines are shifting their content online, a format that presents its own challenges in study; however, according to The Association of Magazine Media, 73% of magazine readers still prefer to read print copies (MPA, 2020).

Conclusion

Magazine coverage of HPV and related cancers was found to be both fragmented and to frame the reader's risk of contracting HPV and/or developing an HPV-related cancer to be higher or lower than reality. Readers who perceive themselves to be at extremely high or extremely low risk of serious illness from HPV may be less inclined

to take adequate measures to protect themselves and may also be less inclined to seek diagnosis or treatment either out of fear or lack of appropriate concern.

When an article is lacking information on how HPV is transmitted, the types of illnesses it can cause, and/or methods of prevention and diagnosis, unless the reader is already knowledgeable about HPV or seeks further information on their own, they will likely be unable to improve their health behaviors. Many of these articles could be greatly improved by including a statement as simple as:

> Human papillomavirus (HPV) is a common sexually transmitted infection (STI) that is spread through skin-to-skin contact and can cause genital warts or lead to certain cancers. High risk strains can be prevented with the HPV vaccine, and cancer caught early with routine Pap testing.

For articles with extremely short word limits, it is even more important to refer the reader to an additional source for further information. Print articles could include a Quick Response (QR) code as a space-effective way to direct readers to a specific section of a webpage, and digital publications could include hyperlinks.

Public health organizations could potentially improve quality of content by providing press releases on HPV that are not sensational in nature or by distributing infographics for magazines to include. Properly educating the public and instilling proper perceptions of the importance are essential in improving health outcomes. While the articles in this study were overall lacking in thorough, actionable information,

magazines remain widely read and should not be ignored as a potential source of health information distribution for public health professionals.

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