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Media coverage of cervical cancer and the HPV vaccine: implications for geographic health inequities

Janice L. Krieger PhD,* Mira L. Katz PhD,† Dana Eisenberg MA,‡ Sarah Heaner MPH,§ Melanie Sarge MA¶ and Parul Jain PhD**

*Assistant Professor, School of Communication, The Ohio State University, Columbus, OH, USA, †Associate Professor, College of Public Health, The Ohio State University, Columbus, OH, USA, ‡Senior Communications Specialist at BLH Technologies Inc., Rockville, MA, USA, §Graduate Student, College of Public Health, The Ohio State University Columbus, OH, USA, ¶Graduate Student, School of Communication, The Ohio State University, Columbus, OH, USA and **Assistant Professor, The Edward R. Murrow College of Communication, Washington State University, WA, USA

Correspondence
Janice L. Krieger PhD
School of Communication
The Ohio State University
3016 Derby Hall
154 N. Oval Mall
Columbus
OH 43210
USA
E-mail: raup-krieger.1@osu.edu

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Janice L. Krieger earned her Ph.D. (2007) at The Pennsylvania State University and is an assistant professor in the School of Communication at The Ohio State University.

Abstract

Objective To describe the content of newspaper articles about cervical cancer and the human papillomavirus (HPV) vaccine published in Appalachia and identify potential differences in coverage as compared to the content of newspaper articles published in non-Appalachia Ohio.

Background Individuals rely on media as an important source of health information. Inadequate coverage of health issues may reinforce health inequities such as the elevated cervical cancer incidence and mortality rates in Appalachia Ohio.

Methods A content analysis was conducted of all newspaper articles about cervical cancer and the HPV vaccine published in Appalachia and non-Appalachia Ohio during 2006.

Findings A total of 121 published newspaper articles (42 in Appalachia and 79 in non-Appalachia) about cervical cancer and the HPV vaccine were identified. Articles published in Appalachia Ohio were significantly less likely than articles published in non-Appalachia Ohio to provide information about the threat of cervical cancer and the efficacy of the HPV vaccine. Specifically, few articles published in Appalachia included information about the ability of the vaccine to prevent cervical cancer, the cost of the vaccine and the availability of assistance programmes for the un- and underinsured.

Conclusions Newspaper articles printed in the Appalachia region lacked vital information that could help promote uptake of the HPV vaccine. Health educators and healthcare providers should be aware that women from underserved geographic regions like Appalachia may have greater information needs regarding their risk of cervical cancer and the potential benefits of the HPV vaccine as compared to the general patient population.

Introduction

People rely on media as an important source of health information.[1–3] However, media often do not provide adequate coverage of topics associated with health inequities, such as sexual health, which means medically underserved communities' need for health information often goes unmet.[4,5] Two important factors related to media coverage of health inequities include the amount of coverage given to a particular health issue and the content of the health information. When the amount of media coverage a health issue receives is disproportionately low compared to the burden of disease, individuals are unlikely to view a particular health problem as having personal or community relevance.[6] Low perceived relevance, in turn, decreases the likelihood that individuals in the community will take personal action to protect their health. Even when the amount of media coverage given to a health issue is proportional to the burden of disease, the content of that coverage is often far from what health educators consider ideal.[7,8] For example, media coverage of sexually transmitted diseases rarely includes information about prevention.[9]

Given this significant problem, it is imperative to examine the amount and type of media coverage provided for health issues associated with inequities. The scant research that has been conducted on this topic has found that both mainstream media and ethnically targeted publications do not publish enough stories about health concerns that disproportionately effect racial and ethnic minority populations and the articles that are published lack vital information.[7,8] Although this line of research has important implications for understanding the perpetuation of racial and ethnic health inequities, it is unclear whether there are patterns associated with health information delivered via media that may also contribute to geographic health inequities. The potential association between physical location and inequities in mediated health information dissemination has been overlooked because proximity is a key determinant of whether a story is newsworthy. Thus, it has long been assumed that media outlets located in medically underserved regions are providing the same, if not greater coverage of medical and scientific advancements related to health topics associated with inequities than outlets serving the general populace. However, the intergroup power dynamics that contribute to health inequities in medically underserved areas such as Appalachia are likely to also result in uneven dissemination of health information. For this reason, investigating geographic differences in how media cover health news is an important contribution to efforts designed to reduce geographic health inequities.

Guided by the extended parallel process model (EPPM), the overarching goal of this research is to explore media coverage of cervical cancer and the human papillomavirus (HPV) vaccine in the underserved, Appalachia Ohio region and compare it to media coverage in non-Appalachia Ohio. The focus on cervical cancer was chosen because women in Appalachia Ohio suffer from elevated cervical cancer incidence and mortality rates as compared to women living in non-Appalachia counties of Ohio.[10,11] This health inequity should have been particularly newsworthy in the Appalachia region in 2006 as a result of FDA approval of a vaccine that protects against the types of the HPV known to cause approximately 70% of cervical cancer cases.[12] The results of this study have important implications for understanding how media cover health issues associated with inequities as well as patient education needs.

The Appalachia Ohio region

Appalachia refers to a largely rural geographic region in the eastern United States surrounding the foothills of the Appalachian Mountains. Appalachia encompasses portions of thirteen states, stretching from southern tier of New York in the north to the upper regions of Alabama, Georgia and Mississippi in the south. In 2006, the Ohio Appalachian region consisted of 29 counties in the south-eastern portion of the state.[13] In 2008, the Appalachia Regional Commission designated three additional counties as Appalachian.[14]

Scholars have argued that people living in the Appalachian region maintain a distinct cultural identity[15] and that health information must be presented in a manner that is sensitive to the health beliefs and practices that are rooted in this cultural identity to achieve maximum effectiveness.[16] An important component of achieving cultural sensitivity is identifying how individuals access health information and then providing education through the mediated and interpersonal channels that a given community utilizes and trusts. With regard to media, people living in Appalachia are similar to people living in other rural areas in that they depend on the local newspaper for much of their health information.[17,18] In the interpersonal realm, studies indicate that the family is an important source for information about prevention and treatment. For example, one study found that rural Appalachian cancer survivors were more likely to report obtaining health information from family members than their urban, non-Appalachian counterparts.[19] Mothers, in particular, play a unique role in disease prevention because they often assume responsibility for the maintaining the health and well-being of the family.[16] The influence of mothers on health decision making is especially important for understanding cervical cancer health inequities, as mothers have been found to be an important source of influence regarding whether their adult daughters are vaccinated against HPV.[20]

Health inequities in Appalachia

In addition to its distinctive geography and culture, the Appalachia region is of particular significance because it has been designated as a medically underserved region. There are several factors that contribute to Appalachia's designation as medically underserved. First, people living in the Appalachia region endure significant socio-economic inequalities, such as higher poverty rates and lower educational attainment as compared to non-Appalachia counties in Ohio.[13] Second, many individuals in Appalachia lack sufficient healthcare access owing to healthcare provider shortages and the limited availability of local healthcare facilities.[21] Third, residents of the US Appalachia mountain region experience an elevated burden of disease as compared to the general population, including higher rates of cancer, heart disease and premature mortality.[21–24]

One cancer health inequity that is of particular concern is the significantly elevated cervical cancer incidence and mortality rates as compared to women living outside the Appalachian region.[23] Specifically, age-adjusted cervical cancer incidence rates were 24.4% greater and the cervical cancer mortality rates were 41.7% greater for women living in Ohio Appalachia vs. non-Appalachia Ohio from 2000 to 2004.[25] The combination of high rates of cervical cancer, high poverty and reduced healthcare access indicates the importance of providing Appalachian females with information that could help promote prevention of cervical cancer and awareness of the HPV vaccine.[26]

Despite the cancer prevention benefits associated with the HPV vaccine, women in Appalachia are unlikely to be vaccinated if they or their parents do not have adequate access to relevant health information. For example, parents and young adults may be unaware of the health risk associated with HPV or the availability of programmes offering free- or reduced-cost vaccines. Although individuals could potentially access information about HPV and the HPV vaccine from a variety of sources, newspapers are considered the most accessible and trusted mediated source of health information in Appalachia.[17] For this reason, both the quantity and quality of information about cervical cancer and the HPV vaccine available in Appalachia newspapers are of particular importance to health providers and health educators.

The extended parallel process model

One strategy for assessing the quality of the health information provided in newspaper articles is to examine the extent to which the content is consistent with principles of effective health message design. The extended parallel process model is a theoretical framework that describes

the components of effective health-risk messages.[27,28] EPPM posits that when individuals are presented with health-risk information, they make cognitive appraisals regarding the severity and likelihood of the threat and the efficacy of the recommended response. Perceptions of threat are thought to increase when a message includes information about the severity of a health threat as well as the likelihood that a health threat will occur (i.e. susceptibility). Response efficacy is likely to be enhanced when a message offers strategies for averting the health threat, while self-efficacy is increased through the provision of information about how to employ those strategies.

According to the EPPM, individuals are most likely to engage in adaptive health behaviours when presented with health messages that heighten psychological perceptions of both threat and efficacy. For example, messages that convey an individual's risk for HPV, the severity of HPV (e.g. cervical cancer), the safety of the HPV vaccine, as well as convenient and affordable strategies for being vaccinated are likely to be most effective in increasing vaccination rates. Conversely, health-risk messages that emphasize threat to the exclusion of efficacy may cause defensive avoidance, a psychological state that can cause individuals to deny their risk of HPV and avoid HPV-related information in the future. Recent studies have found support for the EPPM in contexts where an individual is managing a threat to their own health (e.g. making a decision about whether to be vaccinated against HPV) as well as managing a threat to another's health[29] (e.g. a parent making the decision about whether their child should receive the HPV vaccine).

Purpose and research questions

The purpose of this study is to conduct a content analysis of the quantity and content of media coverage related to cervical cancer inequities in the medically underserved Appalachia Ohio region and compare it to media coverage in non-Appalachia Ohio. Specifically, the objectives of this study are to: (i) identify the types of health information provided in Appalachia Ohio newspaper articles on cervical cancer and the HPV vaccine and (ii) compare the content to articles published in non-Appalachia Ohio newspapers. Such a comparison will yield important descriptive information about the most common types of health information provided in Appalachia and determine whether cervical cancer prevention information is equitably disseminated across regions. In short, the guiding research questions were: What types of health information content did Ohio Appalachia newspapers provide about cervical cancer and the HPV vaccine, and did the information differ from content published in non-Appalachia Ohio newspapers?

Methods

To better understand how media portrayed cervical cancer, HPV and the HPV vaccine in Appalachian and non-Appalachia counties, a quantitative content analysis was conducted of articles published in Ohio newspapers during 2006. Quantitative content analysis is a method for systematically analysing messages by assigning numerical value to symbols according to specific measurement rules and using statistical methods to describe the communication.[30] This approach was deemed most appropriate for answering the research questions because it offers the capability to incorporate large amounts of data in the analysis. The ability to analyse a large quantity of units was desirable because the goal of this study was to analyse all newspaper articles printed in Ohio during 2006 on the topic of cervical cancer, HPV and the HPV vaccine.

Materials

The study included all newspapers published in Appalachian and non-Appalachian counties in Ohio in 2006. Newspapers published in counties designated as being part of 'Appalachia Ohio' by the Appalachia Regional Commission were considered Appalachian counties. Newspapers published in one of the other 59 counties were

considered non-Appalachian newspapers. An exhaustive list of Ohio newspapers was obtained by contacting the Chamber of Commerce in each of Ohio's 88 counties. As a result of this procedure, 169 newspapers were identified. Among these newspapers, 68 were published in Appalachian counties and 101 were published in non-Appalachia Ohio counties.

Given that the newspapers varied widely in size and distribution, we used a multi-step procedure to identify articles within those publications. First, a search was conducted of the Newsbank and Lexis-Nexis databases using the search strings: 'cervical cancer', 'cervical cancer vaccine', 'HPV' and 'HPV vaccine'. Forty-eight articles met the search criteria. For each newspaper not indexed in one of these databases, articles were located by searching the archives on the newspapers' websites. If a paper did not have a searchable website, a research assistant called a member of the newspaper staff (typically the editor) and requested copies of articles meeting the search criteria. Making personal telephone calls to the smaller newspapers also yielded valuable qualitative data in that several Appalachia newspaper staff reported that they do not publish articles about the HPV vaccine because their readers do not want this information. In total, searching individual websites and contacting newspaper staff yielded an additional 73 newspaper articles (42 in Appalachia Ohio and 31 in non-Appalachia Ohio newspapers).

Articles were coded as a news story, an opinion article or other. An article was considered a news story if it contained factual information about cervical cancer, HPV or the HPV vaccine from a scientific perspective. An article was considered an opinion article if provided commentary related to cervical cancer, HPV or the HPV vaccine. Articles were coded other if they did not meet either of the previous criteria. Examples of articles coded as 'other' include those that listed community events such as cervical cancer screening and a commentary about a cartoon that included a character with cervical cancer. Articles that were coded as other were eliminated. The final sample (considered a census) consisted of 121 articles.

Coding

The investigators developed a preliminary coding manual by reviewing newspaper articles containing the terms cervical cancer, HPV and HPV vaccine published in other states during the study period. Specific content codes were developed to reflect each of the EPPM constructs (i.e. severity, susceptibility, response efficacy and self-efficacy).[31] For example, a self-efficacy code was created to identify if an article provided information about assistance programmes for helping the un- and underinsured obtain the HPV vaccine.

Two research assistants received approximately 25 h of training over 2 weeks on how to code articles for the presence or absence of content related to the constructs from the EPPM (see Table 1). During training, disagreements between the coders on practice articles were resolved by clarifying the coding manual and discussing differences until consensus was reached. The two coders subsequently rated all articles in the study, with intercoder agreement ranging from 0.93 to 1.00.

Outcome variables

The key outcome variables represent the extent to which an article conveyed the threat of cervical cancer or HPV (i.e. susceptibility and severity) and the efficacy of the HPV vaccine (i.e. response efficacy and self-efficacy). An article was coded as including information about the *severity of HPV* if it mentioned the association between HPV and cervical cancer. *Severity of cervical cancer* was assessed based on the inclusion of statistics regarding cervical cancer mortality. An article was coded as including information about a female's *susceptibility to HPV* if it mentioned that HPV is a STI. A female's *susceptibility to cervical cancer* was evaluated based on the use of cervical cancer incidence data, and whether an article mentioned risk factors for the disease. *Response efficacy* was conceptualized as information about who can receive the vaccine (i.e. target audience), clinical effectiveness of the vaccine,

Table 1 Comparing threat and efficacy content of Appalachia and non-Appalachia newspapers

	% Appalachia (n = 42)	% Non-Appalachia (n = 79)	% Total (N = 121)
Severity of HPV/cervical cancer			
Cervical cancer mortality rates – World	0	30	20***
Cervical cancer mortality rates – US	2	47	31***
Cervical cancer mortality rates – Ohio	0	0	0
Cervical cancer mortality rates – Appalachia	0	0	0
HPV causes cervical cancer	21	75	56
Susceptibility to HPV/cervical cancer			
Cervical cancer incidence rates – World	0	15	10**
Cervical cancer incidence rates – US	2	23	16**
Cervical cancer incidence rates – Ohio	0	0	0
Cervical cancer incidence rates – Appalachia	0	0	0
HPV is a STI	17	65	48***
Risk factors for HPV/cervical cancer	12	25	21
Response efficacy of HPV vaccine			
Prevents cervical cancer	17	80	58***
Does not protect against all cervical cancer	14	56	41***
Need for continued Pap screening	5	22	16*
Prevents genital warts	12	48	36***
Vaccine approved for use with females	17	70	51***
Vaccine approved for 9–26 year olds	14	61	45***
Vaccine most effective prior to sexual activity	10	46	33***
Information about vaccine side-effects	7	5	6
Alternatives to vaccine	2	17	12*
Self-efficacy for obtaining the HPV vaccine			
Cost of the vaccine	2	39	26***
Vaccine includes 3 injections	12	37	28**
Financial assistance for un- and underinsured	2	22	15**
Where to obtain the vaccine locally	2	10	7
Sources of additional information	12	11	11

*$P < 0.05$; **$P < 0.01$, ***$P < 0.001$.

side-effects and additional cautionary information regarding the vaccine. Content that might increase perceptions of *self-efficacy* to receive the vaccine included information about dosage and cost of the vaccine, financial assistance, local availability and additional sources of information.

Statistical analyses

Chi-square and Fisher's exact test were used to compare differences between the content of articles published in Appalachia and non-Appalachia Ohio newspaper articles.

Results

A total of 121 different newspaper articles mentioning cervical cancer, cervical cancer vaccine, HPV and/or the HPV vaccine were published in one of Ohio's 169 newspapers during the study period. More articles appeared in non-Appalachia Ohio newspapers (n = 79; 65%) compared to the Appalachia Ohio newspapers (n = 42; 35%). No single publication contributed more than four articles to the total sample. The majority of articles were classified as news (n = 90; 74%) as compared to opinion (n = 31; 26%); however, there were significant regional

differences in the distribution of news and opinion articles. Non-Appalachia papers published a significantly higher proportion of opinion pieces related to HPV and the HPV vaccine as compared to Appalachia papers ($\chi^2 = 4.34$, $P < 0.05$).

Nearly two-thirds (65%; $n = 78$) of newspaper articles about cervical cancer, HPV and the HPV vaccine included in this study were published in the 6 months after the vaccine was approved by the FDA (i.e. July through December 2006). Among articles published in Appalachia papers, 76% appeared after vaccine approval and 58% of articles published in non-Appalachia papers appeared after vaccine approval. There was no statistical difference between the regions regarding the timing of when the articles were published.

Cervical cancer and HPV vaccine content of Appalachia newspapers

The first research question was answered by coding Appalachia articles for the presence or absence of specific content related to four general categories: severity of HPV and cervical cancer, susceptibility to HPV and cervical cancer, the safety/effectiveness of the HPV vaccine (response efficacy) and a person's ability to obtain the vaccine (self-efficacy) for themselves or their daughter (see Table 1).

Overall, there were few Appalachia articles that contained information about the threat of cervical cancer. One article mentioned cervical cancer mortality rates in the US, thus indicating the severity of the disease. Articles more commonly addressed the severity of HPV, with 21% stating that HPV causes cervical cancer. Content regarding a female's susceptibility to cervical cancer was included in one article through the use of statistics on US cervical cancer incidence rates. None of the articles provided any statistics regarding the prevalence of cervical cancer in Ohio or Appalachia. Articles referred to a female's susceptibility to HPV by stating that HPV causes cervical cancer (21%) and/or that HPV is an STI (17%). Only 12% provided information about risk factors for cervical cancer.

Appalachia articles were found to contain some content about the response efficacy of the HPV vaccine. Approximately one-fifth of articles mentioned that there is a vaccine that prevents cervical cancer (17%). Guidelines for the vaccine were provided in a few articles, such as the vaccine is approved for use with women (17%), it is approved for women aged 9–26 (14%), and that it is most effective prior to sexual activity (10%). Two (5%) articles mentioned the need for vaccinated females to continue receiving regular Pap tests. Regarding self-efficacy to be vaccinated, there was some content regarding the number of injections in the series (12%) and sources of additional information (12%). The cost of the vaccine, the availability of programmes for the un- and underinsured, and the names of locations where the vaccine could be obtained locally were mentioned in 2% of the articles.

Comparison of Appalachia and non-Appalachia newspaper content about the HPV vaccine

The second research question was answered by coding non-Appalachia articles for the presence or absence of content related to the four general categories described earlier, and then comparing the content of Appalachia and non-Appalachia articles (see Table 1). Non-Appalachia articles were significantly more likely than Appalachia articles to address the severity of HPV by stating that HPV causes cervical cancer (74.7 vs. 21.4%; $\chi^2 = 31.59$, $P < 0.001$). Approximately a third of the articles contained information about the severity of cervical cancer through providing world and/or US statistics on cervical cancer mortality rates. However, non-Appalachia papers were significantly more likely than Appalachia papers to contain statistics about cervical cancer mortality in the world (30 vs. 0%; $\chi^2 = 15.92$, $P < 0.001$) as well as the US (47 vs. 2%; $\chi^2 = 25.16$, $P < 0.001$). None of the newspaper articles analysed contained any data about cervical cancer mortality rates in the state of Ohio or specifically the increased cervical cancer mortality rates in the Ohio Appalachia region.

Non-Appalachia articles were significantly more likely than Appalachia articles to address susceptibility to HPV by including that HPV is an STI (64.6 vs. 16.7%; $\chi^2 = 25.20$, $P < 0.001$). Approximately one-fifth of the newspaper articles conveyed information about susceptibility to cervical cancer through statistics regarding world and/or US incidence rates for cervical cancer. Non-Appalachia papers were significantly more likely than Appalachia papers to contain statistics about cervical cancer incidence in the world (15 vs. 0%; $\chi^2 = 7.08$, $P < 0.01$) as well as the US (23 vs. 2%; $\chi^2 = 8.62$, $P < 0.01$). Again, none of the newspaper articles analysed contained any data about cervical cancer incidence rates in the state of Ohio or the Appalachia Ohio region. Health behaviours that are considered risk factors for cervical cancer were mentioned in only 21% of all articles. A larger percentage of non-Appalachia papers provided information about risk factors (25 vs. 12%), but this difference was not statistically significant. Risk factors for cervical cancer mentioned included initiation of sexual activity at an early age, having multiple sex partners, smoking and failure to have cervical screening within recommended guidelines.

Half of the newspaper articles addressed the response efficacy of the HPV vaccine by informing readers that it is approved for women (51%), that it is approved specifically for 9–26 year olds (45%) and that the vaccine is most effective for girls who have not initiated sexual activity (33%). However, there were vast regional differences in the frequency with which this information was provided. For example, 70% of non-Appalachia articles mentioned that the vaccine was for women, as compared to 17% of the Appalachia articles ($\chi^2 = 30.78$, $P < 0.001$). Similarly, non-Appalachia articles more commonly mentioned the approved age for the vaccine (61 vs. 14%; $\chi^2 = 23.97$, $P < 0.001$) as well as mentioning that the vaccine should be administered prior to sexual initiation (46 vs. 10%; $\chi^2 = 16.10$, $P < 0.001$).

There were also statistically significant differences between the two geographic regions for providing information about the effectiveness of the HPV vaccine. Non-Appalachia newspaper articles were significantly more likely than Appalachia newspaper articles to mention that the HPV vaccine can prevent cervical cancer (46 vs. 16.7%; $\chi^2 = 44.75$, $P < 0.001$) or that the HPV vaccine can prevent genital warts (48.1 vs. 11.9%; $\chi^2 = 15.68$, $P < 0.001$).

Cautionary information regarding the HPV vaccine was also evaluated in this content analysis. A substantial number of articles (41%) were careful to point out that the HPV vaccine does not protect against all cervical cancers, but these articles were more likely to appear in non-Appalachia papers (56 vs. 14%, $\chi^2 = 19.39$, $P < 0.001$) than Appalachia newspapers. Few ($n = 19$) articles mentioned the need for vaccinated women to continue to undergo regular cervical cancer screening (Pap tests), but those that did were more likely to be printed in non-Appalachia than Appalachia newspapers (21.5 vs. 4.8%, $\chi^2 = 5.82$, $P < 0.05$). Only 12% of all articles mentioned any alternatives to the vaccine, such as sexual abstinence, but these were also more likely to appear in non-Appalachia newspaper articles (16.5 vs. 2.4%, $\chi^2 = 5.31$, $P < 0.05$). Few articles ($n = 7$) provided any information about potential side-effects, such as pain at injection site or fainting, with no significant differences between Appalachia and non-Appalachia articles.

The most common information provided that might increase a female's self-efficacy to be vaccinated was that the vaccine includes three injections (28%), with non-Appalachia newspaper articles providing this information significantly more than did Appalachia newspaper articles (36.7 vs. 11.9%, $\chi^2 = 8.35$, $P < 0.01$). Similarly, a quarter of all articles reviewed mentioned the cost of the HPV vaccine, and non-Appalachia articles were significantly more likely to provide this detail compared to Appalachia articles (22 vs. 2%, $\chi^2 = 19.15$, $P < 0.001$). Financial assistance programmes for the un- and underinsured were mentioned in only 15% of articles, with information appearing significantly more frequently in non-Appalachia papers as compared to Appalachia papers (22 vs. 2%, $\chi^2 = 7.93$, $P < 0.01$). Only a very small

percentage of articles mentioned local availability of the HPV vaccine (7%) or identified resources where individuals could obtain additional information about the vaccine (11%) and there were no significant regional differences in providing this information.

Discussion and conclusion

An important, yet often overlooked, aspect of reducing health inequities is how health issues are covered in the media.[4,5] The few studies that have examined this vital topic have demonstrated differences in the way certain topics, such as sexual health, are covered in ethnic as compared to mainstream media outlets.[6,7] The current investigation extends this body of research by examining regional differences in media coverage, and whether these differences are likely to help reduce or reinforce regional cervical cancer health inequities.

The results of the content analysis show no significant differences between Appalachia and non-Appalachia papers in the number of articles being printed about cervical cancer, HPV and the HPV vaccine. However, non-Appalachian newspapers were much more likely to contain information associated with effective health message design. Specifically, newspapers published in Appalachia published significantly fewer articles conveying the threat associated with cervical cancer and the efficacy of the HPV vaccine than newspaper articles published in non-Appalachia during the same time period. For example, only a few articles mentioned that the HPV vaccine is an effective method for preventing some types of cervical cancer.

There are several possible reasons why Appalachia articles failed to provide comprehensive content related to cervical cancer and the HPV vaccine compared to the non-Appalachia papers. One explanation is that Appalachia newspapers were influenced by the unique physical and social characteristics of the communities in this region. The Appalachia newspapers in this study had significantly lower circulation rates, which is indicative of smaller communities. These newspapers may not have the resources of their larger counterparts to conduct in-depth health reporting or purchase wire stories.

It is also possible that newspaper staff in Appalachia strategically adapted articles about cervical cancer and the HPV vaccine to be sensitive to the perceived cultural and religious norms of their readership. For instance, concerns about the connections between cervical cancer, HPV and sexual behaviour are likely to be highly salient in the Appalachian region. One study found that individuals in Appalachia had concerns that the HPV vaccine would promote promiscuity and young women who received the vaccine would become the focus of community gossip.[32] Several newspaper staff that were contacted for this study were sensitive to these types of community concerns, as they reported not printing articles about cervical cancer and the HPV vaccine because their readers did not want this type of information. In addition, Appalachia newspapers that did print articles about cervical cancer and the HPV vaccine were less likely than non-Appalachia articles to mention connections between HPV and sexual activity.

The results of this study have several important implications for efforts to reduce cervical cancer health inequities. First, the absence of information about the local burden of cervical cancer and the HPV vaccine in this trusted medium may inhibit individuals living in Appalachia from perceiving HPV as a problem with any personal or community relevance. The lack of local statistics may be a consequence of these data not being easily accessible. For this reason, it is important for researchers to not only gather local data on health inequities, but to translate the results back to the community. From a practice perspective, health educators and healthcare providers need to recognize that individuals within this patient population and other underserved geographic regions may have additional information needs regarding the threat of cervical cancer. This suggests a need for culturally appropriate interventions to help convey the threat of HPV in the region.

Second, those who perceive HPV to be a threat to themselves or their children may lack

the efficacy to seek out additional information about the HPV vaccine. In medically underserved areas such as Appalachia, mediated interventions should emphasize communicating where the vaccine can be obtained as well as raise awareness of programmes that reduce the cost associated with vaccination. Interventions should also strive to improve communication about the vaccine through interpersonal channels, such as with family members and medical personnel. Previous research has shown that daughters who discussed getting the vaccine with their mothers were nine times more likely to get the vaccine than those who did not.[20] The influence of family members on HPV vaccine decision making may be even more important in medically underserved areas where members of the nuclear and extended family are often considered an important source of health-related social influence.[33] It is also important to encourage physicians to continue to recommend the HPV vaccine to female patients and their parents. This is particularly true in the Appalachian region where paediatricians report recommending the HPV vaccine to parents of female patients less frequently than their non-Appalachian counterparts.[34]

One of the strengths of this study is the rigorous procedure used to identify Ohio newspaper articles about cervical cancer and the HPV vaccine. In addition to using the newspaper databases, we identified all Ohio newspapers articles published during the study period by calling the Chamber of Commerce of all Ohio counties. This is the first study (to our knowledge) to conduct a comprehensive search of all newspapers in Ohio to adequately represent the resources that are available to the underserved. In comparison, most previous reports rely exclusively on newspapers that were readily accessible through academic databases. However, newspapers that target underserved populations in Appalachia are often not included in these large, established databases.

Limitations of this study are that the study was restricted to newspapers published in 1 year, that individuals living in Appalachia Ohio may read newspapers published from non-Appalachia Ohio, and the study was restricted to Ohio because of the time-intensive procedures used to identify all newspapers. It should also be noted that this study was conducted before the US FDA approved use of the quadrivalent HPV vaccine for men (ages 9–26).[35,36] Future studies should explore potential similarities and differences in media coverage of the HPV vaccine for men and women.

Conclusion

Unequal access to quality health information is an important, but often overlooked, facet of geographic health inequities. This study documented significant differences in the availability of information about cervical cancer and the HPV vaccine among newspaper articles published in Appalachia and non-Appalachia Ohio. Articles published in Appalachia were significantly less likely to include vital information related to the risk of cervical cancer, and more importantly, steps women could take to protect themselves from disease. Additionally, articles in Appalachia were less likely than non-Appalachia articles to mention that the HPV vaccine prevents some types of cervical cancer and to include information about programmes for un- and underinsured.

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