

RESEARCH PAPER



# The role of trust in health information from medical authorities in accepting the HPV vaccine among African American parents

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## ABSTRACT

This research examines how and why trust in health information from medical authorities (i.e., doctors or health care professionals and government health agencies) predicts acceptance of the HPV vaccine for one's child among African American parents. A survey of African American parents recruited from community venues revealed that low trust in health information from government health agencies was associated with less favorable attitudes and intentions toward vaccinating their child against HPV. Trust in health information from a doctor or health care professional did not predict vaccine acceptance. Mediation analyses indicated that the relationship between trust in health information from government health agencies and vaccine acceptance was partially mediated by perceived vaccine efficacy. Implications of the findings on communicating to the African American community about the HPV vaccine are discussed.

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## Introduction

A large body of literature has documented distrust in the health care system among African Americans.<sup>1–3</sup> Several scholars have argued that African American distrust of the medical community emerges from a legacy of unethical experimentation in medical research, personal experiences of racism in medical settings, and lack of resources within the healthcare system.<sup>4</sup>

Research has demonstrated that this distrust often leads to a lower likelihood of seeking medical care, failure to comply with recommended prescription medication regimens, and a lack of long-term relationships with medical providers.<sup>5</sup> While a number of studies have found distrust in the medical system or health care providers to be linked with rejection of various vaccines,<sup>6–8</sup> there has been limited research on this issue inside the United States, particularly with regard to the African American population. This research builds on this body of work by seeking to understand whether trust in health information from medical authorities (i.e., doctors and other health professionals and government health agencies) plays a role in African American parents' acceptance of the human papillomavirus (HPV) vaccine, the first vaccine developed to prevent cancer.

HPV is the most common sexually transmitted disease in the United States; the Centers for Disease Control and Prevention (CDC) estimate that nearly all sexually active people will contract at least one type of HPV at some point in their lives.<sup>9</sup> HPV infections are the primary cause for genital warts and cervical cancer, as well as a subset of other types of cancers such as anal, penile, and oropharyngeal cancer.<sup>9</sup> The African American population is disproportionately affected by cervical cancer. African

American women, compared to non-Hispanic White women, are more likely to develop cervical cancer and to die from it.<sup>10</sup>

A safe and effective vaccine, developed to combat HPV infections (Gardasil®), has been licensed by the Food and Drug Administration for children ages 9 through 17 and young adults ages 18 through 26. The CDC recommends that females ages 11 through 26 and males ages 11 through 21 be vaccinated against HPV.<sup>11</sup> Parental consent is needed for vaccinating children under the age of 18. The HPV vaccine is administered in a series of two to three doses depending on the child's age when the first dose is administered. A two-dose schedule is recommended for children who receive their first doses prior to the age of 15. A three-dose schedule is recommended for those who receive their first doses at or after the age of 15.

According to the CDC,<sup>11</sup> the number of teenagers receiving the HPV vaccine has been on the rise. An estimated 68.6% of adolescent girls and 62.6% of adolescent boys had received at least one dose of the HPV vaccine in 2017, compared with 60.0% and 41.7%, respectively, in 2014.<sup>12</sup> Still the coverage is significantly below the goal of 80% in *Healthy People 2020*.<sup>13</sup> In 2014, non-Hispanic African American female adolescents had significantly lower HPV vaccine series completion rates when compared to non-Hispanic White female adolescents,<sup>12</sup> but the difference in completion rates by race has since narrowed.<sup>11</sup>

In addition to assessing the relationship between distrust in health information from medical authorities and acceptance of the HPV vaccine among African American parents, this research aims to examine two psychological factors that mediate this relationship. Specifically, it focuses on how distrust might be linked to vaccine acceptance through its effects on

perceived efficacy and perceived safety of the vaccine. Both psychological factors have been shown to influence decisions to vaccinate one's child.<sup>14–18</sup> A better understanding of how and why distrust in health information from medical authorities might affect African American parents' acceptance of the HPV vaccine is critical for constructing effective communication messages promoting the HPV vaccine among this vulnerable and underserved population.

This survey study serves as a first step in exploring the relationship between distrust of medical authorities and vaccine rejection by African American parents. Prior to creating messages to encourage African American parents to vaccinate their child(ren) against HPV, health communication professionals would benefit from a better understanding of the relationship between distrust of medical authorities, specific perceptions related to vaccine acceptance (i.e., perceived vaccine safety and efficacy), and vaccine uptake. By identifying specific mediating perceptions, this study provides health communication professionals and researchers additional directions for developing and testing strategic interventions for African Americans who are distrustful of medical authorities.

## Literature review

### *Distrust of the medical community among African Americans*

When discussing African Americans' distrust of the medical community, scholars often first mention distrust of medical research.<sup>1</sup> African American distrust of medical research is often in part attributed to the legacy of the Tuskegee Syphilis Study.<sup>1</sup> In 1932, the United States Public Health Service began an observational study of untreated syphilis in hundreds of African American men in the town of Tuskegee in Macon County, Alabama.<sup>19</sup> The study continued for four decades in an attempt to document the course of syphilis in African Americans and differences in clinical manifestation of the disease in various races. In 1972, questions of the study's ethics were raised in a newspaper article, and researchers were accused of failing to fully inform many patients of their condition, doing little to educate the men about how to prevent the spread of syphilis, and denying treatment to some patients even after the advent of penicillin in the 1940s.<sup>14,20</sup> Historical records estimate that as many as 100 men may have died from the disease or related complications during the study.<sup>21</sup> The study was declared "ethically unjustified" by the Department of Health, Education and Welfare and halted 40 years after the study had begun.

Several research studies have documented disparities between people of varying ethnicities in their levels of trust in medical research, physicians, and the healthcare system as a whole.<sup>22–24</sup> Specifically, Boulware and colleagues demonstrated that African American respondents were less likely to trust their doctors than non-Hispanic White respondents.<sup>1</sup> Musa and colleagues showed that African Americans had significantly less trust in their own physicians and greater trust in informal health information sources, such as friends and family and church or religious leaders, than Whites.<sup>5</sup>

Additionally, Armstrong and colleagues found African Americans were more likely to distrust the healthcare system than Whites, questioning the honesty of the goals of the healthcare system.<sup>20</sup> Finally, Doescher and colleagues showed that African American and Hispanic participants were less likely than White participants to believe that doctors placed the patients' needs above other considerations, but more likely to think that doctors performed unnecessary tests and procedures and that doctors were influenced by insurance rules.<sup>24</sup>

Additional research finds that African Americans have less trust in government. African Americans, more so than Whites, believe that the government withhold information about disease.<sup>25</sup> African Americans, compared to Whites, report significantly lower levels of trust in the healthcare system and the federal government.<sup>26</sup>

Trust in medical professionals, the health care system, and the government has been shown to play a central role in relationships with physicians and positive healthcare outcomes. For instance, distrust in government has been associated with more emergency room visits.<sup>22</sup> Overall, lack of trust is associated with less doctor-patient interaction, reduced adherence to recommended treatments, poorer health, and reduced utilization of healthcare services.<sup>5,22</sup> In situations where African Americans distrust doctors, medical authorities, or the government, this lack of trust likely puts people at risk for health complications.

### *Trust and vaccine acceptance*

Trust in health care providers, the government, or the medical establishment as a whole has emerged in previous research as an important determinant of vaccine acceptance. Researchers have demonstrated a relationship between trust and acceptance (or acceptability) of vaccines such as MMR,<sup>27</sup> H1N1,<sup>6</sup> influenza,<sup>8</sup> AIDS,<sup>28</sup> and hepatitis B.<sup>7</sup> Scholars in the United Kingdom were particularly interested in the concept of trust following debunked reporting of the link between autism and the MMR vaccine. Casiday and colleagues' study of nearly 1,000 parents revealed that MMR-refusing parents expressed a lack of trust in the government to protect the public from health risks and the majority believed the government would not stop distributing the MMR vaccine if there was evidence of serious risk.<sup>27</sup>

Recent research has examined parents' trust in doctors and the government to provide information about vaccination in general and the link between perceptions of trust and vaccine acceptance.<sup>29–33</sup> A survey of parents of children 17 and younger found that 76% of parents reported trusting their doctor "a lot" for information about vaccination, but only 23% reported trusting government vaccine experts or officials "a lot."<sup>26</sup> Glanz and colleagues demonstrated that parents who refused vaccines were less likely than other parents to trust their doctor for information about vaccines even though they generally accepted advice from their doctor about other medical care, such as nutrition, behavior, and development.<sup>30</sup> Using data from both focus groups and surveys, Glanz and colleagues concluded that parents who refused vaccines tended to trust their doctors in general but believed that most physicians were not educated enough about the

potential side effects of vaccination. Another study found that 30% of U.S. adults believe the government is lying about the dangers of vaccines and that vaccine skeptics tend to distrust the health system, health care providers, public health departments, and university researchers.<sup>31</sup> Specifically, that study found that vaccine skeptics (compared to non-skeptics) are three times more likely to believe that the health system would try to hide a serious mistake and up to four times more likely to believe that health care providers, public health departments, and university researchers care most about making money.

Research has only begun to address the link specifically between trust in medical professionals and government health agencies and acceptance of the HPV vaccine. A school-based survey of attitudes toward HPV vaccination in the United Kingdom showed that parents with greater trust in doctors and governmental institutions were more willing to vaccinate their children against HPV.<sup>32</sup> An analysis of the 2007 Health Information National Trends Survey found trust in health information from doctors and health care professionals as well as government health agencies to be a significant predictor of acceptance of the HPV vaccine.<sup>33</sup>

Little research has specifically examined the role of trust in health care professionals and government health agencies in African American parents' decisions to vaccinate against HPV. Interviews with practicing pediatricians by Tissoot and colleagues revealed that doctors had concerns about African American parents' distrust in the medical system and how that distrust might have reduced their intentions to vaccinate their children against HPV.<sup>34</sup> Similar concerns have been expressed by Cates and colleagues, who studied African American women's intentions to get their children vaccinated against HPV.<sup>35</sup> In interviews with 25 African American parents, Joseph and colleagues found that most parents trusted their family physician (92%), but only 64% indicated they would vaccinate their sons against HPV based on their physician's recommendation.<sup>36</sup>

### Research gaps and hypotheses

Despite shared concerns about the potential influence of distrust in the medical establishment on vaccine acceptance among African Americans,<sup>32</sup> empirical evidence on this issue has been limited. Moreover, with only a few exceptions,<sup>29,30</sup> there has been scarce research on how trust in the medical establishment might influence African American parents' decisions to get their children vaccinated against HPV. To address these gaps in the literature, we advance the following hypotheses:

H1: Greater trust in health information from doctors or other health care professionals by African American parents will be associated with a) more positive attitudes toward vaccinating their child against HPV and b) greater intentions to vaccinate their child against HPV.

H2: Greater trust in health information from government health agencies by African American parents will be associated with a) more positive attitudes toward vaccinating

their child against HPV and b) greater intentions to vaccinate their child against HPV.

Although the link between trust in the medical establishment and vaccine acceptance has been demonstrated in previous studies, it is not clear why trust might determine vaccine acceptance or rejection. In this research, we examine two psychological factors – perceived vaccine efficacy and perceived safety as possible mediators. According to the Health Belief Model,<sup>37</sup> perceived benefits and barriers of performing a health behavior are key determinants of one's motivation to adopt that health behavior. For instance, when a vaccine is perceived as effective at preventing a disease, the perceived benefits of getting vaccinated are also likely to be high. Conversely, perceiving a vaccine as unsafe constitutes a major barrier for obtaining the vaccine. Empirically, both perceived vaccine efficacy and safety have been shown to influence acceptance of vaccines in general and the HPV vaccine in particular.<sup>14–18</sup> To explore the possible psychological mechanisms through which trust might influence acceptance of the HPV vaccine, we propose the following hypotheses:

H3: Trust in health information from medical authorities (i.e., doctors or other health care professionals or government health agencies) by African American parents will influence acceptance of the HPV vaccine for their child through perceived vaccine efficacy.

H4: Trust in health information from medical authorities (i.e., doctors or other health care professionals or government health agencies) by African American parents will influence acceptance of the HPV vaccine for their child through perceived vaccine safety.

## Results

### Study sample

One hundred and twenty-four African American custodial parents of children who had not yet been vaccinated for HPV participated in this study. The sample was 77% female ( $n = 95$ ) and 23% male ( $n = 29$ ). Participants' ages ranged from 23 to 71 years old ( $M = 36.44$ ,  $SD = 8.69$ ). In terms of gender of participants' children, 37.9% indicated they were custodial parents of boys, 41.9% indicated they were custodial parents of girls, and 16.1% indicated they were custodial parents of children of both genders. The ages of their children ranged from 9–17 ( $M = 11.85$ ,  $SD = 0.77$ ). Other sample characteristics, such as parents' education levels and household income, are presented in Table A1.

### Trust and vaccine acceptance

It was predicted that trust in health information from doctors or other health care professionals (H1) and government health agencies (H2) would be positively associated with attitudes and intentions toward vaccinating one's child against

HPV. Multiple regression analyses were conducted to evaluate whether these two predictors significantly associated with attitudes and intentions – both when free and when costing \$375 – toward vaccinating one’s child. The regression models included sex, age, education, income, and health care coverage status as control variables.

As reported in Table A2, trust in health information from health care professionals was not significantly associated with attitudes or intentions toward vaccinating one’s child against HPV. Thus, H1 is not supported. On the other hand, trust in health information from government health agencies was significantly associated with attitudes ( $b = 2.22, p < .05$ ), intentions when the vaccine cost \$375 ( $b = 2.40, p < .05$ ), and intentions when the vaccine was free ( $b = 2.34, p < .05$ ). H2 is strongly supported.

### Mediators

H3 predicted a mediating role of perceived vaccine efficacy in the relationship between trust in health information from medical authorities and vaccine acceptance. Because the relationship between trust in health information from doctors or other health care professionals was not statistically significant, as shown above, mediation analyses were carried out only for the relationship between trust in health information from government health agencies and vaccine acceptance. Three mediation analyses, with attitudes toward HPV vaccination and the two types of intentions toward HPV vaccination (free of cost and with cost) as the dependent variables, were conducted through a bootstrap approach.<sup>38</sup>

The results showed that the indirect effect of trust in health information from government health agencies on attitudes toward HPV vaccination through perceived vaccine efficacy was statistically significant ( $M = .094, 95\% \text{ CI} = [.024, .185]$ ). Significant mediation was found for both measures of intentions toward HPV vaccination (free of cost:  $M = .106, 95\% \text{ CI} = [.029, .207]$ ; with cost:  $M = .074, 95\% \text{ CI} = [.012, .165]$ ). Across all three dependent variables, a similar pattern of relationships emerged as expected. As trust in health information from government agencies decreased, perceived vaccine efficacy decreased ( $b = .155, p = .016$ ), which in turn was associated with decreased attitudes toward HPV vaccination ( $b = .607, p = .0001$ ) and intentions to have one’s child vaccinated (free of cost:  $b = .688, p < .0001$ ; with cost:  $b = .474, p = .004$ ). With these findings pertaining to trust in health information from government health agencies, we consider H3 partially supported. Of note, perceived vaccine efficacy appeared to only partially mediate the relationship between trust and vaccine acceptance, as trust remained a significant predictor of attitudes toward HPV vaccination while perceived vaccine efficacy was controlled for ( $b = .200, p = .05$ ). Partial mediation also approached significance for both types of intentions (free:  $b = .192, p = .077$ ; with cost:  $b = .191, p = .088$ ).

H4 predicted a mediating role of perceived vaccine safety in the relationship between trust in health information from medical authorities and vaccine acceptance. For the reason explained above, mediation analyses were carried out only for the relationship between trust in health information from

government health agencies and vaccine acceptance. Using Preacher and Hayes’ bootstrap approach,<sup>38</sup> we found that none of the mediation effects involving the three dependent variables was statistically significant due to a lack of association between trust and perceived vaccine safety. That is, trust in health information from government health agencies did not affect perceived vaccine safety. On the other hand, as expected, lower perceived vaccine safety was associated with less favorable attitudes toward HPV vaccination ( $b = .284, p = .017$ ) and reduced intentions to have one’s child vaccinated (free of cost:  $b = .295, p = .021$ ; with cost:  $b = .263, p = .039$ ). H4 is not supported.

### Discussion

This research examines how and why trust in health information from medical authorities might be associated with acceptance of the HPV vaccine for one’s child among African American parents. We focused on two types of medical authorities: doctors or health care professionals and government health agencies. After controlling for a number of socio-demographic factors (age, sex, education, income), we found trust in health information from government health agencies to be a significant predictor of vaccine acceptance across all three dependent variables measured in this study (i.e., attitudes toward vaccinating one’s child against HPV, intentions to have one’s child vaccinated free of cost and with cost). Lower trust in health information from government health agencies, as expected, was associated with more negative attitudes toward HPV vaccination and reduced intentions to get one’s child vaccinated, either free of cost or with cost. These findings are consistent with previous literature on other types of vaccines<sup>6–8</sup> and emerging research on HPV vaccines.<sup>30</sup>

We also expected that lower trust in health information from doctors or health care professionals would be similarly associated with less favorable attitudes and reduced intentions toward HPV vaccination. This hypothesis is not supported, however. In contrast to a previous study<sup>30</sup> that detected a positive association between trust in doctors or health care professionals and acceptance of the HPV vaccine for one’s child, we found no such relationship in this study. Because the current study, compared to the previous one, had a much smaller sample size, it is possible that the discrepancies in findings were due to the current study being under-powered. These discrepancies might also result from more substantive differences between the two studies. For example, the participants in the previous study were a diverse sample of the general population and not all of them were parents of HPV vaccine eligible children. In that study, questions about intentions of getting one’s child vaccinated against HPV were asked hypothetically. The current study recruited African American parents with at least one child between the ages 9 through 17 who had yet to receive the HPV vaccine. Therefore, participants in the current study might have been more personally involved with the issue of HPV vaccination and answered the questions based on their understanding of the pros and cons of this vaccine. The less involved participants, such as those in the previous study, might base their judgment on heuristics such as trust in



doctors. Additionally, because the previous study was based on a multi-ethnic sample, there might be greater variance in reported trust, which made it more likely to detect an association between trust and vaccine acceptance. The current study relied on a sample of African American parents, which might have led to reduced variance in reported trust, possibly resulting in an association between trust and vaccine acceptance that did not achieve statistical significance.

Another important purpose of the current research was to explore psychological factors that might mediate the relationship between trust in health information from medical authorities and acceptance of the HPV vaccine for one's child among African American parents. We focused on two psychological factors that had been shown in previous research to be significant predictors of vaccine uptake: perceived vaccine efficacy and safety. We found a consistent pattern of mediation involving trust in health information from government health agencies as the predictor and perceived vaccine efficacy as the mediator across all three dependent variables. Specifically, less trust in health information from government health agencies was associated with lower perceived vaccine efficacy, which predicted less favorable attitudes and reduced intentions toward HPV vaccination. These findings provide insights into *why* trust in health information from government health agencies might predict acceptance of the HPV vaccine, bridging a gap in the current literature. We also found that perceived vaccine efficacy only partially mediated the above relationship, suggesting that trust in health information from government health agencies could have a direct association with vaccine acceptance or an indirect association mediated by other factors not examined in the current study. Other factors might include parents' perceptions of the likelihood that their son or daughter will get HPV (susceptibility) or perceptions of the severity of contracting HPV. Both perceived susceptibility to and severity of health problems have been shown to be predictive of protective behavior.<sup>36</sup>

Although we expected perceived vaccine safety to be another mediator of the relationship between trust in health information from medical authorities and acceptance of the HPV vaccine, our data do not support this hypothesis. The lack of mediation was due to a lack of association between trust and perceived vaccine safety, since, as expected, perceived vaccine safety was a significant predictor of all three dependent variables. It is interesting that trust in health information from government health agencies predicted perceived vaccine efficacy, but not perceived vaccine safety, especially in light of the controversies related to information about the safety of other vaccines for children. One explanation may be that some parents do not rely on government health agencies for information about HPV vaccine safety, but instead turn to doctors and nurses or family and friends. In fact, Freed and colleagues found that 38% of parents do not use governmental Websites about vaccination to assess the safety of vaccines.<sup>29</sup> Another explanation for these findings may be particular to the issue of HPV vaccination and information provided by government health agencies. Materials from both the CDC and the National Cancer Institute related to the HPV vaccine clearly indicate that the vaccine is safe. However, there may be more uncertainty surrounding vaccine

efficacy, as materials concerning efficacy have gone through some changes throughout the years. It was suggested that HPV vaccines were only effective in preventing two to four types of HPV, among over 100 types of HPV, that most commonly cause cervical cancer in the past. However, it is now shown that the 9-valent HPV vaccine covers 9 serotypes and 90% of HPV-associated cancers.<sup>39</sup> It might be difficult for parents to keep track of all the updated information and thus it causes confusion and uncertainty among parents.

As with all research, this study was constrained by a few limitations. First, this study employed a convenience sampling method. While it is assumed that a variety of people patronize community outlets such as Laundromats and shopping malls, the sample was not representative of the general population of African American parents. Second, people in this study were ones who agreed to participate after being approached by a researcher. It is possible that others who met the eligibility requirements chose not to participate for various reasons, and these people were not represented in this study. Third, residency of our sample (Maryland suburbs of Washington, DC) may limit the generalizability of the results to African American parents in other areas of the United States. It is likely that our participants are more familiar with government health agencies than the average U.S. resident due to their proximity to Washington, DC, and this familiarity may influence perceptions of trust. In addition, participants in the current study may also have been more knowledgeable about the HPV vaccine than average due to their residency location. Washington, DC is the only city to mandate the HPV vaccine for school attendance. Participants recruited for this study reside in the Washington, DC media market and may receive more messages related to the HPV vaccine – and thus be more knowledgeable about the HPV vaccine – than African American parents in other areas. These three points limit the generalizability of the study's findings. Related to the sampling issue, a fourth limitation of this study is its sample size. The sample size of 124 participants is relatively small, which likely reduced the stability of the results and the power of our analysis. Fifth, including additional measures in the study could have led to a more complete understanding of the relationship between distrust of medical authorities and vaccine uptake. For example, we did not measure health literacy or knowledge about the HPV vaccine. It is unknown whether health literacy or knowledge influenced vaccine intentions among our participants. Additionally, the primary outcome variables in this study were attitudes and intentions toward vaccinating one's child against HPV. Actual behaviors were not assessed. It is unknown whether trust in health information from medical authorities is a significant factor in predicting actual parental behavior. Finally, although mediation models were tested here, the cross-sectional nature of our data did not allow for an unequivocal test of causal relationships. Future research could use an experimental or longitudinal study design to determine causal relationships.

Our findings hold several implications for HPV vaccine communication. First, health communication professionals might want to focus particularly on increasing trust in health information distributed by government health agencies to improve attitudes and intentions toward vaccinating one's

child against HPV in African American communities. Additional research is necessary to better understand the specific language that needs to be included in mediated messages or interpersonal communication to increase perceptions of trust in government agencies, as well as perceptions of vaccine efficacy, by African American parents. Additionally, engaging in more open and interactive communication by government health agencies may enhance public trust in these entities. Second, for parents who are skeptical toward the government, alternative sources of health information (e.g., family or friends, schools) might be more effective for encouraging vaccine acceptance.<sup>40</sup> For example, parents have reported that including the HPV vaccine in school-based vaccination programs and offering the HPV vaccine together with other pre-teen vaccinations required for attending school would make them more confident in their decision to vaccinate their son or daughter against HPV.<sup>36,41</sup>

Future research is needed to understand eroded public trust in medical authorities, its origins, and its potential detrimental effects on vaccination programs, particularly in underserved populations. If lack of trust in doctors or the government constitutes a reason why parents would not accept the vaccine, greater knowledge on why distrust emerges in the first place could offer insights into strategies to remedy the situation. In addition, the relationship between trust in health information from medical authorities and attitudes and intentions toward HPV vaccination warrants further consideration among other underserved groups. For example, data show that Hispanic women also have higher rates of cervical cancer compared to White women.<sup>10</sup> The same data show that Hispanic men are more likely to have HPV-associated penile cancer compared to non-Hispanic men. Understanding how and why trust in health information from medical authorities relates to HPV vaccination behaviors among Hispanics is therefore another important avenue for future research.

This study is a critical first step to understanding how and why distrust in health information from medical authorities affects African American parents' acceptance of the HPV vaccine. Results demonstrate the influence of distrust of government health agencies on African American parents' decisions to vaccinate their sons and daughters against HPV and the mediating role of perceived vaccine efficacy. These findings provide health communication professionals and researchers additional directions for constructing effective communication messages promoting the HPV vaccine among African American parents.

## Method

### Procedure

Participants were recruited by trained researchers at community outlets (e.g., laundromats, shopping malls) in the Maryland suburbs surrounding Washington, DC. We selected community outlets that had been used in previous research to successfully recruit African American study participants.<sup>42,43</sup> People qualified to participate if they were over 18 years of age, self-described their racial background as Black or African American and were custodial parents of at least one child

between the ages of 9 and 17 years old who had not yet received the HPV vaccine. People were told that participation would be compensated with a \$25 gift card to a drug store. Eligible individuals who agreed to participate were informed as to the nature of the study and gave informed consent. They then filled out a survey that consisted of questions about their perceptions about the HPV vaccine and trust in medical authorities. After returning the survey, participants were thanked and compensated with the \$25 gift card. This study was approved by a university Institutional Review Board.

## Measures

### Trust in health information from medical authorities

Participants indicated the degree to which they trust information about health topics from two medical sources. Participants were asked how much trust (1 = *Not at all*; 4 = *A lot*) they placed in doctors or health care professionals ( $M = 3.45$ ,  $SD = 0.68$ ) and government health agencies ( $M = 2.76$ ,  $SD = 0.90$ ). The questions were adapted from the 2007 Health Information National Trends Survey conducted by the National Cancer Institute.

### Perceived vaccine efficacy

People rated their agreement with three Likert-type items (1 = *Strongly disagree*, 5 = *Strongly agree*) about the efficacy of the HPV vaccine (e.g., "The HPV vaccine works in preventing HPV;" and "If my child gets the HPV vaccine, he or she will be less likely to get HPV"). The scale was adapted from previous research<sup>44</sup> and evidenced reasonable reliability ( $M = 3.58$ ,  $SD = 0.63$ ,  $\alpha = .73$ ).

### Perceived vaccine safety

Three Likert-type items (1 = *Strongly disagree*, 5 = *Strongly agree*) assessed vaccine safety (e.g., "The HPV vaccine may negatively affect my child's body" [reverse-coded] and "The HPV vaccine may have unknown risks" [reverse-coded]). The scale was adapted from previous research<sup>34</sup> and evidenced acceptable reliability ( $M = 1.68$ ,  $SD = 0.78$ ,  $\alpha = .82$ ).

### Attitudes toward HPV vaccination

Attitudes toward HPV vaccination were assessed with three semantic differential items ("Having my child vaccinated against HPV would be: *bad* vs. *good*, *harmful* vs. *beneficial*, *foolish* vs. *wise*") measured on a five-point scale. The items evidenced strong reliability ( $M = 3.83$ ,  $SD = 1.08$ ,  $\alpha = .93$ ).

### Intentions toward HPV vaccination

Intentions toward vaccinating a child were assessed under two conditions: whether the vaccine cost \$375 or was free. For each condition, participants rated the likelihood of getting the vaccine on three items (e.g., "How likely would you be to have your child vaccinated against HPV sometime soon?" and "How likely would you be to have your child vaccinated in the future?") on a five-point scale (1 = *Extremely unlikely*, 5 = *Extremely likely*). Items evidenced strong reliability under the cost ( $M = 3.36$ ,  $SD = 1.14$ ,  $\alpha = .90$ ) and free ( $M = 3.86$ ,  $SD = 1.15$ ,  $\alpha = .91$ ) conditions.

## Analysis strategies

To test the hypotheses concerning the association between trust in health information from two authoritative sources and vaccine acceptance, we conducted multiple regression analyses in which a number of socio-demographic variables were controlled for. To test the mediation hypotheses (perceived vaccine efficacy and safety as mediators), we used the bootstrap approach developed by Preacher and Hayes.<sup>38</sup> This approach bootstraps the sampling distribution of the indirect effect and derives a confidence interval from it. It overcomes some limitations associated with alternative procedures and has the additional benefit of having greater statistical power and decreasing the likelihood of a Type I error.<sup>38</sup>

## Disclosure of potential conflicts of interest

No potential conflict of interest was reported by the authors.

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## Appendix A

**Table A1.** Descriptive results of the sample.

Sample description	Level	Percentage
Education levels of parents	Some levels of high school	2%
	High school	18%
	Having some college courses	40%
	Completing college	25%
	Post-graduate education	15%
Household income	Less than \$15k	2%
	Between \$15K and \$34k	20%
	Between \$35k and \$75k	49%
	Between \$75k and 100k	12%
	Above \$100k	11%
Whether had health care coverage	Yes	82%
	No	18%
Whether had heard of HPV	Yes	86%
	No	14%
Whether had heard about the HPV vaccine as a means to prevent cervical cancer	Yes	69%
	No	31%
Children in different age categories	9–10	40%
	11–12	25%
	13–17	35%

**Table A2.** Trust in health care professionals and government health agencies as a predictor of acceptance of the HPV vaccine.

Variable	Attitude				Intention, Cost				Intention, Free			
	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
Sex (1 = M, 2 = F)	-.29	.26	-.12	-1.14	.09	.27	.04	0.34	.09	.27	.03	0.32
Age	-.02	.01	-.14	-1.42	-.02	.01	-.18	-1.79 <sup>†</sup>	-.03	.01	-.18	-1.82 <sup>†</sup>
Education	.02	.13	.01	.012	.03	.13	.03	0.22	-.02	.13	-.02	-0.15
Income	-.12	.13	-.11	-0.97	.09	.13	.08	0.70	.01	.13	.01	0.09
Health Care Coverage (1 = Y, 2 = N)	-.09	.31	-.03	-0.28	.04	.32	.01	0.12	.30	.32	.10	0.92
Trust in Health Care Professionals	.18	.17	.12	1.07	-.01	.18	-.01	-0.07	.16	.18	.10	0.91
Trust in Government Health Agencies	.28	.13	.23	2.22*	.32	.13	.26	2.40*	.31	.13	.25	2.34*
<i>R</i> <sup>2</sup>	.11				.10				.12			
Adjusted <i>R</i> <sup>2</sup>	.05				.03				.06			

<sup>†</sup>*p* < .08, \**p* < .05, \*\**p* < .001