Giving Girls a Shot

An Examination of State Policies Addressing the HPV Vaccination

by

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Abstract

On June 8, 2006, the FDA approved the vaccine Gardisil, which protects women from the Human Papilloma Virus (HPV) that is linked to 99 percent of all cervical cancers. Immediately, forty-one state legislatures began entertaining initiatives that would make the vaccine mandatory for all fifth and sixth grade girls in public schools. HPV suddenly went from a non-issue to one that catapulted itself onto the public and political agenda. The vaccine's producer, Merck & Co., encouraged this flurry of activity through its marketing and lobbying efforts. This project seeks to understand the agenda setting and policy adoption processes associated with the HPV vaccine. The results indicate that despite the millions of dollars spent promoting its vaccine, Merck's attempts to influence policy actually decreased the likelihood of policy adoption.

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Introduction

On June 8, 2006, the Food and Drug Administration (FDA) gave its seal of approval to Gardasil, a vaccine that protects women from the Human Papilloma Virus (HPV), a sexually transmitted infection that has been identified as the cause of nearly all cervical cancers (World Health Organization 2006). Merck & Co., producer of the vaccine, quickly sprung into action, lobbying state legislatures to pass laws to make the vaccine mandatory. In September 2006, Michigan became the first state to introduce legislation (National Conference of State Legislatures 2008). Many other states followed suit, entertaining initiatives to make the vaccine compulsory for young girls. By early 2008, 41 states had proposed legislation "requiring young girls to be vaccinated, or schools to inform parents about the vaccine" (Wilson 2007, para. 5; National Conference of State Legislatures 2008).

The quick and extensive launch of HPV onto state policy agendas deserves attention. Many of these bills were withdrawn, died in committee, or were voted down, creating even more of a puzzle. Despite many states' initial enthusiasm, legislation pertaining to the HPV vaccine quickly disappeared. This could be attributed to Merck's inability to control the issue definition. As issue salience increased, the debate entered the realm of morality politics. Understanding what prompted 41 states to rush to action on the HPV vaccine issue and then, within a matter of months, abandon the policies is the primary focus of this paper. I focus on the efforts of Merck & Co. to promote the new HPV vaccine through the framework of interest group influence in issues of morality, with the goal of unraveling the

relative influence of economic interests, morality influences, and public health concerns on state legislative activity. This paper proceeds in four parts, beginning with a discussion of the politics behind the HPV vaccine and state legislation addressing it. Second, I examine relevant literature from interest group and morality politics scholarship. Next, I outline methods and test my research question. Finally, I discuss the results and explore areas of future research.

The Politics of HPV

In 2004, Merck & Co. was forced to pull its arthritis pain medication, Vioxx, off the market after it was linked to an increased risk of heart attacks and strokes (Smith 2006). Not only did Merck lose its "cash cow," which pulled in approximately $2.5 billion each year, the incident caused the company's stock value to take a dive, dropping nearly 27 percent (Rubin 2004). Analysts estimate that in the end, Merck could see between $30 and $50 billion in costs from its Vioxx problem (Smith 2006). The loss of Vioxx was not Merck's only setback. In June 2006, the company's patent expired for Zocor, Merck's top-selling drug to reduce cholesterol. Zocor alone was responsible for approximately $4.4 billion in sales each year (Smith 2006). Merck's new HPV vaccine, had the potential to fill the void left by these two top-selling drugs, and the FDA approval of Gardasil in June 2006 could not have come at a better time for the pharmaceutical company.

On the heels of these developments, adversity, and setbacks, it seems no surprise that Merck quickly began to campaign to have the new HPV vaccination mandated (Wilson 2007). With the number of women in the United States affected

by HPV and cervical cancer growing each year, it seems that Merck's vaccine could not have come at a better time. Not only did Gardasil present a solution to an ever-growing health concern, but it also provided a solution for Merck's financial woes.

According to the Centers for Disease Control and Prevention (2006), HPV affects around 20 million people, making it the most prevalent sexually transmitted infection in the United States. The CDC (2006) also estimates that the number of infected individuals grows by 6.2 million each year, making it the "second leading cancer killer of women worldwide" (National Conference of State Legislatures 2008, para. 3). Nearly 99 percent of all cervical cancers are caused by HPV (World Health Organization 2006). Gardasil protects women from the four most common strains of HPV, which account for 70 percent of all cervical cancer incidence (Centers for Disease Control and Prevention 2006).

Although cervical cancer incidence and mortality rates in the United States are lower than any other country in the world due to early screening methods, estimates put the mortality rate of cervical cancer in the U.S. between 3,700 and 4,000 per year (National Conference of State Legislatures 2008; Centers for Disease Control and Prevention 2006). Cervical cancer continues to affect an estimated 26,000 women each year. This number is continuously growing with approximately 10,000 more women diagnosed each year.

With ever-growing rates of HPV and cervical cancer, the introduction of Gardasil had the potential to ameliorate a public health problem and potentially solve Merck's financial woes. Merck's marketing strategy included an "aggressive

lobbying campaign" and increased campaign contributions which prompted 41 states to consider laws that would require school-aged girls to be vaccinated or would mandate that schools inform parents about the vaccine (Wilson 2007, para. 5; National Conference of State Legislatures 2008; Annenberg 2007). Merck found strong support in Women in Government, a national, bipartisan organization of women state legislators, which serves as an educational and networking resource for female policymakers (Drug Week 2006, para. 6). It was this link to Women in Government, however, that contributed to Merck's campaign backfire. In early 2007, the news media began to cover the connection, reporting that Merck had "funneled money through Women in Government" to lobby state legislators (Associated Press 2007, para. 7; Gold 2007). The Associated Press also revealed that a prominent executive from the pharmaceutical company's vaccine department held a seat on the business council for Women in Government (Associated Press 2007).

As Merck's relationship with Women in Government began to receive media attention, opposition groups became involved in the debate. This opposition primarily came from traditional, conservative activists who argued that the vaccination would "promote sexual promiscuity" and that Gardasil had not yet been "proven safe" (Wilson 2007, para. 2; Gold 2007). In addition, Merck received criticism from public health officials who were concerned that the pharmaceutical company was more motivated by the financial bottom line than public health. Indeed, Larry Gostin, an expert in public health law from Georgetown University told National Public Radio reporter Brenda Wilson that "this, what seems to me to be a

steamroller effort, makes me very uncomfortable because it's being pushed so hard by the company itself, which stands to make a lot of money" (Wilson 2007, para. 4). Gostin's sentiments are not unwarranted as experts predict that Gardasil sales could net Merck between $1.6 and $2 billion dollars annually by 2009 (Smith 2006). Making the vaccine mandatory, at a price of approximately $360 per dose, could increase those projected profits (Centers for Disease Control and Prevention 2006).

With the negative press and growing scrutiny, in February 2007, Merck announced that it would end its campaign for mandatory vaccinations. Mary Elizabeth Blake, public affairs official, released a statement saying that "We do not want any misperception about Merck's role to distract from the ultimate goal of fighting cervical cancer, so Merck has re-evaluated its approach at the state level and we will not lobby for school requirements for Gardasil" (Childs 2007, para. 9). Company spokesperson, Richard Haupt, did say, however, that Merck would continue to promote education about the vaccine through "legislators, health departments and coalition groups in various states" (Reuters 2007, para. 8). Since that time, many state legislatures that had considered bills to make the vaccine mandatory withdrew the legislation, voted it down, or let it die in committee. As of April 2008, only Virginia had passed a compulsory mandate. Even so, the Virginia legislature introduced a bill in 2008 that would delay the requirement of the HPV vaccination (NCSL 2008).

Money and Morality

The flurry of state legislative activity that surrounded the HPV vaccination provokes several questions. First, what incited such widespread legislative action? One possible explanation lies in the Merck campaign. What role did Merck play in facilitating the proposal and adoption of policy across the 50 states? Specifically, did Merck's campaign contributions launch the HPV vaccine onto state legislative agendas? Second, why did states back away from this legislation so quickly? Did policymakers respond to the increased salience and the mobilization of opposition based on moral concerns?

The intersection of morality politics and strong moneyed interest characterizes the HPV vaccine debate. Because morality politics are typically highly salient issues, and moneyed interests tend to fare better in legislative politics when there is low salience and opposition, Merck was walking a fine line. Schattschneider (1960) theorized about this type of environment, noting that groups have an incentive to minimize the scope of the conflict so as not to entice opposing voices into the debate. As salience built around the HPV issue, especially after the revelation that Merck had ties to Women in Government (Associated Press 2007, para. 7; Gold 2007), the scope became so large that Merck eventually withdrew from the conflict, stopping all lobbying (Associated Press 2007).

Despite the end result, Merck is not the first organized interest group to work to have its goals added to the policy agenda. In fact, efforts to influence legislative action have been fruitful as governments "continue to respond to groups that clearly

communicate their interests and have the funding to convey their messages effectively" (Loomis and Cigler 2007, 1). There are a variety of tactics and strategies that organized interests employ to impact policy including lobbying, grassroots efforts, media appeals, and contributing to campaigns (DeGregorio and Rossotti 1995). The strategy that a particular group chooses is influenced by the resources available to the group and the political context. In the case of the HPV vaccine, Merck chose a lobbying and campaign contribution strategy (Wilson 2007). Scholarship examining just how much of an impact organized interests can have on policy outcome is mixed. Scholars do agree that campaign contributions are linked to access to political actors (Wright 1989; Schlozman and Tierney 1986) and money is often used to "afford favored access on matters involving direct economic benefits to givers" (Adamany 1980, 596). Thus, Merck stood to gain a large profit with the passage of mandatory vaccination legislation.

The newness of the issue may have given Merck an initial advantage in influencing state policy. Haider-Markel (1999) notes that groups can have more impact when issues are in their infancy because policymakers may not have formed strong beliefs. Under these circumstances, legislators rely more heavily on information provided from organized interest when making their individual decisions (Haider-Markel 1999). Legislative activity surrounding the HPV vaccine gives support to this idea. Almost immediately after FDA approval of Gardasil in June 2006, Merck began its campaign, and only three months later, Michigan became the first legislature to propose compulsory vaccination for girls entering sixth grade

(NCSL 2008). The literature seems to suggest that the initial success of the Merck campaign could have been due to the freshness of this issue.

However, looking at the actions of Merck & Co. solely as an organized interest seeking to influence favorable policy outcomes is inadequate. Because HPV is a sexually transmitted infection, policy concerning this particular vaccine addresses consequences of sexual behavior and naturally evokes discussions of sexuality and premarital sexual activity. Therefore, the nature of the HPV vaccine debate places it in the morality politics arena where political actors seek to regulate social behaviors and redistribute values (Meier 1994). The HPV issue is clearly situated between several competing interests including Merck's desire to profit from the sale of Gardasil, the public health interest to prevent HPV and cervical cancer, and the concern that such a vaccine would increase promiscuity among young girls.

Mooney and Lee (2000) outline two types of morality issues—consensus and contentious. Consensus issues have a clear "sin" element to them such as drinking and driving or gambling (Meier 1994; Sharp 2002). Contentious issues, on the other hand, involve moral arguments on several fronts, each claiming "moral supremacy on the issue" (Doan 2007, 11). The HPV debate seems to be situated in the latter category with the moral debate of preventing disease being pitted against regulating the sexual choices of adolescent girls. Merck's ability to impact state legislation seems to be rooted in the fact that it was able to avoid the contentious nature of morality politics in the early stages. As previously noted, by April 2008, 25 states had proposed mandatory vaccination of young girls and many other states were

considering other forms of legislation to provide information about or to fund the vaccinations (NCSL 2008). Despite Merck's initial advantage, ultimately only one state, Virginia, passed a compulsory vaccination policy, and even it is considering overturning this legislation (NCSL 2008).

One factor that characterizes contentious morality politics issues is high salience (Haider-Markel and Meier 1996). Because morality issues, despite their inherent complexity, are often boiled down into a simple, understandable debate, they are highly accessible to the public (Doan 2007; Mooney and Lee 1995). These high levels of public attention tend to leave little room for expert knowledge, and when salience is high, citizens have more influence on public policy outcomes (Meier 1994). Smith (1995) notes, however, that groups can influence policymaking decisions when there is low salience and when the group's efforts are unopposed. These conditions of low salience and lack of opposition appear to have been met early in Merck's campaign to state legislatures. As other groups became mobilized against the vaccine including religious groups and some medical professionals, the salience surrounding the push for a mandatory vaccine increased (Wilson 2007). This mobilization is often easily achieved in morality politics as coalitions tend to organize around "preexisting religious beliefs" (Haider-Markel and Meier 1996, 334).

In morality politics there is little room for compromise or finding a middle ground (Peters 2007). As such, when new issues emerge, opposing factions vie for control of the problem definition (Rochefort and Cobb 1994). When the HPV vaccine became available, Merck framed the issue as a solution to a public health

crisis, perhaps realizing that characterizing the severity of HPV and cervical cancer was key to defining the issue (Rochefort and Cobb 1994). Garnering support from key players such as Women in Government, Merck was successful in framing the debate in its favor, prompting 41 states to propose legislation promoting the new vaccine. Less than half of these proposals resulted in new policy, begging us to ask what derailed Merck's efforts. Did the growing salience of the issue open the door for new stakeholders to redefine the issue?

Methods

The HPV vaccination issue provides an opportunity to investigate state legislative decision-making when economic, morality, and public health considerations intersect. State HPV legislation can be broken down into three main categories: mandatory vaccination, information distribution, and enhanced access policies. The most aggressive category is legislation that requires girls to be vaccinated in order to attend school. As of April 2008, only Virginia had passed such legislation.[1] Twenty-five states, however, had proposed legislation to make the HPV vaccination compulsory including California, Colorado, Connecticut, Florida, Georgia, Illinois, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Mexico, New York, Ohio, Oklahoma, South

[1] The Virginia legislature introduced a bill in 2008 that would delay the requirement of the HPV vaccination (National Conference of State Legislatures 2008).

Carolina, Texas,[2] Vermont, West Virginia, and Wisconsin (National Conference of State Legislatures 2008; Women in Government 2008).

The second category of state legislation is informational. States have proposed and passed legislation requiring the dissemination of information on the HPV vaccination and the link between HPV and cervical cancer to girls entering either the fifth or sixth grades and their parents. As of April 2008, 25 states including Arizona, Colorado, Connecticut, Florida, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Michigan, Minnesota, Missouri, Montana, New Jersey, New Mexico, New York, North Carolina, North Dakota, Pennsylvania, Texas, Utah, Washington, and Wisconsin had proposed such legislation. Of those 25, only 12 passed legislation (NCLS 2008; Women in Government 2008).

The final category of state legislation involves access to the vaccination. State legislatures across the United States have proposed and passed legislation to increase access to the HPV vaccination by either requiring the vaccination to be covered by Medicaid, state benefits, and/or insurance companies, or by having state funds cover part or all of the vaccination costs. As of April 2008, 28 states had proposed and 9 had passed such legislation (National Conference of State Legislatures 2008; Women in Government 2008). A summary of all proposed and passed legislation can be seen in Table 1.

[2] The Texas governor had signed an executive order making the HPV vaccine compulsory, but the legislature passed a law to override the order. The governor did not veto the override bill (National Conference of State Legislatures 2008).

Table 1: HPV Vaccine Policies Proposed and Passed in the United States

State	Proposed Mandatory School	Proposed Dispersing Information	Passed Dispersing Information	Proposed Expanding Access	Passed Expanding Access
Alabama					
Alaska					
Arizona		X		X	
Arkansas				X	
California	X			X	X
Colorado	X	X	X	X	X
Connecticut	X	X		X	
Delaware					
Florida	X	X		X	
Georgia	X			X	
Hawaii		X		X	
Idaho					
Illinois	X	X	X	X	X
Indiana		X	X		
Iowa		X	X	X	
Kansas	X	X			
Kentucky	X	X		X	
Louisiana					
Maine	X	X	X	X	X
Maryland	X				
Massachusetts	X			X	
Michigan	X	X			
Minnesota	X	X			
Mississippi	X			X	
Missouri	X	X		X	
Montana		X			
Nebraska					
Nevada				X	X
New Hampshire				X	X
New Jersey		X	X	X	
New Mexico	X	X		X	X
New York	X	X		X	
North Carolina		X	X		
North Dakota		X	X		
Ohio	X			X	
Oklahoma	X				
Oregon				X	
Pennsylvania		X		X	
Rhode Island				X	X

Table 1: HPV Vaccine Policies Proposed and Passed in the United States Continued

State	Proposed Mandatory School	Proposed Dispersing Information	Passed Dispersing Information	Proposed Expanding Access	Passed Expanding Access
South Carolina	X				
South Dakota				X	X
Tennessee					
Texas	X	X	X	X	
Utah		X	X		
Vermont	X			X	
Virginia	X			X	
Washington		X	X		
West Virginia	X				
Wisconsin	X	X	X		
Wyoming					
Totals	**25**	**25**	**12**	**28**	**9**

Source: National Conference of State Legislatures (NCSL 2008) and Women in Government (2008)

Based on these three categories of legislation, I test five statistical models designed to examine the relative influence of economic, morality, and public health factors on HPV legislation. The first model examines states that have proposed making the HPV vaccination compulsory. States that have proposed legislation are coded one, and all others are coded as zero. Because only one state has actually passed legislation to make the vaccine mandatory, I do not model this relationship. The second and third models look at states that have proposed and passed legislation mandating dissemination of information to children and their parents. States who have either proposed or passed legislation are coded one, and all others are coded zero. The fourth and fifth models examine states that have proposed and passed legislation to improve access to the HPV vaccine, respectively. States who have passed or proposed legislation are coded one, and all others are coded zero.

Economic Considerations

Each of the models examines three categories of considerations in the HPV vaccination debate including economic, morality, and public health. Because interest group contributions have been linked to favored access to policymakers (Adamany 1980), it is necessary to examine the impact of Merck contributions. Therefore, the primary economic variable measures contributions from Merck pharmaceutical company, makers of the HPV vaccine, Gardasil. This variable is measured by the total dollar amount of contributions given to candidates for state offices in 2006. Because states with larger legislatures would have more candidates running for office, and thus could attract more contributions, the total dollar amount is divided by the number of members of the state legislature. Merck contributions were gathered from the National Institute on Money in State Politics (2008). Merck contributions are expected to be positively associated with all three types of legislation.

Other economic concerns include the percent of uninsured women within a state. If states were to pass legislation to either make the vaccine mandatory or to expand access to the vaccine, the cost of vaccination would either fall to insurance companies or to the states. This variable is a proxy measure designed to capture the potential economic costs of enacting such legislation and is expected to be negatively related to all types of HPV legislation. For these same reasons, population is another important variable to include in the model. Larger populations could indicate a stronger need for a solution to the HPV problem or alternatively a large economic market for Merck. I expect that states with larger populations will be more likely to

pass all three types of legislation. The percent of urban population in a state is the final economic consideration in these models. Because low-income, urban young women are at a higher risk for HPV and other sexually transmitted diseases (Bunnell et al. 1999), states with larger urban populations may see higher urban populations as an economic burden. It is expected that states with smaller percentages of uninsured women will be more likely to propose and pass all three types of HPV vaccine legislation. The percent of uninsured women, population, and the percent of urban population highlight the economic costs of a solution. As Rochefort and Cobb (1994, 26) point out, although a solution to a public problem may be available, political actors may not "perceive that adequate resources exist to pay for what needs to be done."

Morality Considerations

To assess the impact of morality politics on the HPV legislation, several additional indicators are included in the models. Those who wish to see the HPV vaccination become mandatory have seen some opposition from Christian conservative activists (Gold 2007). Therefore, the percent of the population within a state that identify as Christian using data from the 2000 US Census Bureau is included in the models. Larger Christian populations within a state are expected to be negatively associated with proposing and passing all types of legislation. Ideology has also been linked to political decisions at both the individual level and at the government level (Minar 1961).

Since numerous studies have shown that citizens tend to elect representatives that share their viewpoints (Berry et al. 2002) measures of both citizen ideology and government ideology are included in the models. It is expected that states with more liberal citizens and governments will be more likely to propose and pass HPV vaccine policies. Although citizen and government ideology are important in legislative decision-making, the level of electoral competition also influences whether policymakers are willing to take risks on their political stances (Holbrook and Van Dunk 1993). It is expected that states with low electoral competition will be more likely to propose and pass HPV policies because when competition is low, legislators have more freedom to take sides on contentious issues without fear of electoral repercussions. Conversely, when competition is high, policymakers may be more inclined to avoid strong stances that could hurt them in future elections. Furthermore, with contentious and salient morality politics issues, legislators tend to pay closer attention to public opinion (Meier 1994; Norrander and Wilcox 2005).

Legislative professionalism is another important consideration in these models. Squire (2007) notes that more professional legislatures are able to devote more time to policy research and development. As such, we would expect that more professional legislatures would be able to devote more time to understanding the complexity of the HPV vaccine debate rather than viewing it in terms of more simplistic morality arguments. I expect that more professional legislatures will be more likely to propose and pass all three types of legislation. The final indicator of morality in the models is the number of female legislators in each state legislature.

Because Women in Government was a significant supporter of HPV vaccination policies, including policies to make it mandatory for school-aged girls, and because cervical cancer is an issue that is salient to women, I expect that states with more female legislators will be more likely to propose and pass all types of HPV policies.

Public Health Considerations

The final set of considerations in the HPV debate includes issues of public health, namely the rates of cervical cancer and cervical cancer mortality in a state[3]. The number of women who have either developed or died from this particular type of cancer is included in the models because 99 percent of all cervical cancer has been linked to the HPV virus. Data on the incidence and mortality rates were collected from the Center for Disease Control and Prevention's National Program of Cancer Registry (nd). The data is listed per 100,000 and includes incidence and mortality rates for 2004. Because states with higher incidence rates have a stronger need for a solution, I expect that these measures will be positively associated with proposing and passing HPV legislation. I employ logistic regression to estimate the models because each dependent variable is dichotomous. Wallace and Silver (1988) suggest routinely estimating robust standard errors to correct for potential problems of heteroskedasticity and auto-correlation. More recently, Angrist and Pischke (2008), recommend estimating both regular and robust standard errors and reporting the more conservative estimations. When comparing the robust and regular standard errors, there was no substantive difference in the results of the models.

[3] Although it may appear that there could be colinearity between these two measures, diagnostic tests revealed no such problems with the data.

Results

Mandatory Vaccination Model

The results from the first model testing the likelihood of states to propose legislation making the HPV vaccine compulsory can be seen in Table 2. Turning first to the economic considerations, the primary independent variable, Merck contributions, yielded a statistically significant result, but not in the expected direction. States that had higher amounts of contributions per legislator were significantly less likely to propose legislation requiring girls to be vaccinated before entering school. Population also had a strong, positive impact suggesting that states with larger populations were more likely to propose such legislation. The results of the model also indicate, however, as the percent of urban population increases, the probability that a state would propose compulsory vaccination legislation decreased.

Examining the morality considerations in the HPV vaccination debate, the model indicates that citizen ideology was a positive indicator of proposing mandatory vaccination legislation. As a state's ideology became more liberal, the likelihood of proposing legislation increased. Legislative professionalism performed the same way, suggesting that as professionalism increased, the likelihood of proposing legislation increased. Conversely, electoral competition appears to decrease the likelihood of a state proposing a mandatory vaccination mandate.

The final two variables address the public health considerations in the HPV vaccination debate. The rate of cervical cancer incidence in a state has a strong, positive impact on proposing legislation. States that had higher incidence rates of

cervical cancer were statistically more likely to propose legislation. Cervical cancer mortality rates were also a strong predictor, but in the opposite direction.

Table 2: Proposed Compulsory Vaccine for School Admission

Independent Variables	β	Probability	mfx
Economic Considerations			
Merck Contribution	-.020 (.009)	.026	-.004
Percent Uninsured Women	-.042 (.209)	.839	
Population	.000 (.000)	.016	.000
Percent Urban	-.190 (.086)	.028	-.046
Morality Considerations			
Percent Christian	-.027 (.062)	.662	
Citizen Ideology	.194 (.104)	.062	.046
Government Ideology	-.034 (.029)	.242	
Electoral Competition	-.174 (.077)	.024	-.042
Legislative Professionalism	14.987 (6.698)	.025	3.618
Female Legislators	.029 (.020)	.146	
Public Health Considerations			
Cervical Cancer Incidence	4.218 (1.242)	.001	1.018
Cervical Cancer Mortality	-9.137 (2.185)	.000	-2.206
Constant	-2.225 (10.667)	.835	
Number of Cases	49		
Wald χ^2	29.36	.003	
Pseudo R^2	.64		
Log Pseudolikelihood	-12.065		

Robust Standard Errors are in parentheses. Marginal effects (mfx) are estimated after a logistic regression estimation, where the values of the independent variables are set to the mean or the mode.

Table 2 also presents the marginal effects coefficients[4] for the model. Marginal effects coefficients are post-estimation calculations that give the probability

[4] The marginal effects coefficients are located in the column labeled "mfx."

slope, holding all other variables constant (Long 1997; Long and Freese 2005). Marginal effects coefficients can be compared to determine the relative impact of each variable on the dependent variable. In this model, legislative professionalism appears to be having the most significant positive impact on the probability of a state proposing a compulsory vaccination, followed by cervical cancer incidence, citizen ideology, and population. The most important negative impact comes from cervical cancer mortality rates, followed by percent urban, electoral competition, and finally Merck contributions. So while Merck contributions had a statistically significant, negative impact on proposing this policy, cervical cancer mortality rates were more important.

Information Distribution Models

The second model examined states that proposed legislation requiring that information about the HPV virus and its connection to cervical cancer be distributed to children and their parents. Unlike the mandatory vaccination model, the results in Table 3 indicate that this information dissemination model performed poorly.

Turning to the third model, which examines states that passed information legislation, we see that Merck contributions had a statistically significant, negative impact. As in the first model, Merck contributions had the opposite effect of what was hypothesized. In the states where legislators received more Merck contributions, policymakers were less likely to pass legislation requiring the distribution of HPV vaccine information. Population also produced a significant result, indicating that

states with higher populations were more likely to pass this type of policy. The other economic considerations did not significantly impact state decision-making.

Table 3: Proposed Information Distribution to Children and Parents

Independent Variables	β	Probability	mfx
Economic Considerations			
Merck Contribution	-.006 (.004)	.168	
Percent Uninsured Women	-.035 (.140)	.801	
Population	.000 (.000)	.142	
Percent Urban	.008 (.032)	.787	
Morality Considerations			
Percent Christian	.029 (.046)	.526	
Citizen Ideology	.025 (.027)	.355	
Government Ideology	-.028 (.020)	.154	
Electoral Competition	.042 (.048)	.373	
Legislative Professionalism	-4.194 (4.714)	.374	
Female Legislators	.014 (.023)	.543	
Public Health Considerations			
Cervical Cancer Incidence	.473 (.400)	.237	
Cervical Cancer Mortality	-1.343 (1.245)	.280	
Constant	-4.128 (6.628)	.533	
Number of Cases	49		
Wald χ^2	12.45	.4106	
Pseudo R^2	.2186		
Log Pseudolikelihood	-26.530		

Robust Standard Errors are in parentheses. Marginal effects (mfx) are estimated after a logistic regression estimation, where the values of the independent variables are set to the mean or the mode.

Examining the influence of morality considerations, the results indicated that electoral competition was the only statistically significant variable. The analysis suggests that states that have higher electoral competition were more likely to pass

this legislation. In this model, no other morality consideration, or the variables measuring public health considerations, achieved statistical significance. In terms of relative impact, the marginal effects coefficients suggest that electoral competition had the most significant impact on whether or not states passed HPV information legislation. The full set of results for the third model can be seen in Table 4.

Table 4: Passed Information Distribution to Children and Parents

Independent Variables	β	Probability	mfx
Economic Considerations			
Merck Contribution	-.016 (.006)	.007	-.001
Percent Uninsured Women	.128 (.109)	.241	
Population	.000 (.000)	.007	.000
Percent Urban	-.035 (.039)	.365	
Morality Considerations			
Percent Christian	.085 (.054)	.118	
Citizen Ideology	-.035 (.031)	.271	
Government Ideology	.037 (.026)	.159	
Electoral Competition	.115 (.053)	.031	.013
Legislative Professionalism	-6.395 (7.246)	.378	
Female Legislators	.002 (.018)	.894	
Public Health Considerations			
Cervical Cancer Incidence	.091 (.383)	.812	
Cervical Cancer Mortality	-1.309 (1.520)	.389	
Constant	-7.763 (7.268)	.285	
Number of Cases	49		
Wald χ^2	20.30	.061	
Pseudo R^2	.310		
Log Pseudolikelihood	-18.795		

Robust Standard Errors are in parentheses. Marginal effects (mfx) are estimated after a logistic regression estimation, where the values of the independent variables are set to the mean or the mode.

Enhanced Access Models

The fourth and fifth models examined states that proposed and passed legislation to enhance access to the HPV vaccine, respectively. The results for the fourth model can be seen in Table 5.

Table 5: Proposed Legislation to Enhance Access to HPV Vaccine

Independent Variables	β	Probability	mfx
Economic Considerations			
Merck Contribution	.003 (.004)	.465	
Percent Uninsured Women	-.046 (.109)	.667	
Population	.000 (.000)	.514	
Percent Urban	.033 (.028)	.247	
Morality Considerations			
Percent Christian	-.006 (.030)	.837	
Citizen Ideology	.074 (.038)	.0557	.017
Government Ideology	-.017 (.020)	.386	
Electoral Competition	-.063 (.045)	.163	
Legislative Professionalism	-2.664 (4.736)	.574	
Female Legislators	.016 (.015)	.285	
Public Health Considerations			
Cervical Cancer Incidence	.147 (.460)	.749	
Cervical Cancer Mortality	.148 (1.229)	.904	
Constant	-3.431 (5.525)	.535	
Number of Cases	49		
Wald χ^2	14.21	.287	
Pseudo R^2	.238		
Log Pseudolikelihood	-25.483		

Robust Standard Errors are in parentheses. Marginal effects (mfx) are estimated after a logistic regression estimation, where the values of the independent variables are set to the mean or the mode.

The results show that citizen ideology was the only significant predictor of proposing such legislation. Those states that had a more liberal citizen ideology were more likely to propose enhancing access. No other variables produced statistically significant relationships.

Table 6: Passed Legislation to Enhance Access to HPV Vaccine

Independent Variables	β	Probability	mfx
Economic Considerations			
Merck Contribution	.006 (.005)	.254	
Percent Uninsured Women	.090 (.148)	.544	
Population	-.000 (.000)	.684	
Percent Urban	.042 (.045)	.343	
Morality Considerations			
Percent Christian	.018 (.048)	.705	
Citizen Ideology	.049 (.033)	.148	
Government Ideology	-.008 (.023)	.699	
Electoral Competition	.053 (.058)	.362	
Legislative Professionalism	-5.529 (6.505)	.395	
Female Legislators	.034 (.019)	.072	.003
Public Health Considerations			
Cervical Cancer Incidence	-.247 (.668)	.711	
Cervical Cancer Mortality	.932 (2.184)	.670	
Constant	-12.120 (10.489)	.248	
Number of Cases	49		
Wald χ^2	12.61	.398	
Pseudo R^2	.182		
Log Pseudolikelihood	-19.104		

Robust Standard Errors are in parentheses. Marginal effects (mfx) are estimated after a logistic regression estimation, where the values of the independent variables are set to the mean or the mode.

Results for the fifth model can be seen in Table 6. States with more female legislators were more likely to pass legislation to enhance access to the HPV vaccine. Aside from this morality variable, no other statistically significant economic, morality, or public health relationships were revealed in this model.

Discussion

The results of the analyses uncovered some intuitive as well as surprising results. The most intriguing results appeared in the realm of the economic considerations. Most notable is the impact of Merck contributions. In the first and third models, Merck contributions were a significant predictor of the dependent variables to propose compulsory voting and pass informational legislation, respectively. The relationships, however, were in the opposite direction than expected. In both of these models, as Merck contributions increased, the likelihood of a state taking action decreased. Although this seems counterintuitive, these results could be explained by the severe backfire of the Merck lobbying techniques and subsequent loss of issue framing. By February 2007, Merck ended its campaign to push for mandatory vaccination of school-age girls after coming under scrutiny. While Merck dominated the debate early on, as salience about the HPV vaccine began to grow, the pharmaceutical company began to lose control over the issue. With the growing salience, other stakeholders entered the debate, primarily those who wished to frame the debate as a morality issue. These opponents to the vaccine worried that vaccination would promote promiscuity among young girls (Childs 2007; Reuters 2007; Wilson 2007; Gold 2007).

Population is the other economic consideration that achieved statistical significance. When considering whether states proposed mandatory vaccination or passed legislation to provide HPV vaccination information, increased population enhanced the likelihood that states would act. Although this is in the opposite direction than hypothesized, it could be that states with larger populations may have perceived a stronger need for a solution to the HPV problem. Conversely, states with higher urban populations were less likely to propose mandatory vaccination. Because low-income, urban young women are at a higher risk for HPV and other sexually transmitted diseases (Bunnell et al. 1999), states with larger urban populations may have seen a mandatory vaccination program as an economic burden.

The results also suggest that morality played a minor role in HPV state policymaking. It is interesting to note that states with a higher percentage of people who identified as Christian were no more likely to propose or pass legislation dealing with the HPV vaccine. Although I anticipated that states with a higher Christian presence would be less likely to propose or pass policies concerning the HPV vaccination, we can find some explanation for these results. Although certain conservative groups actively opposed the HPV vaccination, Focus on the Family and the Family Research Council "recently have spoken in support of HPV vaccines from Merck and GlaxoSmithKline because of their life-saving potential" (Smith 2006, para. 21). They do, however, maintain the position that the best method to prevent HPV and cervical cancer is abstinence and monogamy. This support, albeit weak

support, may be sending a mixed message to Christians, and thus could explain the lack of significance of this particular variable.

Citizen ideology had a significant, positive impact on states proposing mandatory HPV vaccination and proposing increased access to the vaccination. As the state's citizenry became more liberal, the likelihood of proposing these policies increased. This result was expected because liberal ideology is associated with enhanced social services (O'Connor, Orloff, and Shaver 1999). Another morality consideration that seemed to play a role in state activity surrounding the HPV vaccine is electoral competition. In the first model looking at mandatory vaccination, electoral competition had a negative impact on proposing the legislation. As electoral competition increased, support for legislation decreased. Making the vaccine mandatory for school-age girls was the most contentious and aggressive approach to the HPV issue. Because compulsory vaccination was met with debate from both ideological and public health perspectives, it is intuitive that legislators in states with more competitive elections would be less likely to take such an aggressive, politically risky stance (Holbrook and Van Dunk 1993). The analysis suggests that policymakers may have been paying more attention to public opinion in an effort to avoid alienating voters in future elections. In the model examining states that passed policies to disperse information about the HPV vaccination, however, electoral competition increased the likelihood that states would pass such a policy. Although this is opposite of what was hypothesized, the result could be explained by the fact

that distributing information about the HPV vaccine was a less aggressive and contentious approach than mandatory vaccination.

Legislative professionalism is another morality consideration that was significant in the first model. As hypothesized, as a state's legislative professionalism increased, so did the probability of proposing mandatory vaccination legislation. The final variable in the morality domain is female legislators. The role of female legislators was only significant in the final model looking at states that passed policies to enhance access to the HPV vaccine. In this model we see that more female legislators translated into more initiatives to enhance access to the vaccine. This could be due in part to the role of Women in Government, especially noting that much of this legislation was introduced by members of this organization (Associated Press 2007). Further study should examine the relationship between the lobbying efforts of Women in Government and HPV legislation within the states.

The final dimension of the HPV vaccine debate is public health, measured by cervical cancer incidence and cervical cancer mortality rates. Interestingly, these two measures were only significant in the first model examining states that proposed mandatory vaccination. The fact that public health only affected state legislation when it came to compulsory vaccination is interesting in of itself. The results suggest that enhanced need did not significantly influence states to either propose or pass information-dispensing policies or enhanced access policies. Cervical cancer incidence rates did increase the probability of a state proposing mandatory vaccination legislation. Cervical cancer mortality rates, however, had the opposite

effect. Because cervical cancer is treatable, increased mortality rates are often indicative of low access to health care and poverty (Freeman and Wingrove 2005). Mandatory vaccination would be costly for a state to provide, and large populations of individuals with low access to health care could be seen as an economic burden.

There are some limitations to this research. The first, and most obvious, is the lack of data on the lobbying efforts of Merck. While campaign contributions can serve as a good proxy for the attention of a group on a particular state, it is not a perfect measurement. Much of what is contributed depends on the number of candidates running for office as well as campaign finance laws. I also found that some states received no campaign contributions from Merck, including Michigan, which was the first state to propose compulsory legislation (National Conference of State Legislatures 2008). Further investigation should investigate why some states seemed to be ignored. Future research should also examine campaign contributions over time from Merck to see if there is a pattern between states that receive more funds and favorable legislation toward Merck.

Conclusion

The primary goal of this paper was to understand the state legislative action on the HPV vaccination issue. More specifically, examine why so many states rushed to place the HPV vaccination on their legislative agendas and then so quickly back away. To dissect this puzzle, I first explored the HPV vaccine debate. This exploration revealed the critical role that Merck played in launching HPV onto the legislative agenda. Turning then to literature on the role of interest groups in

policymaking especially in the realm of morality politics, I explored conditions necessary for Merck & Co. to be successful in influencing policymaking. Through several statistical models, I examined the outcome of state legislative activity when economic, morality, and public health considerations intersect.

The results indicate that while contributions to individual legislators did have an impact on legislation, increased contributions actually decreased the likelihood that a state would either introduce or pass legislation. These results seem to suggest that Merck's lobbying efforts were not successful in influencing policy outcomes. While Merck may have had success in early stages of agenda setting, once its campaign contribution efforts were publicized, the pharmaceutical company's efforts actually decreased the likelihood for a favorable policy response. While Merck's economic interests seemed to dominate the earlier stages of the policymaking process, increased awareness invited a host of morality opponents to the decision-making table. As the analyses suggest, when the HPV debate took on a morality perspective, Merck's influence was stunted. Public health concerns also had relatively little influence on state decision-making. Only one analysis suggested that rates of cervical cancer influenced a state to propose policies on HPV vaccination. The results of this analysis indicate that when morality politics intervene, they have the ability to destabilize an issue. Although Merck and public health concerns may have lead 41 states to propose numerous pieces of legislation to introduce the HPV vaccine as a policy solution, morality interests influenced states to back away from strong

legislation. Some states opted for more mild approaches to the HPV vaccine, and many dropped the issue all together.

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Appendix

Variable Coding and Sources

Variable	Source	Coding
Merck Contributions	National Institute on Money in State Politics	Total $ given to candidates in 2006 in a state divided by the total number of state legislators.
Percent Uninsured Women	American Cancer Society	Percentage of uninsured women in each state.
Population	2006 US Census Bureau	Number in thousands.
Percent Urban	2000 US Census Bureau	Percent of population that liven in urban areas in 2000.
Percent Christian	2000 US Census Bureau	Percent of population that identify as Christian in 2000.
Citizen Ideology	2002 Berry et al. (1998)	100 = Perfectly Liberal 0 = Perfectly Conservative
Government Ideology	2002 Berry et al. (1998)	100 = Perfectly Liberal 0 = Perfectly Conservative
Electoral Competition	Holbrook and Van Dunk (1993)	100 = Perfect Competition 0 = No Competition
Legislative Professionalism	Squire (2007)	Range from 0 to 1. 1 = More Professional 0 = Less Professional
Female Legislators	Center for American Women and Politics	Number of female legislators in each state legislature in 2008.
Cervical Cancer Incidence	Centers for Disease Control and Prevention National Program of Cancer Registry	Rate per 100,000 in 2004.
Cervical Cancer Mortality	Centers for Disease Control and Prevention National Program of Cancer Registry	Rate per 100,000 in 2004.