Public Health and Agenda Setting: Determinants of State Attention to Tobacco and Vaccines

Abstract: What determines government attention to emerging health issues? We draw upon research in agenda setting and public policy diffusion to develop a theoretical model of the determinants of public health attention in the United States. We find that horizontal intergovernmental influence has the strongest and most consistent influence over state attention to tobacco and vaccines from 1990-2010. While national attention to tobacco or vaccines also sparks attention in the states, the “top-down” effect is much smaller in magnitude to the “horizontal” impact of gubernatorial attention and neighboring state attention. We find no evidence that interest groups influence the attention states pay to tobacco or vaccines. Finally, we find some support that issue saliency, measured as disease burden, matters however these results are highly dependent on the measures used and the particular issues. Our results point to the importance of institutions, as well as disease burden, in explaining governmental attention to health policy.
In April of 2009, public health officials in the United States detected the first case of the H1N1 influenza virus; a novel strain of the “swine flu” scientists feared could trigger a severe global influenza pandemic. In response to growing alarm over the emergence of the H1N1 influenza virus, federal public health officials called upon state and local governments to enact new emergency preparedness measures to mediate the potential spread of the influenza. While the federal government worked to coordinate national emergency preparedness by disseminating information and grant funding for new programs through the CDC, state governments assumed a prominent role in developing and implementing local responses to mediate the threat of the H1N1 virus. Despite the widespread publicity and urgency, however, state legislative responses to H1N1 flu varied dramatically. In many state governments, policy-makers introduced a slate of new proposals to update their general emergency preparedness plans-- expanding vaccine delivery, implementing new sanitation programs, making budget appropriations for infectious disease control, providing for mandatory sick leave for workers, and regulating the content of H1N1 vaccine itself (NCSL 2010). In other states, the legislatures proposed few—if any—new policies in response to the threat of the flu pandemic (NCSL 2010).

The different responses of state governments to the threat of the H1N1 flu raise an important question for students of public health policy making. What determines governmental attention to emerging health issues? This question has interested scholars since at least the 1960s when Schattschneider (1960) observed, “he who determines what politics is about runs the country” (66). After decades of research, we know that legislative attention to public problems is influenced by myriad factors including issue characteristics and problem definition (Rochefort and Cobb 1994, Donovan 2001), interest group activity (Baumgartner and Jones 1993), intergovernmental influence (Karch 2010; McCann, Volden and Shipan 2012), focusing events
(Birkland 1998), the media (Colby and Cook 1998), and the public (Jacobs 1993). The majority of this research, however, has been conducted on one single policy arena, the national government, and often on issues not related to health. Focusing on the national government and its subsidiaries has limited our ability to evaluate how variations in the political system influence variations in attention allocation. While recent research on agenda setting has documented how differences in the basic structure of national governments shapes the general dynamics of public policy-making (Jones et al. 2009), we know less about how differences in the institutions and organization of governments shape attention allocation to common problems in time. In short, we know little about why governments allocate vastly different agenda space to common policy pressures and even less about the determinants of attention to health.

A comparative model of state agenda setting has implications for our understanding of how governments identify health policy problems and develop new policy solutions in the United States. Theories of federalism contend that decentralized policy-making encourages a “marketplace of ideas” as autonomous state governments develop new policies in response to locally severe problems (Oates 1999). Although we have developed a robust literature for modeling the spread of health policy innovations in the United States (Carter and LaPlant 1997; Shipan and Volden 2006; Pacheco 2012), we have only a limited understanding of how actively state governments engage in public health agenda setting prior to policy adoption. States may place health policy reforms on the agenda through committee hearings, floor resolutions and bill introductions for years before a state finally passes a formal law addressing an emerging health policy concern. The legislative proposals emerging from various states may reflect competing ways of defining and designing policy innovations well before governments converge on a preferred policy solution.
Extant research on national agenda setting has largely focused on longitudinal changes in problem definition shaped by shifts in disease burden or incidence to explain shifts in attention allocation. This orientation has often discounted the important roles that institutions and participants play in determining state level agenda setting. Health policymaking often involves difficult trade-offs between public health protection, economic productivity, and individual rights and responsibility. In these cases, health policymaking can be characterized by considerable political, social, and economic opposition both from elected officials, organized interests and the mass public, regardless of disease burden or prevalence.

This paper draws upon the 50 policy arenas of the American states to test how institutions, problem characteristics, and policy participants simultaneously influence government attention to public health problems. We integrate research from agenda setting and policy diffusion to understand the determinants of state level public health agenda setting in federalism. Drawing upon recent research on the horizontal and vertical diffusion of innovations (Karch 2010; Shipan and Volden 2006; McCann, Volden and Shipan 2012), we explore how federalism structures the allocation of public health policy making over time. Specifically, we evaluate three distinct paths of influence on state level agenda setting. We first explore paths of “top-down” diffusion, exploring whether agenda setting in Congress triggers similar agenda setting responses in the states. We then extend a classic expectation of diffusion of innovations research, exploring whether the allocation of legislative attention in one state leads to a change in the agenda setting behavior of neighboring governments. Finally, we explore paths of intergovernmental influence, extending research on presidential agenda setting to evaluate whether gubernatorial pressure leads to changes in legislative attention.
In addition to mapping the paths of intergovernmental influence, we also extend research on national agenda setting to understand how local variation in public health problem severity and interest group participation shapes the allocation of state level policy attention. As with prior research on the diffusion of innovations, our approach allows us to explore the external and internal determinants of state level agenda setting in the United States. Such a comparative orientation allows us to test a general theory about how geographic, temporal and institutional variations shape the allocation of state level political attention.

Our analyses differ from previous work in a number of ways. While other scholars have typically looked at state agendas at a few points in time (e.g., Lowery et al. 2011) or for a subset of states (e.g., Karch 2007), we draw upon a more extensive measure of state legislative attention over time. We collected comprehensive data on US state-level legislative agenda setting for all of the states over a period of twenty years, focusing specifically on state level bill introductions related to tobacco control and vaccine regulation from 1990 through 2010. These descriptive data are interesting in their own right, as they are the first to document the considerable differences in state agenda setting to these two critical public health problems over time.

Second, by including measures of state gubernatorial attention, neighboring state attention, and national attention, our research allows us to test theories of intergovernmental influence, both vertically (from the national government to the states) and horizontally (across state institutions or neighboring states) simultaneously, shedding light on how federalism itself structures the allocation of national and state level political attention. To our knowledge, we are the first to look at multiple sources of intergovernmental influence on state attention.

We find that horizontal intergovernmental influence has the strongest and most consistent influence over state attention to tobacco and vaccines. While national attention to tobacco or
vaccines also sparks attention in the states, the “top-down” effect is much smaller in magnitude to the “horizontal” impact of gubernatorial attention and neighboring state attention. We find some support that problem severity matters, however, these results are highly dependent on the measures used and the particular issue. Finally, we find less evidence that interest groups influence the attention states pay to tobacco or vaccines.

**Determinants of Attention Allocation**

There are countless issues on which policymakers can take action, ranging from budgetary decisions to same-sex marriage to foreign policy, yet the *agenda space*, the amount of time available for a particular issue, is incredibly limited. More fundamentally, for an underlying condition to achieve agenda space, government must recognize and define an emerging problem as appropriate for intervention (Sabatier and Jenkins’ Smith 1999). In the face of considerable constraints in time and resources, officials often engage in disproportionate information processing, selectively updating a majority of issues through incremental adjustment, while dedicating considerable resources to policy development on issues demanding urgent intervention (Jones and Baumgartner 2005). Other issues rise and fall on the formal agenda, receiving episodic attention as government responds to new dimensions of a policy problem (Downs 1972). Given these dynamics, many policy solutions receive limited if any attention from policymakers. The implications of non-attention are obvious; particular interests from the public, elites, or other important groups will be excluded from the political system if they do not receive government attention (Schattschneider 1960; Bachrach and Baratz 1962). As importantly, the scarcity of agenda space means that governments may dedicate only limited attention to emerging problems.
Why, then, do some issues receive more government attention compared to others? Research at the national level suggests a number of distinct mechanisms that drive governmental attention ranging from issue characteristics (Schneider and Ingram 1993), problem definition (Rochefort and Cobb 1994), and exogenous shocks (Kingdon 1995; Birkland 1998), as well as the pressure of organized interests (Baumgartner and Jones 1993) political leaders (Cox and McCubbins 2004; Beckmann 2010) and the public (Jacobs 1993). We draw upon these theories to identify discrete hypotheses for how variation in the structure of government, problem characteristics, and policy participants may trigger different state level agenda setting responses to common public health problems. Specifically, we focus on three distinct explanations of agenda setting including intergovernmental influence, issue saliency, and interest group activity.

*Intergovernmental Influence*

In a system of separated powers, perhaps one of the most important influences over attention is intergovernmental influence across branches or levels of government. We consider three types of intergovernmental influence including horizontal influence across branches of government, vertical influence from the national government to the states, and the diffusion of attention across neighboring states.

There is evidence at the national level that institutional agendas are linked in a horizontal fashion. Congress and the president are more likely to pay attention to civil rights issues after the Supreme Court has ruled on such cases (Fleming, Bohte, and Wood 1999). On the other hand, Congress tends to lead the way on environmental issues (Fleming et al. 1999), while the president influences Congressional attention to domestic issues, such as health care and education (Edwards and Wood 1999). The president is especially important in setting the policy
agenda because of his ability to focus attention on one particular topic and pressure other elected officials to make policy changes (Kingdon 1995; Baumgartner and Jones 1993).

We consider the link between gubernatorial and legislative agenda setting. In many states, the governor is the single most visible and powerful person in state governments (Rosenthal 1990; Beyle 2004). And, one of the major ways that governors influence state policy is by setting the agenda (Dometrius 1979). Formally, governors set the legislative agenda through the State of the State address to the legislature (Ferguson 2006) as well as calling special legislative sessions to address a particular topic. Informally, the governor’s power to persuade is much like the president; governors are the symbolic leader of the state, able to skillfully use the mass media with the help of an enormous staff (Morehouse and Jewell 2004). Consequently, we expect state legislatures will dedicate more agenda space to health issues when the governor deems health as important. (H1).

Federalism itself also shapes the agenda setting process in two distinct ways. First, there may be vertical diffusion of attention as national consideration of issues influences state level attention (a process called “top-down” influence) or vice versa (a process called “bottom-up” influence). Evidence suggests that, while there are various forms of attention linkage between the federal government and the states (see Lowery et al. 2011 for an overview), national attention tends to foster widespread consideration across the states (Karch 2007; Baumgartner et al. 2009, McCann, Shipan and Volden 2012). Karch (2010), for example, finds that national attention to

\footnote{It could be that governors follow the agenda setting of state legislatures or that under some conditions the governor leads while in others the legislature leads in attention allocation. Analyzing the determinants of gubernatorial attention and the interplay between the governor and the state legislature is beyond the scope of this paper.}
stem cell research from 1999-2008 measured via President Bush’s nationally televised addresses increased the probability that state officials introduced similar bills. Consequently, we expect for *states to spend more attention to health issues when the national government pays attention to health* (*H2*).

Second, federalism creates a system of policy learning as publics and elites are directly influenced by the actions of their geographic neighbors (Walker 1969). A consistent finding in the policy diffusion literature is that as the proportion of neighboring states adopts a policy, the probability of adoption in the home state also increases (e.g., Berry and Berry 1990). There is also evidence that state legislative attention is influenced by the legislative attention of neighboring states (Mintrom 1997). Indeed, officials often look to neighboring or nearby states to learn about policies for reasons of political and demographic similarity (Walker 1969; Berry & Berry 1990) and political networking (Mintrom & Vergari 1998). States are also most likely to compete economically with nearby states due to the mobility constraints of residents (Boehmke and Witmer 2004). Recent research suggests that residents in the home state directly learn about policies in neighboring states and then pressure their own officials to adopt similar policies (Pacheco 2012). All of this suggests that *states will spend more attention to health when neighboring states pay attention to health* (*H3*).

**Issue Saliency**

In addition to intergovernmental influence, problem characteristics also matter for attention allocation. Public perceptions of political problems evolve over time, and the changing nature of political problems influence why some specific policies are politically controversial and garner government’s attention, while others are consensual and virtually non-existent in the political realm. Researchers in public policy have noted how facets of the target population
(Schneider and Ingram 1993), the content of the issue, which affects the mobilization of constituencies, the public or elite understanding of the issue (McCombs and Shaw 1972), and objective conditions, such as problem severity (Best 1990). We focus on one issue characteristic: issue saliency.

Saliency has various conceptualizations and measures (Epstein and Segal 2000), however, for our purposes, saliency refers to the severity of a problem. At its most basic level, the severity of a problem (e.g., disease incidence or the cost of a problem) should be positively related to governmental attention. We would expect, for example, that as traffic related deaths increase, policymakers will shift their attention towards finding solutions to make it safer to drive. This clear expectation, however, has received mixed empirical support. Several researchers claim that empirical indicators of severity are unrelated to issue attention (e.g., Blumer 1971). For instance, Baumgartner and Jones (1993) find that problem severity is a poor predictor of governmental attention to drug and alcohol abuse. Many of the null effects, however, come from studies conducted at the national level using single case studies. Research using a comparative approach across time and issues suggests that empirical measures of severity influences attention. For instance, Armstrong et al. (2006) find that newspaper attention to specific diseases increased as the number of deaths from that disease increased. Other researchers have demonstrated that problem severity is an important stimulus leading state governments to adopt new policy innovations (Sapat 2004; Nice 1994). Consequently, we expect that states will allocate more intense attention to health when locally severe (H4).

By locally severe, we are referring to issue severity in a particular state, absent from national conditions. States vary tremendously on the severity of the problems they face due to differences in geography, culture, demographics, ideology, or other factors, which make them
unique from each other and the national government. Take immigration policy as an example. One explanation for why Southern states like Alabama, Georgia, and South Carolina have been so attentive to immigration policy in recent years is because these states have seen a sudden and sharp growth in their immigrant populations over the last two decades (Boushey and Luedtke 2011). We use the variation in problem severity in tobacco and vaccines across the states to explore the role that it has on governmental attention over time.

**Interest Groups**

Finally, policy participants influence governmental attention allocation. The importance of interest groups in drawing government attention to problems is well established at the national level. Indeed, the explicit aim of interest groups is to focus government and public attention to their specific problem (Best 1990). Interest groups can increase governmental attention through a variety of ways, such as by communicating to policymakers or the public through general advocacy activity (Caldeira and Wright 1988), mobilizing voters in response to a particular issue (Donovan 2001), and providing information to the media (Colby and Cook 1991; Armstrong et al. 2006), which influences how the public thinks about policies. Furthermore, research on interest group behavior in the United States suggests that organizations engage in strategic venue shopping, exploiting the multiple venues of government in the United States to secure policy change (Pralle 2003). And, there is evidence that the as the mobilization of interests change over time, so too does the likelihood that certain issues receive government attention. For instance, in times when the policy community is rife with political conflict and controversy, such as in the 1960s on nuclear power, governmental attention allocation is likely to increase (Baumgartner and Jones 1993). Therefore, we expect that *states with a large and more powerful interest group population operating within a given health area will allocate more attention to health (H5).*
Here, again, there is a vast amount of variation in interest group activity across the states. States vary in both the number and type of organized interests that are active (e.g., Lowery and Gray 1993; Gray and Lowery 1995; Goldstein and Bearman 1996). For instance, in 1994, 28% of the lobbyists in Pennsylvania were health related compared to 7% in Illinois (Goldstein and Bearman 1996); in 1980, Pennsylvania had 69 registered banking-interest groups, while Arkansas’s legislature registered only 11 (Lowery and Gray 1995). We expect for these state variations to translate into different patterns of governmental attention to health.

To summarize, we have five hypotheses about the determinants of state attention to health:

\[ H1: \text{State legislatures will dedicate more agenda space to health issues when the governor deems health as important.} \]

\[ H2: \text{States will spend more attention to health issues when the national government pays attention to health.} \]

\[ H3: \text{States will spend more attention to health when neighboring states pay attention to health.} \]

\[ H4: \text{States will allocate more intense attention on health when locally severe.} \]

\[ H5: \text{States with a large and more powerful interest group population operating within a given health area will allocate more attention to health.} \]

We test our hypotheses using a unique dataset on state agenda setting from 1990-2010 on two important public health issues, tobacco legislation and vaccine regulation, as we describe below.

**Data on State Attention Allocation to Tobacco and Vaccines**

To measure state attention, we collected data on the number of bills introduced in American state legislatures related to tobacco and immunization from 1990-2010 using the State
Bill Tracking database on Lexis Nexis State Capital.\(^2\) Employing bill introductions to assess legislative attention is common at the national level (e.g., Adler and Wilkerson 2010) as well as in the states (e.g., Baumgartner et al. 2009).

We chose to collect data on tobacco legislation and vaccine regulation for several empirical and theoretical reasons. First, states have primary jurisdiction across the entire timeframe on both issues, ensuring ample variation across states and time on attention allocation. For instance, while the FDA regulates and licenses all vaccines to ensure safety and effectiveness, and the National Vaccine Advisory Committee makes recommendations regarding vaccine coverage, the 50 states to have considerable autonomy to decide how to regulate who is vaccinated and for which diseases. Second, for both issues, we can clearly measure issue saliency using widely available public health data at the state level allowing us to test \(H4\). Third, interest group activity at the state level has been particularly high for both domains allowing us to test \(H5\). Tobacco remains a divisive issue in state politics, as tobacco manufacturers and distributors have a strong and vested interest in preventing strong tobacco regulation, while major public health advocates have organized to enact ever more restrictive tobacco legislation. Similarly, major pharmaceutical manufacturers and public health officials are active in immunization policy.

Finally, from a public health perspective, it is important to understand what influences state attention allocation to these two significant health issues. Cigarette smoking remains the

\(^2\) The database is maintained by LexisNexis, a division of Reed Elsevier Inc. and is available at http://web.lexis-nexis.com. The database contains bill synopses for each bill introduced by each state house in a calendar year. More details about our data collection methods, including keywords used and intercoder reliability can be found in the Supplemental Text.
single most preventable cause of death in the United States, responsible for more than 430,000 premature deaths each year including an estimated 53,800 people who die from exposure to SHS (Centers for Disease Control 2005). Cigarettes take its toll economically as well; smoking causes more avoidable illness and work absenteeism than any other behavior and accounts for 6-10% of all health care costs (Warner 2006). And, according to the CDC, cigarette smoking is estimated to be responsible for $193 billion in annual health-related economic losses in the United States. Immunizations, heralded as one of the 20th century’s most successful public-health achievements, protect both individuals and the larger population from serious illness and death (National Conference of State Legislatures 2011). Vaccines are responsible for the control of many infectious diseases that were once common, including polio, measles, diphtheria, pertussis, rubella, mumps, and tetanus (Centers for Disease Control and Prevention 2009). Even still, each year as many as 42,000 adults die and thousands more hospitalized from diseases that could be prevented by vaccination with the costs of treating these diseases exceeding $10 billion each year (Council of State Governments 2007). And, while rates of coverage among children are high, adult immunization rates continue to be stagnant or even decrease.


the number of tobacco related bills that were introduced in four select states in each region for each legislative session.  

[Figure 1 about here]

From Figure 1, there are clear regional differences in attention towards tobacco with the Northeast introducing more tobacco related bills compared to other regions, particularly the South. A closer look at Figure 1 reveals large variation in tobacco attention across states and legislative sessions. Some states, like Massachusetts and Illinois, allocate much more attention to tobacco compared to other states, like Colorado and Ohio. Similarly, some states (e.g., New York and Illinois) have increased their attention towards tobacco, others (e.g., Pennsylvania and Connecticut) have decreased their attention, particularly since the early 2000s, and still others (e.g., California and Texas) have generally been stable towards their attention to tobacco. The majority of the variance is between states (63%), however, 38% of the variance is within states suggesting that there are temporal differences across the states. Detailed descriptive information is available in Table S1 in the Supplemental Text.

We see a similar degree of heterogeneity with state attention to vaccines. As shown in Figure 2, the West generally introduces fewer vaccine related bills compared to other regions. Some states, such as New York and Texas, spend much more attention on vaccine regulation compared to other states, such as California and Ohio. Similarly, it appears that many states (e.g., Massachusetts and Washington) increased their attention towards vaccines since the 2000s, while other states (e.g., Alabama and Connecticut) show spikes in attention at certain times. The majority of variance in state attention to immunizations is between states (54%), however, there is still an ample amount of variance to be explained temporally (47%).

4 These states were selected for descriptive purposes only and are not to be exhaustive.
Analysis: Determinants of State Attention to Tobacco and Vaccines

To test our three hypotheses concerning intergovernmental influence, we include measures of gubernatorial, national, and neighboring state attention. Recall that $H_1$ suggests that states will spend more attention to health when governors see health as important. We measure gubernatorial attention to tobacco or vaccines using State of the State addresses (SOS).\textsuperscript{5} SOS addresses are similar to the president’s State of the Union address and are indicative of the governor’s top legislative priorities (Ferguson 2006). Given its relevance, SOS addresses have been used by a number of scholars as a valid way to measure the governor’s agenda across time and across governors (e.g., DiLeo 1997; Kousser and Phillips ND). For each speech, we coded whether tobacco or vaccines were mentioned in each year. We then averaged the number of mentions per legislative session so that our variable ranges from 0 to 1. For example, a value of .5 on this measure indicates that the governor mentioned a particular topic in one of the two years during a legislative session. Thirty-four percent of the governors mentioned tobacco and twenty-one percent mentioned vaccine regulation in their SOS addresses across the states spanning over 11 legislative sessions.

To test $H_2$, which suggests that states will pay more attention to health when the national government does, we measure Congressional attention to tobacco and vaccines over time using

\textsuperscript{5} In cases when SOS addresses were not given, we used the governor’s budget address. If the SOS and budget address were not given, we used the inaugural speech. Some speeches were given, but we could not find a record of such a speech (text or video) to code. In other instances, it was confirmed that no such SOS speech was given in a particular year. In both of these instances, the governor’s agenda variable is coded as missing.
the Policy Agendas Project data. Specifically, we include measures of the number of Congressional hearings focused on tobacco or vaccines across the 11 legislative sessions.

We include the average number of tobacco or vaccine-related bills introduced in neighboring states for each legislative session to test $H_3$. We add up all of the tobacco or vaccine related bills introduced in neighboring states and divide this value by the number of neighboring states. We expect the neighboring attention variable to be positively related to attention allocation to tobacco control and immunization.

To test whether states allocate more attention to health when problems are locally severe ($H_4$), we measure problem severity of tobacco and vaccine using various variables. For tobacco, we use two variables: the percentage of smokers in a state and the smoking attributable mortality rate (SAMR). We expect for states with a large number of smokers to pay more attention to tobacco simply because of the burden that smokers place on the state’s health and economy. This variable is time varying and taken from the CDC’s Behavioral Risk Factor Surveillance System (BRFSS). For SAMR, we measure the average annual number of deaths caused by

6 The data used here were originally collected by Frank R. Baumgartner and Bryan D. Jones, with the support of National Science Foundation grant numbers SBR 9320922 and 0111611, and were distributed through the Department of Government at the University of Texas at Austin. Neither NSF nor the original collectors of the data bear any responsibility for the analysis reported here.

7 For tobacco related hearings, we use the major topic code 341: Tobacco Abuse, Treatment and Education. For vaccine related hearings, we use major topic codes 331: Prevention, Communicable Diseases and Health Promotion, and 332: Infants and Children.
cigarette smoking for each state from 1997-2001. We expect for severity of tobacco to increase as the number of deaths by cigarette smoking increases.

For immunization, we measure three variables that we believe capture severity. First, we pool the rate of deaths per 100,000 caused by vaccine preventable diseases from 1999-2008 for each state, with the expectation that states with a high death rate will spend more attention to vaccines.\(^8\) Second, we measure the rate of immunization from two important age groups. For children, we measure the average percentage of children 19-35 months of age vaccinated across a variety of diseases including diphtheria, tetanus, and pertussis (DTaP), poliovirus, measles, mumps, and rubella (MMR), *Haemophilus influenza* type b (Hib), hepatitis B, and varicella (chickenpox) pooled from 1995-2009.\(^9\) For seniors, we measure the percentage of residents aged 65 years and older who report receiving a flu vaccine in the past year pooled from 1995-2010 using the BRFSS. Here, we expect that as states with high levels of immunization rates will pay attention to vaccines less as the threat of outbreaks decreases.

Finally, as stated by *H5*, we expect for states with large and more powerful interest group populations operating within a given health area to allocate more attention to health. The battle over tobacco control is primarily between the tobacco industry and health advocates, particularly

\(^8\) These data come from the CDC’s Wonder searchable database. Specifically, these diseases include viral hepatitis (B15-B19) and Influenza (J11, J11.1, and J09).

\(^9\) These data come for the National Immunization Survey. Specifically, we took the average percentage of children from 19-35 months of age who were administered 4 or more doses of DTAP, 3 or more doses of 3 or more doses of poliovirus vaccine, 1 or more doses of any MMR vaccine, 3 or more doses of Hib vaccine, 3 or more doses of HepB vaccine, and 1 or more doses of varicella vaccine.
since the 1990s (Givel and Glantz 2001). Consequently, we include four measures of state organized interests for the tobacco analyses: the ratio of the number of health (or tobacco) lobbyists in the state to the total number of registered lobbyists and whether health (or tobacco) interests were listed as one of the ten most effective lobbies within a state (coded as 2), one of the top 20 groups (coded as 1) or not mentioned. Together these variables capture the presence and perceived power of health and tobacco lobbyists compared to other organized interests in each state. These variables come directly from Shipan and Volden’s (2006) analysis of anti-smoking legislation and are non-time varying. For vaccines, we include the two variables on health lobbyists only. We expect for states to pay more attention to tobacco legislation or vaccine regulation in states where health organizations are present and powerful; similarly, we expect for states to pay less attention to tobacco control in states where tobacco organizations are present and powerful.

We also include various control variables that may influence state agenda setting separately from our hypotheses. These include state ideology and state partisanship, as measured

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10 Ideally we would have a comparable measure to capture the presence and power of the pharmaceutical interest groups however these variables are not, to our knowledge, available.

11 We recognize that our interest group variables are less than ideal and potentially outdated. At the same time, the Shipan and Volden data (2006) are the state of the art in terms of measuring interest group activity across the states on health-related issues. Creating new measures of interest group activity across the states and over time is an important endeavor, but beyond the scope of this manuscript.
by Pacheco (2011). In general, states with large numbers of liberals or Democrats are more likely to adopt health-related bills (e.g., Paul-Shaheen 1998; Kousser 2002). We expect similar results for state attention to tobacco and vaccines. Second, we include a measure of democratic strength with the typical expectation that states under Democratic control will be more likely to pay attention to health-related bills. This variable is the sum of percentages of state house and senate that are Democrats plus 100 if the governor is a Democrat (Bailey & Rom 2004). For the tobacco analyses, we include a dummy variable to indicate whether a state is a tobacco producer; tobacco producing states are less likely to pass smoking legislation. We also include Squire’s (2007) measure of legislative professionalism with the expectation that highly professionalized legislatures will introduce more bills. Finally, we include a counter variable for session to account for systemic influences on state attention that are not captured by the model.

12 An annual estimate was not available for the 2009-2010 session, so 2007-2008 estimates were included.

13 An annual estimate was not available for the 2009-2010 session, so 2007-2008 estimates were included.

14 We also included a squared version of the session variable. The squared version of the session variable was negative and statistically significant for both issues. The addition of the squared session variable causes the percentage smokers and SAMR to fail to reach statistical significance for tobacco (B= -.0006, p-value=.969, B=-.002 for the smokers variable, p-value=.298 for SAMR). The addition of the squared session variable causes the gubernatorial attention variable to fail to reach statistical significance for vaccines (B=.094, p-value=.15). All other conclusions are nearly identical.
The session counter also accounts for all election effects as well as any other annual level influences on state attention allocation to tobacco and vaccine (Lowery et al. 2011).

The dependent variables are count variables and analyses suggest the presence of overdispersion. Using Gaussian techniques for non-normally distributed data can lead to biased estimates of the regression parameters (King 1988). Correspondingly, we report results from a negative binomial regression with random effects. Results are shown in Table 1.

[Table 1 about here]

As shown in Table 1, there is moderate support for \( H1 \), which suggests that states will pay more attention to health when the governor deems health as important. Specifically, our analyses suggest that states are more likely to pay attention to tobacco when governors mention tobacco regulation in their SOS addresses. We see a similar result for vaccines; states are more likely to pay attention to vaccine regulation when the governor explicitly mentions immunizations in their SOS address. There is minimal support for \( H2 \), which suggests that states pay more attention to health when the national government does. As shown in Table 1, states are no more likely to pay attention to tobacco when the national government does. However, for vaccines, the national attention variable is significant suggesting that states are more likely to pay attention to vaccines when the national government does. Even still, the national government’s influence over state attention to vaccines is comparatively similar to that of the

\[ \text{Table 1 about here} \]

\( ^{15} \) The mean number of counts for tobacco is 28 with a variance of 557. The mean number of counts for vaccine regulation is 5.92 with a variance of 45.9.

\( ^{16} \) The negative binomial regression is preferable over the Poisson regression model because it does not assume that events are independent and allows for the variance to be greater than the mean (e.g., Long 1997).
Finally, there is strong empirical evidence that states pay more attention to health when neighboring states pay attention to health \((H3)\). In Table 1 for tobacco, states are more likely to pay attention to tobacco when neighboring states also pay attention to tobacco. And, we see a similar result with vaccine regulation.

There is moderate support that problem severity increases attention \((H4)\) to health across both issues. States are more likely to pay attention to tobacco as the percentage of smokers increases, but less likely as the SAMR increases. For vaccines, the percentage of children immunized is positively related to state attention. Across both issues, there is no empirical support for \(H5\), which suggests that states will pay more attention to health when that interest groups advocate strongly for health issues within the state. As shown in Table 1, the interest group variables are consistently not significant for both tobacco and vaccine regulation.

Other control variables conform to expectations; states are more likely to pay attention to tobacco legislation or vaccine regulation when there were many bills introduced in the previous section. States with a high percentage of Democrats or liberals are more likely to introduce health related legislation. Finally, highly professional legislatures are more likely to introduce bills related to tobacco or vaccine compared to those that are less professional. Democratic

\[\text{Using the negative binomial regression, the coefficient of gubernatorial attention to vaccines indicates that for a one unit increase in gubernatorial attention, there is .11 increase in the difference in the logs of the expected counts, keeping all other variables constant. The comparable effect for national attention is .002. However, the range for gubernatorial attention is 0 to 1, so the coefficient indicates the maximum effect. The maximum effect for national attention to vaccines is .108 (the maximum, } 54^* .002).\]
strength of the legislature does not matter when explaining state attention to emerging health issues.

**Conclusion**

Using an original dataset on state bill introductions on tobacco and vaccines from 1990-2010, we identify factors influencing the agenda setting process across the states on health. Our results suggest several novel things about agenda setting and public health policymaking in general. First, intergovernmental influence, particularly horizontal influence, is a driving force in determining attention allocation to health. When governors highlight public health problems in state of the state speeches, state legislatures respond with policy-making activity. Like the president, governors play a strong role in shaping and influencing state agenda setting. Given that gubernatorial power has increased over time (Beyle 2004), governors now play a prominent role in determining state attention allocation compared to 40 years ago. Governors who are highly popular or skilled at persuading legislative behavior may be particularly successful at pushing their agenda. This suggests that state public health officials concerned with slow legislative responses to disparate issues such as infectious disease control, obesity, or distracted driving should emphasize the importance of executive leadership in addressing the salience of public health policy problems.

We also find that attention allocation is shaped by the agenda setting activity of neighboring states. It is therefore not simply the act of policy adoption that triggers policy emulation and imitation, but rather an earlier process of legislative agenda setting. This suggests an interesting line of inquiry for future research, as scholars may wish to explore whether adopting and non-adopting states differ not only in the decision to enact legislation, but also in their agenda setting and problem definition activities. For policymakers, public health officials
may wish to pressure locally influential state governments to attend to emerging health problems. Our results suggest that such a concentrated effort could lead to a spillover of legislative attention in subsequent years.

The national agenda is also influential for state attention to health however we find that horizontal intergovernmental influence is stronger in magnitude compared to vertical intergovernmental influence. Identifying instances where vertical influence is particularly influential, for instance, on issues that are primarily the jurisdiction of the national government or when partisanship is shared between Congress and state legislatures, are interesting avenues for future research. Likewise, future research may look at how other federal signals shape state level attention allocation. Federal agencies administer grant programs, and often make direct policy recommendations to the states. Federal grants themselves are intended to induce state governments to direct policy attention to a specific area.

We find mixed empirical support that internal dynamics such as local problem severity drive attention to emerging health issues, echoing previous research at the national level. The inconsistency in our results may reflect the difficulty that policymakers have in identifying and deciphering appropriate indicators of population health. Here, future research may benefit from developing comparable measures of bureaucratic influence, since public health departments serve as a critical information source for policymakers. Some states, with highly professionalized public health departments, may be particularly successful at informing policymakers about emerging health problems and focusing the agenda to these problems.

We find no evidence that interest groups influence attention allocation to tobacco or vaccines. These results may be a function of the limited measures available to capture interest group activity in the American states. While we are able to capture the presence and power of
the tobacco and health industries within states, our measures are static. Therefore, we are unable to pick up meaningful changes in interest group activity, which may have an impact over time on state attention. We also are unable to locate comparable measures of pharmaceutical groups, which may be particularly important for attention to vaccines. Future research would benefit from more detailed measures of interest group activity across states and time.

In addition, our control variables point to other factors that drive state level attention to emerging public health problems. For example, state legislative professionalism is strongly associated with state level attention to immunization policy, suggesting that legislative expertise may play an underappreciated role in problem recognition. We also find some evidence that state partisanship may shape preferences for public health agenda setting. More democratic states are likely to dedicate more attention to public health policy, although this finding is especially strong for tobacco regulation.

Empirical analyses of other policies would help further determine what influences attention allocation. To this end, scholars can benefit from taking advantage of the longitudinal variation in attention allocation across the states, as we have done in this paper. In this regard, our data collection effort serves as a template for scholars interested in state attention on other important policy areas. Finally, while the current study explores the determinants of agenda intensity over time, it does not capture changes in the underlying policy alternatives considered by state governments from one year to the next. Future research could add to our understanding of state level agenda setting dynamics by exploring variation, not just in the intensity of attention as we have done here, but also in the range and content of public health policy alternatives over time.
Works Cited


Beckmann, Mathew. *Pushing the Agenda*. Cambridge University Press


National Conference of State Legislatures. 2011. “Immunizations.” Available at: 


### Table 1 Negative Binomial Regression Models Predicting State Attention Allocation to Tobacco and Vaccines 1990-2010

<table>
<thead>
<tr>
<th>Intergovernmental Influence (H1, H2, and H3)</th>
<th>Intergovernmental Influence (H1, H2, and H3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gubernatorial Attention to Tobacco (t)</td>
<td>Gubernatorial Attention to Vaccines (t)</td>
</tr>
<tr>
<td>.20 ***</td>
<td>.11 *</td>
</tr>
<tr>
<td>(.04)</td>
<td>(.07)</td>
</tr>
<tr>
<td>National Attention to Tobacco (t)</td>
<td>National Attention to Vaccines (t)</td>
</tr>
<tr>
<td>-.001</td>
<td>.002 *</td>
</tr>
<tr>
<td>(.003)</td>
<td>(.002)</td>
</tr>
<tr>
<td>Neighboring State Attention to Tobacco (t)</td>
<td>Neighboring State Attention to Vaccines (t)</td>
</tr>
<tr>
<td>.02 ***</td>
<td>.04 **</td>
</tr>
<tr>
<td>(.004)</td>
<td>(.02)</td>
</tr>
<tr>
<td>Issue Saliency (H4)</td>
<td>Issue Saliency (H4)</td>
</tr>
<tr>
<td>Percent Smokers (t)</td>
<td>Percent Aged 19-35 Months Immunized for Various Childhood Diseases</td>
</tr>
<tr>
<td>.06 ***</td>
<td>.04 *</td>
</tr>
<tr>
<td>(.01)</td>
<td>(.02)</td>
</tr>
<tr>
<td>Smoking Attributable Mortality Rate</td>
<td>Percent Aged 65+ Immunized for the Flu</td>
</tr>
<tr>
<td>- .01 **</td>
<td>-.02</td>
</tr>
<tr>
<td>(.002)</td>
<td>(.02)</td>
</tr>
<tr>
<td>Death Rate of Vaccine Preventable Diseases</td>
<td>- .01</td>
</tr>
</tbody>
</table>

| Interest Groups (H5)                        | Interest Groups (H5)                        |
| Power Tobacco Lobbyists                     | Power Health Lobbyists                      |
| -.13                                        | .06                                         |
| (.15)                                       | (.09)                                       |
| Power Health Lobbyists                      | Ratio Tobacco Lobbyists                     |
| .07                                         | -5.05                                       |
| (.08)                                       | (7.35)                                      |
| Ratio Tobacco Lobbyists                     | Ratio Health Lobbyists                      |
| -5.05                                       | -.43                                        |
| (7.35)                                      | (1.22)                                      |
| Tobacco State                               | Democratic Strength                        |
| -.13                                        | -.0003                                      |
| (.14)                                       | (.004)                                      |
| Democratic Strength                         | Legislative Professionalism                 |
| -.0003                                      | .98 *                                       |
| (.004)                                      | (.51)                                       |
| Legislative Professionalism                 | Session Counter                             |
| .98 *                                       | .07 ***                                     |
| (.51)                                       | (.01)                                       |
| Session Counter                             | Constant                                   |
| .07 ***                                     | .77                                         |
| (.01)                                       | (.59)                                       |
| Constant                                    | Constant                                   |

| Control Variables                           | Control Variables                           |
| Percent Democrat (t)                        | Percent Democrat (t)                       |
| .03 ***                                     | .02 *                                       |
| (.01)                                       | (.01)                                       |
| Percent Liberal (t)                         | Percent Liberal (t)                        |
| -.01                                        | -.01                                        |
| (.01)                                       | (.02)                                       |
| Tobacco State                               | Democratic Strength                        |
| -.13                                        | -.0003                                      |
| (.14)                                       | (.004)                                      |
| Democratic Strength                         | Legislative Professionalism                 |
| -.0003                                      | .98 *                                       |
| (.004)                                      | (.51)                                       |
| Legislative Professionalism                 | Session Counter                             |
| .98 *                                       | .07 ***                                     |
| (.51)                                       | (.01)                                       |
| Session Counter                             | Constant                                   |
| .07 ***                                     | .77                                         |
| (.01)                                       | (.59)                                       |
| Constant                                    | Constant                                   |

Note: All specifications employ random effects. *p<.10,**p<.05, ***p<.001 with a two tailed test. Standard errors are shown in parentheses.
Figure 1 Number of Tobacco Related Bills Introduced By State Legislative Session

Northeast

South

West

Midwest

Legend:

PA
NY
MA
CT
AL
FL
TX
VA
CA
AZ
WA
CO
IL
MN
OH
MI
Figure 2 Number of Vaccine Related Bills Introduced by State Legislative Session

Northeast

South

West

Midwest

[Graph showing the number of vaccine-related bills introduced by state legislative session for different regions, with states indicated by lines of different styles and colors.]