ANTICIPATORY POLICYMAKING:
WHEN GOVERNMENT ACTS TO PREVENT PROBLEMS AND WHY IT IS SO HARD

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by
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ABSTRACT OF DISSERTATION

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ABSTRACT

Public policy analysts and political pundits alike tend to describe the policymaking process as a purely reactive sequence in which government develops solutions for clearly evident and identifiable social problems. While this depiction holds true in many cases, it fails to account for instances in which public policy is enacted in anticipation of a potential future problem. Whereas traditional policy concerns manifest themselves through ongoing harms and ills, “anticipatory problems” are projected to occur sometime in the future, and it is the prospect of their catastrophic impact that generates intense speculation in the present. This thesis sets out to answer the following questions: What kinds of issues on the contemporary scene fall into this category of “anticipatory”? What are the means by which such issues gain entrance onto the agenda, what forms of political conflict are they associated with, what kinds of policy actions do they prompt, and how are those policies implemented? Finally, to what extent can key patterns of anticipatory policymaking be recognized as distinctive from activity in other areas of public policy development? Three substantive topics will be analyzed in depth, from the initiation to conclusion of the policy cycle: (1) nanotechnology; (2) the H5N1 avian influenza; and (3) global warming. All are important issues with possible ramifications not only for the United States, but for other members of the international community as well. A concluding chapter also explores the role of anticipation as a tool in the continuing effort to “reinvent,” or improve, the performance of government.
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On April 14, 2010, several thousand men and women descended on historic Boston Common in protest of what they called a government “spending spree” as well as the looming threat of tax increases (Qtd. in Finucane and Schweitzer 2010, para. 1). This rally represented the latest in an ongoing series of nationwide public demonstrations spearheaded by the Tea Party, a populist political movement calling for smaller government and lower taxes along with a host of other targeted legislative initiatives, such as repealing the 2010 health care system overhaul (Finucane and Schweitzer 2010). While polls have demonstrated that Tea Party supporters are overwhelmingly Republican (according to one, nearly 77% of the Tea Party’s membership voted for McCain in 2008), many of the movement’s leading members have indicated the Tea Party is critical of government in general and should not be construed as a purely partisan attack on the Obama Administration (Brown 2010).

The Boston rally culminated with a 21-minute speech by former Republican Vice Presidential Candidate Sarah Palin, who for several months had been on a tour—the “Tea Party Express”—touting the movement’s anti-government platform. “Americans now spend 100 days out of the year working for government before we even start working for ourselves,” Palin decried, in an attempt to evoke the same anti-government fervor that had spawned the original Boston Tea Party in 1773. “It is time to remind [elected officials] that government should be working for us, we should not have to work for government. That is why there are more and more Patriots every day standing up and speaking out” (Qtd. in Finucane and Schweitzer 2010, para. 2).

The populist undercurrents that led to formation of the Tea Party movement are, in many ways, as old as the country itself. Steps away from the site of the 2010 rally, Charles Sprague, a participant in the original Tea Party and a soldier in the Revolutionary War, lies at rest in Boston’s Central Burying Ground. Sprague and his fellow revolutionaries had rallied against what they saw as
a broken system of governance marked by autocratic rule and, most importantly, taxation without representation. At its core, the Revolution was fueled by a commonly held belief that individuals maintain an inalienable right to protest—and dissolve—governing regimes that fail to act in the interest of those represented (Lewis 2012).

Recent research suggests current discontent with government transcends the Tea Party Movement. An October 25, 2011, *New York Times/CBS News* Poll documented pervasive distrust and discontent with government. The poll revealed that 89% of Americans distrust government to do the right thing and 74% said the country was on the wrong track. President Obama also suffered from a negative approval rating of 46%, while the Congressional approval rating reached a new low at 9% (Zeleny and Thee-Brenan 2011). Commenting on the poll, Paulette Delgadillo, a self-employed decorator from Tempe, Arizona, indicated: “Probably the government in Washington could be trusted at one time but now it seems like it’s a game of who wins rather than what’s best for the people” (para. 20).

Most who follow the American political scene recognize that discontent with government ebbs and flows over time. It is exceedingly rare for Americans to register overwhelming confidence in their government and its priorities. The current uptick in discontent is not surprising given the dire state of the economy. There are, however, perceived government limitations that transcend this current moment of discontent. Indeed, certain problems are assumed to be inherent in the very structure or system of government. Central to this perspective is the complaint that American government is primarily *reactive*.

The reactive assumption, like so many others about our system of government and the problems and issues it deals with, is often communicated by means of a narrative or story. This “reactivity narrative” holds that government tends to wait for policy issues to develop into large scale—and often costly—problems before addressing them. A more logical approach, critics argue,
would be for policymakers to act quickly with countermeasures or, better yet, anticipate or prevent problems before they occur, saving both precious resources and, in some instances, lives. Thus, government should embrace a proactive approach to policymaking, as opposed to simply responding to issues after they have emerged and blossomed into significant ills. This notion that a proactive approach is somehow superior is only reinforced by the high esteem Americans hold for private sector enterprises, which are perpetually “looking ahead” as a way to achieve a strategic advantage. Government, it seems, is only adept at cleaning up society’s problems and, even in this regard, Americans are skeptical about its abilities.

A simple Internet search of the terms “reactive government,” “reactive policymaking,” or “reactive Congress” suggests the pervasiveness of this narrative in popular depictions of government. Scholars, journalists, former and present government officials, and miscellaneous bloggers have all lamented government’s reactive disposition. Often, the situation is portrayed as evidence of a stifling or prohibitive trait that hinders government’s very ability to solve complex policy problems.

Perhaps no event did more to elevate this concern than the attack of September 11, 2001. Although the federal government was criticized on a number of grounds, one of the most prominent critiques held that intelligence agencies failed to anticipate and prevent this national tragedy despite an abundance of indicators that an attack was imminent. As Donald Kettl (2007) points out, the proverbial “take away” lesson of September 11 for policymakers looking to construct a 21st century homeland security infrastructure is that security would require both prevention—future attacks would have to be anticipated and stopped—and response—in the event that the uncertain did occur, government would have to react swiftly and effectively. Writes Kettl:

[The Bush Administration] sought prevention: to do everything possible to ensure that those who might launch such attacks were stopped before they could try. But they also needed to strengthen response: to do everything possible, should an attack occur, to minimize injuries, the loss of life, and damage to property. Administration officials
knew that although any attack was unacceptable, total protection was impossible. The terrorists had proved that they were cunning strategists who worked hard to identify and exploit points of vulnerability. Officials also were aware that they needed to strengthen the system’s response. But that would matter only if the prevention strategy failed, and they did not want to talk publicly about the possibility. Officials thus needed to maximize their ability to respond while doing everything possible to prevent attacks in the first place. (p. 8)

While the federal government’s capacity to respond to natural or man-made crises certainly requires strengthening (these deficiencies were again highlighted by Hurricane Katrina), much of the post-9/11 debate has focused on providing government with the means to anticipate. Indeed, anticipation sometimes seems a novel construct that only truly became the centerpiece of government reform efforts due to national tragedy. Calls for greater “prevention,” “anticipation,” “foresight,” and “proactiveness” abounded in the wake of 9/11. For example, in presenting a menu of options for Congress to consider its revision of aviation security policy, the Congressional Research Service (CRS) explicitly integrated anticipation into the methodology it used to evaluate various policy options. One of CRS’s five evaluative criteria asked: “Is the national strategy for aviation security forward-looking, or does it perpetuate a reactive approach to strategic security planning in the aviation domain?” (Elias 2008, p. 21). Summarizing the claims of those who criticized the current aviation security standard, CRS writes: “Critics argue that reacting to single events is near-sighted and goes against the very purpose of developing strategies and plans in the first place, which is to be proactive in assessing threats and directing resources to mitigate associated risks” (p. 21). Here, then, is a clear normative preference toward anticipation, or being forward-thinking, reflecting an assumption that the existing aviation security domain is reactive and thus not prepared to deal with future terrorist threats.

Countless variations of this same narrative now exist in other domains. In “Making Data Breach Prevention a Matter of Policy,” Chris Sullivan, vice president of customer solutions at Courion, an identity access and management company, lamented the “reactive model” of data
breach prevention adopted by many organizations and perpetuated by government policy. Sullivan summarized this faulty model as entailing three broad steps: “Step 1—Wait for a breach to occur, hoping it doesn’t happen to you organization; Step 2—Get breached and notify consumers; Step 3—Get money and get focused post-breached, and try to catch up and fix the problem” (Sullivan 2008, para. 3). While data-breach prevention is in many ways a problem for individual organizations to deal with, Sullivan noted that the breach notification laws adopted by government are a far cry from preventive and actually serve to reinforce the reactive model. And, in fact, he reports that recent studies demonstrate notification statutes have not reduced identity theft.

A June, 2010, report issued by the Institute of Medicine charged that the Food and Drug Administration is “too often caught flat-footed when problems arise” and the agency should devote greater resources toward preventing illness, as opposed to simply responding to outbreaks. Although the panel proposed a number of structural reforms that might facilitate a more prospective approach, such a change would ultimately require “a cultural change, a different way of doing business,” stated the study’s main author, Dr. Robert Wallace of the University of Iowa’s College of Public Health (Qtd. in Zajac 2010, para. 2).

One of the clearest and most concise statements of this perspective can be found not in a public affairs monthly or a scholarly journal, but on the Blogosphere. While only the sentiments of an individual blogger, an individual writing under the anonymous moniker “Carltonwelsh” (2010) succinctly echoes the same attacks levied against the FDA, aviation security industry, and identify theft prevention infrastructure. States Carltonwelsh in his or her personal weblog “For What It’s Worth”:

The American federal government is reactive (para. 1)…

The vast majority of the legislation passed by our Congress is to handle problems already arisen. Very little is ever done as a preventative measure before things go wrong. That would be a proactive approach and our leaders do not seem to understand what that might mean. Take the case of Katrina:
the Bureau in charge of Emergency Management did not manage anything. After Katrina hit, they started wheels in motion to do a “recovery”… mainly by throwing money at the problem (resulting in the usual misuse of millions of dollars… hey, but what’s new?) (para. 3)

I would suppose about 99% of the legislation belched out of Congress is of the reactionary sort, attempting to solve problems already arisen. And the other 1%? Not proactive, I am afraid. That last 1% is the plethora of ornamental laws like “the official aquatic lifeform of the nation” or what sporting events should begin with the national anthem.

I would prefer a government that lived within a budget and with a proactionary posture (2010, para. 6-7).

No doubt the argument against government reactivity is, to a great extent, accurate. Any democratic system wherein elected officials are supposed to deliberate, consider, and represent the disparate interests of the governed is going to be largely reactive. Moreover, contemporary government must address a seemingly endless list of manifest issues, ranging from house fires to homelessness, shootings to sexual harassment, “pot-holes” to prescription drug approval. It is more than a full-time job keeping up with these problem solving demands.

By contrast, American companies and economists have long touted the strategic advantage gained by anticipating and acting on emerging economic trends. In their quest to turn a profit, private firms continuously forecast the future and gauge shifts in interest and culture, which are then used to inform areas of investment. Even as these scions of business complain about the growth of capacity in the public sector, they contrast government unfavorably with the lean, forward-thinking model of business organization. In sum, the private sector is presented as the public sector’s converse—private companies are inherently proactive, government is reactive.

Few would argue that the public sector is—or ever will be—as proactive, forward thinking, and entrepreneurial as the private sector. Yet the notion that government is purely reactive is far from true. In fact, government—be it at the local, state, or federal level—has, from time to time, made deliberate efforts to shift focus, even in some of the policy areas just mentioned.
Consider the homeless policy domain, which is regulated by a number of programs that aim to prevent individuals and families from losing their homes in the event of economic misfortune. As an example, the Massachusetts’ Residential Assistance for Family in Transition (RAFT) program provides families deemed “at-risk” of homelessness with upwards of $3,000 to be used for a variety of housing related needs, including rent payments and arrearages, utility bills, first/last month’s rent, and even transportation to and from work. By helping at-risk families in the present, policymakers believe they can prevent future instances of homelessness (DeLeo et al 2009).

In the healthcare field, “preventative medicine” has been a hallmark of nearly every proposed reform of the past 25 years, including President Obama’s recently enacted health care overhaul. The logic is simple: many diseases and ailments grow worse when left untreated. The worse these types of sickness become, the more they necessitate advanced costly treatment. Moreover, many of these same diseases and ailments are quite treatable if caught early. Thus government can save money by encouraging the practice of preventative medicine in order to respond to these ailments early on, instead of waiting for them develop into serious health problems demanding emergency medical intervention or chronic care (Pickert 2009; “Affordable Care Act…” 2012; American Board of Preventative Medicine 2012).

Neither of these examples constitutes anticipation in a pure sense. Homeless prevention programs and preventative medicine may be considered learned responses to problems that have long plagued society and are highly foreseeable. Put differently, they demonstrate that government policy often follows some sort of hybrid behavior wherein prevention and response are melded into a combined response to social problems.

However, one can point to stronger examples of government’s anticipatory capacity. Take the now-defunct federal Office of Technology Assessment (OTA). OTA was created through the Technology Assessment Act of 1972 to provide Congress with objective analysis of scientific and
technological change. As part of its mission, OTA was responsible for providing foresight, or early alerts, regarding new developments that could impact federal policy. OTA was far more than simply a research arm of Congress. It was a means for the institution to forecast changes and developments, especially emerging technologies, and, at least in theory, allowed Congress to enact policy change in anticipation of these events. OTA published more than 750 studies, covering topics from health care to global climate change, polygraphs to acid rain (Epstein 2009; “Technology Assessment…” 2012; “The OTA Legacy” 2012).

An even more compelling example is the Congressional Clearinghouse for the Future, established in 1976 by members of Congress who wanted to integrate greater prescience into the policymaking process. The Congressional Clearinghouse for the Future was a Legislative Service Organization (LSO), which meant that interested members had to pool resources and time in order to support the entity. At one time, the Clearinghouse enjoyed a bipartisan membership of more than 100 members from both House and Senate. The Clearinghouse actually proposed three separate pieces of legislation, including the “Critical Trends Assessment Act,” which sought to establish a permanent agency within the Executive Branch responsible for long term planning; the “Global Resources, Environment and Population Act,” which would have established an interagency council to coordinate national planning for population and demographic change; and the “Cost-Conscious Congress” initiative, which would require executive agencies to conform to the Carter Administration’s “Global 2000 Report,” a multi-year study of the future implications of world population, natural resources, and environmental trends (Woodrow Wilson International Center for Scholars 2002). None of these initiatives was able to mobilize the support needed for passage and died in the committee setting. Moreover, both OTA and the Clearinghouse were created during the 1970s, a period marked by noticeable interest in forecasting and assessment (Bezold 2006; Cobb and
Rixford 1998). This interest in forecasting eventually waned and neither of these entities survived to the new century.

Anticipation has also played a significant role in the environmental field. Policymakers have set out to identify and respond to “emerging contaminants,” or “potentially toxic substances whose effects or presence are poorly known, often because these chemicals have only begun to enter the human water or food supply” (Hove 2007, para. 3). By identifying potentially harmful contaminants early, policymakers hope to move away from their traditional reactive mode of responding to dangerous chemicals and pollutants only after they have caused human harm or environmental degradation. Called the “New Front on the Fight for Clean Water,” this shift in focus has prompted agencies at both the federal and state levels to convene workgroups and devote resources to identify and anticipate future environmental and health hazards (Hove 2007). Among these efforts was the Emerging Contaminants Workgroup in Massachusetts, which cited nanotechnology as an emerging contaminant that demands immediate study and investigation (Massachusetts Department of Environmental Protection 2012).

These examples all speak to the willingness and capacity of government to anticipate, even if such efforts have been the exception, not the norm. Yet the assumption that government is purely reactive is so pervasive it even permeates the discipline devoted to studying government. Herein lies the impetus for the current study. While it is far beyond the scope of this work to encompass the political science discipline in its entirety, I focus my attention on a distinct subfield, public policy studies. Colebach (2006) implicitly summarized the public policy subfield’s tendency to depict policymaking as reactive enterprise when he wrote: “The dominant paradigm in texts on policy practice sees the policy process as an exercise in informed problem-solving: a problem is identified, data is collected, the problem is analyzed and advice is given to the policymaker, who makes a decision which is then implemented” (p. 309). He adds that the “textbook account” of the policy
process assumes the policymaking process leads to a “known and intended outcome: it is a collective attempt to construct a policy in order to address some evident problem” (p. 311). Thus the public policy paradigm sees the policymaking process largely as a reaction to known or evident problems. Once these problems are identified, a series of steps is set in motion toward some sort of known outcome—presumably the enactment and eventual implementation of a statute (Jones 1984).

My intent is not to refute this model (at least not initially). Instead, I define and describe a distinctive “type” of policy problem called “anticipatory.” Anticipatory problems are distinctive in that they necessitate policymakers enact policy change in anticipation of a future problem. In other words, policy change must precede the problem. At the time of government action, anticipatory problems will not have caused any significant tangible harm to human health, the economy, the environment, or society in general. They do, however, threaten to cause devastating, if not catastrophic, harms in either the immediate or long-term future. Equally important, these problems are marked by tremendous uncertainty, as policymakers may or may not know how, when, if, and/or to what extent they will occur. In some cases, they may not even know what to look for as symptoms or signs of a problem, only that a very real problem could exist sometime in the future.

To examine this pattern of policymaking, I will review three case studies. In each case, policy change is pursued in anticipation of a potential or likely problem. My investigation begins with nanotechnology. Nanotechnology, which refers to the manipulation of matter at a subatomic level, has been heralded as arguably the most revolutionary technology of the 21st Century. Nanotechnology is a broad designation that denotes a wide array of technologies in computing, energy production and transmission, health care, agriculture, national security, materials, physics, and other fields. It promises to provide humankind with a plethora of new and improved products, such as improved drug delivery systems, stronger building materials, longer lasting batteries, and lighter but more protective athletic equipment, to name a few. Yet for all nanotechnology’s promise, the
hopes of scientists and policymakers alike are tempered by concern that this potentially revolutionary technology may also pose unforeseen and unexpected risks. At present, there is little consensus as to what those risks may be, but experiences with previous technologies (e.g., nuclear power, chemical pesticides, petrochemical-based plastics, genetically modified organisms) leave no doubt that some will emerge. Therefore, a concerted movement is afoot, largely supported by federal funding and institutional support, to identify these potential health and environmental risks, as well as the potential social implications of this technology, before they have even occurred. Thus, the nanotechnology case underscores the importance of forecasting—the act of identifying a potential condition before it manifests itself as an event—as a mechanism for anticipating potential policy problems.

My second example of anticipatory policymaking will be the H5N1 avian influenza case. Not to be confused with the H1N1 influenza or swine flu, H5N1 avian influenza, commonly referred to as “avian” or “bird flu,” was, as implied by its name, an avian-born influenza virus that first emerged in 1997 in fowl populations in the Guangdong Province, China. Less than a year after the Guangdong outbreak, H5N1 influenza infected and sickened 18 Chinese citizens. Six cases were fatal. At least within the international public health community, the presence of a potentially lethal virus capable of infecting both human and animal populations represented a significant public policy problem, and indeed one worthy of government attention and action. However, from a public policy perspective, and indeed from the perspective of American policymakers, the true source of anxiety—the “real” problem at hand—was not simply the sporadic infection of citizens, but the possibility this virus might undergo a mutation making it capable of airborne transmissibility. This would mean H5N1 could be spread via a sneeze or cough, like any other seasonal influenza virus. Such a mutation, it was feared, would spark a global pandemic infecting and perhaps even killing millions of people worldwide. These extraordinarily dire predictions reflected the fact that H5N1
was essentially a novel virus for which humans had no natural immunity. In the face of these concerns, federal policymakers enacted sweeping preparedness plans, allocating billions of dollars toward readying the nation for pandemic H5N1 influenza.

The final case in this thesis will explore the policy dynamics associated with global warming. As early as 1904, when Swedish scientist Svante Arrhenius suggested that minor changes in atmospheric temperature might be caused by Western industries, scientists have raised concerns about the potential implications of global warming and climate change. Beginning in the 1980s, a political movement crystallized aiming at both increasing awareness of climate change and advocating for substantive government regulation of greenhouse gases, the alleged cause of the rise in the Earth’s temperature. Since then, the global warming debate has become a mainstay on the American political landscape, with both major parties staking out positions on this controversial policy issue. This study focuses most of its attention on one aspect of this most engrossing case. Specifically, climatologists have warned of an approaching “tipping point”—a juncture at which global climate change permanently enters a stable and irreversible state. The advent of this so-called tipping point would be expected to result in permanent changes in the environment, leading to extreme climate fluctuations and weather patterns potentially having catastrophic implications for mankind. This event has yet to happen, but policymakers have taken measures to prevent its emergence. This study focuses on the policy debate surrounding these efforts.

The organization of my dissertation is as follows. In Chapter 2, a basic framework for studying anticipatory problems and policymaking is presented. This thesis melds two distinct but interrelated streams of public policy literature. The first stream encompasses the literature on policy typologies, a conceptual device used to classify and distinguish different categories of public policies. Policy typologies are founded on the assumption that policy issues can be qualitatively different from one another and engender distinctive patterns of political development and resolution. By
categorizing policies, then, scholars are able to make causal inferences as to the likely policymaking dynamics—the nature of the conflict, relevant institutional actors, and public salience—associated with each type. This study sets out to present anticipatory policy as a new policy type.

The second stream of literature describes policymaking as a cyclical process marked by a number of distinct but often overlapping stages. Each stage represents an important step in the evolution of a policy problem and necessitates that government perform different functions, ranging from the identification and definition of social problems to the drafting and adoption of laws, to the implementation and evaluation of substantive policy outputs. As such, each stage focuses our attention on a different set of actors, institutions, and norms. In order to provide a comprehensive understanding of the distinctive policymaking dynamics associated with anticipatory policy problems, this thesis examines anticipatory policy problems across the entirety of their life cycle.

With this conceptual structure in place, Chapters 3, 4, and 5 cover the three cases of nanotechnology, avian influenza, and global warming. All of the cases represent classic examples of anticipatory problems in that they examine instances wherein the underlying source of concern—the underlying policy “problem”—has yet to occur. Thus, in each instance, policymakers are compelled to proactively fashion legislation in order to stave off, or at least prepare, for a future threat.

Chapter 6 closes by highlighting the distinctive features of anticipatory policymaking, paying particularly close attention to its implications for contemporary theories of policy change. To what extent does anticipatory policymaking differ from reactive policymaking? Does the fact that problems have yet to occur create special policymaking patterns throughout the various stages of the policymaking cycle? What does anticipatory policymaking reveal about the utility of extant models of policy change? These are the kinds of overarching questions that will be formally addressed based on my case studies.
Contrary to popular belief and scholarly assumption, policymaking can be and often is a proactive process. Environmental threats, new technologies, and emerging diseases are but a sampling of the public problems that we can anticipate. Scores of contemporary society’s most pressing problems dictate an anticipatory policymaking process. With this in mind, the following study represents a modest effort to illustrate the distinctive political and policymaking dynamics associated with anticipation.
Chapter 2
Toward an Anticipatory Policy Type

This study proposes to identify a specific type of policy issue—the anticipatory policy problem—that is made distinctive by both its objective features and the policymaking pattern it engenders. Analysis of this subject requires familiarity with two distinct yet highly interrelated strands of public policy literature. The first concerns the logic of policy types and typologies, which can be traced to the seminal work of Theodore Lowi in the 1960s and 1970s. Policy typologies are founded on the notion that certain policy issues entail features that make them objectively discernible from other issues. Such features refer not only to the descriptive characteristics of the issue, but also the very nature or pattern of political conflict that tends to arise during decision-making.

The second stream of literature approaches the policymaking process as a cycle, beginning with identification and definition of a social concern and continuing through to the implementation and evaluation of outputs. The latter are the policies created to address the original condition or concern. The policymaking cycle depicts policymaking as a continuous process, although contemporary scholarship tends to distinguish between different “stages” in the cycle. Each stage underscores a particular policymaking activity ranging from the identification and definition of social problems to the implementation and evaluation of existing statutes. The policymaking cycle rejects the notion that public policymaking is solely a legislative exercise, instead highlighting the multiplicity of activities involved in transforming social concerns into government intervention and action. What is more, each stage offers new opportunities for organized interests to promote or stunt policy change, further substantiating the contention that we cannot “boilerplate” our understanding of the policy process as simply a series of voting decisions by lawmakers. Dividing the cycle into distinct but interrelated stages allows scholars to conceptualize policymaking as an evolutionary process and provides a powerful framework for organizing and abstracting the
complexities of political conflict. In this study, the policy cycle represents a means for elucidating and structuring my discussion of the policymaking pattern evidenced in response to anticipatory problems.

**Anticipation and the Policy Process**

The concept of anticipation is hardly foreign to political science. Examples of subfields that have applied the concept of anticipation include organization studies, most notably the work on High Reliability Organizations (HROs) (Sagan 1993; Weick and Sutcliffe 2007; Roberts 2009; Perrow 1990), international relations (McCelland 1977); decision theory, especially game theoretic and rational choice models (Morrow 1994; McCarty and Meirowitz 2007); and disaster management, an interdisciplinary field that draws heavily from political science (Possekel 1999; Wildavsky 1988; Morone and Woodhouse 1988). In addition, scholarship in the interdisciplinary fields of “futurism” (Toffler 1970; Bezold 1978), and science and technology studies (Barden, et. al. 2008; Guston and Sarewitz 2002; Karin and Guston 2010), have offered models of anticipatory governance that, broadly speaking, seek greater government foresight while promoting public discourse on thinking about emerging technological innovations.

While the concept of anticipation has certainly not figured prominently into extant theories of policy change and the policy process, neither has it been entirely absent. For one, occasional case studies have implicitly illustrated government’s ability to approach policymaking in an anticipatory fashion. Lambright and Heckley (1985) examined the willingness of policymakers in California to adopt an earthquake prediction technology with probabilistic foresight capabilities. Their study paid particularly close attention to the political difficulties engendered by a promising, but still very much underdeveloped, technology. Menaham (1998) explored the state of Israel’s long-term water policy planning initiative, which set out to anticipate and prepare for future shortages. However, in both
examples, anticipation is presented as an outgrowth of the particular policy issue under investigation, or as a contextual “sidelight” rather than a focal point of analysis.

Similarly, Rose (1993) introduced the concept of anticipation in his study of “lesson drawing” in public policy. Like Menaham (1998), and Lambright and Heckley (1985), Rose offered no explicit examination of anticipation, only using the term to describe a particular pattern of political strategy. Writes Rose:

Although policymakers cannot draw lessons from events that have yet to occur, they can try to anticipate events. In doing so, they may treat the future as an extension of the present in order to bound speculation by existing knowledge. Theorists can claim future success for their prescriptions on the grounds that predictions follow logically from premises, whether or not their premises are plausible. Politicians can exploit uncertainty about the future by willfully asserting faith in their proposals, which have yet to be proven wrong. (1993, p.91)

Rose believes anticipation allows policymakers to forgo the necessary rigors of empirical evidence. Anticipation is a political tool. Unfortunately, he provides little in the way of additional explanation, only offering the above quote as a contrast to the pattern of retrospective political learning or “lesson drawing” investigated in his work.

Scholars studying “policy styles,” a concept used to denote the “standard operating procedures” followed by states for making and implementing policy, have offered the most developed portrayal of anticipatory policymaking. Most notably, Richardson, Gustafsson, and Jordan (1982) distinguished varying governmental approaches to problem solving, which can range from anticipatory to reactive. Whereas the anticipatory approach tries to forestall problems before they occur, the reactive approach assumes that, particularly in the face of imperfect information, governments will opt to respond to problems. Richardson’s typology, which informs this study, has been elaborated on and widely applied to cases examining Western European and Canadian policymaking (Richardson et al. 1982; Manzer 1984; van Waarden 1995; Calef and Goble 2007; Hinnfors 1997).
The concept of anticipation is devoid of a singular definition within the subfield of public policy, let alone the discipline of political science. Indeed, it has been taken to represent different things in different contexts. What, then, does anticipation mean within the context of this study? Here we assume that the defining feature of anticipation is its distinctive temporal dimension. Possekal (1999) holds that social scientists see time, or temporality, as marked by one of three time horizons—past, present, and future. Obviously, the past denotes a time or event that has occurred, the present a time or event currently occurring, and the future an event or a time that has yet to occur. Within two of these horizons—the past and the future—there are gradations. An event that occurred yesterday will likely be referred to as the recent past. An event that occurred a million years ago, by contrast, will likely be seen as the distant past.

Anticipation is concerned with the future (Selin 2010; Bernstein 1996). It can be defined simply as the “the act of looking forward” (Selin 2010). What is more, the act of anticipation is inextricably linked to events, situations, conditions, changes, or other phenomena yet to occur. From checking the weather to investing in stocks, humankind is perpetually trying to look ahead and to predict future events. But this current study also assumes that anticipation is more than simple star gazing or dreaming about what could be. In fact, it holds that foreseeing, or looking ahead, represents only a first step in a larger anticipatory process. Anticipation is also concerned with translating the information gathered through this process of proactive inquiry into action. In this regard, this study’s understanding of the anticipatory process shares commonalities with the vast literature on disaster management. DiMaggio (2011) tells us that the “keys to disaster management are anticipation, preparedness, and mitigation” (p. 2). The disaster management process begins with identification of a potential problem, be it a hurricane, earthquake, or disease outbreak. Once relevant information on the nature of that threat is collected and analyzed, disaster managers then script a logical course of action to prepare for the likely impending event. Finally—ideally—the
system will implement the preparedness policy in order to avoid or at least mitigate the harmful effects of the event (Karwan and Wallace 1984; DiMaggio 2011). Such a process from identification to preparation to action will be seen in the cases examined in this study.

This study further assumes that the act of anticipating is marked by acute uncertainty. Anything anticipated has yet to occur and in fact may never occur. As such, we can only conjecture or reasonably speculate as to the exact characteristics of these types of events. When will they occur? What will be the scope of their impact? Who will they impact? How will they interact with other social forces? How will the so-called problem respond to certain interventions, like public policy solutions? These are but a sampling of the questions created by uncertainty.

Uncertainty is, of course, a characteristic of all social problems, even those already manifest in society. Consider, for example, crime. It is well established that certain acts constitute such infringements on social order that they should, in fact, be considered “crimes.” We are also fairly certain that a number of policy and governmental interventions can help mitigate, deter, or at least control crime, among the most basic being creation and maintenance of a police force. Other actions might include youth intervention programs, education initiatives, and ensuring a well functioning justice system. Yet even in this centuries-old policy area, we are still confronted with a great deal of uncertainty. What is the “cause” of crime? Which policy intervention is most effective at preventing crime? Why do some individuals have a predisposition for committing violent crimes while others do not? The answers to these, as well as countless other related questions, are hotly debated.

While uncertainty is a characteristic of all problems, on some level the type of uncertainty surrounding an anticipatory problem is different. Unlike the crime example, the uncertainty associated with anticipatory problems is not solely derived from a lack of clarity regarding normative questions, such as root causes or the “best” policy intervention. Instead, anticipatory problems are
characterized by the sort of uncertainty and indefiniteness inherent in events or conditions that are projected to occur sometime in the future. Note the degrees of ambiguity. While we may be able to predict the future with varying degrees of accuracy, the human condition is such that anything that has yet to happen is inherently uncertain. We can and often will try to define these features within certain probabilistic parameters but, ultimately, we are never certain that these projections are accurate until after the problem has emerged, if it ever does.

Just as it is possible to distinguish among different time horizons, so too can we distinguish different types of uncertainty from each other. McManus and Hasting (2004) identify three particularly useful classifications: (1) statistically characterized uncertainties; (2) known unknowns; and (3) unknown-unknowns. Statistically characterized variables/phenomena refer to “things that cannot always be known precisely, but which can be statistically characterized, or at least bounded” (p. 4). Humankind cannot predict weather patterns with exact precision, but it is generally quite proficient at forecasting these conditions (save the occasional, botched snow storm prediction, of course). In the case of known unknowns, we may be able to identify the actual source of uncertainty. However, it is unlikely we will be able to say anything about the nature or characteristics of that uncertainty (i.e., its scope, implications, timing, etc.). Examples of this type of uncertainty include future budgets, emerging political adversaries, or new technologies. While we often recognize that the known unknown will happen and that its occurrence will have some sort of “impact”—negative, positive, or otherwise—we generally cannot say what exactly those implications will be. As evidenced in the forthcoming case of nanotechnology, most experts and lay observers do recognize that when a new, transformative technology is released onto the market it will likely have social implications, and in many cases health and environmental implications as well. Few, however, can predict with any accuracy what those implications might be. Finally, “unknown unknowns” or “gotchas” are essentially unimaginable. They often constitute entirely novel and totally unpredictable
events (e.g., the arrival of extraterrestrial life). Generally, social institutions see this type of uncertainty as futile even to contemplate. As a result, they tend to ignore it. On the other hand, simply by virtue of the fact that we know unknown unknowns exist, mankind has a tendency to build in redundancies or layered “back-up” systems in order to protect against remote threats. Many civil engineering projects, for example, are based on very high uncertainty probability margins that something untoward will happen many years down the road.

By and large, then, the types of problems investigated in this study can be classified as “known unknowns,” in that policymakers have ample reason to believe they are likely to occur sometime in the future, but their occurrence is by no means a given. Moreover, the exact features or dimensions of the anticipatory problems are very unclear. Indeed, uncertainty abounds as to whether, how, when, where, to what extent they will occur. The uncertainty associated with anticipatory problems is considerable, but not enough to warrant wholesale ignorance, however. These problems are likely to capture the government’s attention and will compel at least some factions within government to advocate for policy action.

Drawing from these basic assumptions, we can thus offer a working definition of the anticipatory policy type. Unlike most policy problems, which are more or less tangible and manifest within society, anticipatory problems have yet to occur. Birkland (2006) indirectly distinguishes between anticipatory problems (although he never refers to a specific policy type, let alone an anticipatory problem) and what we might see as a “typical” policy problem—a policy problem that exists and thus affords the luxury of reactivity. The latter refers to unexpected disaster, such as earthquakes, hurricanes, planes crashes, and even nuclear power plant meltdowns. These problems, which are the defining feature of what Birkland calls “domains prone to disaster,” rarely garner policymakers’ attention until after a catastrophe or “focusing event” has occurred. However, once disaster strikes, these problems are given immediate priority on the institutional agenda.
More important, Birkland (2006) also notes the existence of “domains not prone to disaster” that share notable similarities with this study’s conceptualization of anticipatory problems. In domains not prone to disaster, early warning signs and indicators of a problem slowly reveal themselves, allowing policymakers, at least in theory, to identify a problem in advance. In these domains, problems can be anticipated and, hopefully, prevented. He cites the safety and disease domains as examples of domains not prone to disaster. Birkland uses the case of the avian influenza to illustrate this dynamic:

In 2005, for example, the problem of the H5N1 strain of bird flu influenza gained worldwide attention, and its transmission to humans in Turkey and Europe in early 2006 has increased concern about pandemic flu, and in particular about the possibility of its transmission from person to person rather than from birds to people. But a global flu pandemic is a different kind of disaster from the type described in this book because it can be anticipated before the pandemic occurs. (p. 7)

Unlike domains prone to disaster, policy change can precede the onset of an event in domains not prone to disaster. Theoretically, although policymakers can rarely avoid a disaster, they can prepare for it and mitigate its effects. In other words, certain types of problems can be anticipated.

My conceptualization of the policymaking process engendered by anticipatory policy problems dovetails closely with Manzer’s (1984) description of “anticipatory problem-solving” (p. 581). Anticipatory problem solving is a policymaking making style—otherwise known as the “elitist planning style”—wherein “Decision-makers try to pre-empt the cycle of policy-making by identifying potential policy problems and resolving them before they become serious issues or social crises. Their orientation is preventative rather than curative policy-making” (p. 581). Like Manzer, this study holds that anticipatory problems demand a proactive and even preemptive policymaking approach. Anticipatory policymaking necessitates that policy change precede the onset of an actual problematic event. However, unlike Manzer, who assumes that the act of anticipation is used to circumvent a pluralist and inclusive policymaking process, this study examines instances wherein
anticipation is explicitly engaged as a broadly inclusive policymaking endeavor. In this regard, it is
the interplay between these two pivotal concepts—the anticipatory policy type and the policymaking
cycle—that shapes the configuration and character of anticipatory policy action.

Policy Typologies

The notion of a type of policy we can call anticipatory suggests that certain problems and
their policymaking styles differ profoundly from other types of problems and policymaking styles,
and that such differences matter. In making this claim, my study follows in the tradition of devising
policy typologies, which are analytical schemas used to classify public policies into categories. These
categories or “policy types” correspond not only to distinctive policy outputs and policy goals, but
also serve to identify different patterns of interest group participation and mobilization, degrees of
public salience, levels of conflict, institutional locations, as well as a host of other variables typically
associated with public policymaking (Birkland 2011; Smith 2002; McCool 1995). As Birkland (2011)
points out, policy typologies “explain policy outcomes by explaining and predicting key aspects of
the politics underlying these policies” (p. 209).

The theoretical strengths of policy typologies are threefold, all of which are more or less
related to the qualities of parsimony and simplicity. First, typologies provide a logical schema for
describing the important kinds of issues that come before government. Most typologies offer
between two and six categories. By reducing the seemingly infinite number of policies adopted by
government to a handful of categories, policy typologies hugely simplify and clarify the policymaking
process. Second, typologies can be used to explain the nature of political decision-making. As
indicated above, policy typologies draw our attention to the institutions, actors, and interests most
relevant to a policy debate. In addition, they highlight other critical variables, like the level of conflict
and public visibility of an issue. Third, and perhaps most importantly, policy typologies have
predictive power. They identify and describe all of the previously listed variables and espouse a causal relationship between the type of policy likely to be adopted and the ensuing political conflict. In other words, they predict patterns of behavior (Lowi 1964, 1972; Smith 2002; Birkland 2011).

The vast body of literature on policy typologies stems from the seminal works of Lowi in the 1960s and 1970s (Lowi 1964, 1972). Lowi’s typology was founded on two overriding assumptions. First, Lowi argues that policy causes politics, meaning that different types of policy produce different types of political conflict. Lowi’s contention that the nature of political relationships and conflict can be predicted on the basis of policy type “reversed (and continues to reverse) the causal path assumed by most political scientists” (Smith 2002, p. 379). Prior to Lowi, political conflict was seen purely as an independent variable, in part because policymaking is seen as a linear process that concludes with the production of a policy output. Lowi, by contrast, presented conflict as a dependent variable, or the product of policy genre. Second, Lowi assumed coercive power, or the ability to force individuals and groups into certain activities, is perhaps the most important characteristic of government (Lowi 1964, 1972; Smith 2002). Coercive power represents the basis for Lowi’s typology. Specifically, he constructs a two-dimensional typology where one dimension represents the likelihood of government applying its coercive powers (ranging from immediate to remote) while the other represents the target of coercion (the individual or the environment of conduct) (Lowi 1964, 1972; Smith 2002).

Applying this schema, Lowi (1964, 1972) argued that policy issues can be classified as one of four types—distributive, redistributive, regulatory, or constituent. Distributive policy focuses on the distribution of new resources. In these “positive-sum” cases where everyone is said to win, the likelihood of coercion is remote, and any that occurs is directly applied to individuals. Distributive policy predicts a political process marked by very little visibility, little political conflict (in fact, policymaking typically occur vis à vis logrolling or reciprocity), with decision making authority
resting chiefly in the hands of entrenched political actors (policymaking is often dominated by “iron triangles”). Redistributive policy seeks to change the distribution of already existing resources, meaning the deliberate movement of resources from one group to another. Redistributive policies are exceedingly difficult to enact because they are marked by high public visibility and awareness as well as high levels of political conflict, largely due to the reality of clear winners and losers.

Regulatory policy controls certain private activities. Regulatory policies have low visibility, as conflict is generally isolated to industry groups and not the general public. Additionally, the pressure put on government tends to be highly organized and competitive because interest groups represent powerful social elites. Finally, constituent policies “set up” new, or reorganize existing, institutions. Constituent policies tend to be noticeably “top-down” and dominated by elected officials and administrative agencies.

According to Sabatier (1991), “Of all the work in public policy over the last two decades, Lowi’s (1964, 1972) argument that political behavior varies across policy types—distributive redistributive, regulatory—has probably had the greatest effect on the discipline of political science” (p. 149). Greenberg, Miller, Mohr, and Vladeck (1997) echoed this sentiment in stating: “No single theoretical construct has been more important to the development of public policy studies than Lowi’s categorization scheme” (p. 1534).

However, such typologies do have their detractors (Heelo 1972; May 1986; Greenberg et al. 1977; Steinberger 1980; Cobb and Elder 1977). The most common critique is that the policy types themselves are so vague they tell us little about the actual implications of specific policy proposals. Critics also argue it is exceedingly difficult to classify policies into the categories developed by Lowi, noting that policies overlap categories or shift categories over time and in response to environmental changes (Greenberg et al. 1977; Steinberger 1980; Smith 2002; May 1986). Thus, the “unit of analysis” examined in Lowi’s theory is seen as a false construct.
In addition, some have questioned the testability of Lowi’s scheme. Most notably, Cobb and Elder (1977) believe Lowi’s typology is stunted by the fact that it is based on “substantive rather than analytical criteria” (Qtd. in Parsons 1995, p. 133). To clarify, policy types are not empirical phenomena that we can observe in “reality,” but are instead subjectively derived. Policies do not naturally fall into these categories—theoreticians put them there. While Lowi’s typology might be a convenient way of discerning the content of public policy and the key institutional actors involved in the production of that output, then, it fails to offer an adequate explanation of the real variables driving policy change.

Regarding the first criticism, or what can be referred to as the unit of analysis quandary, policy scholars have offered a number of solutions and responses. Wilson (1995), for example, abandoned Lowi’s reliance on coercive power and developed a typology that accounted for the extent to which the costs or benefits of a specific policy type are focused either on a particular interest or spread across numerous people or interests. Wilson’s typology distinguishes among various categories of “politics”—interest group, entrepreneurial, clientele, and majoritarian. Interest-group politics (both benefits and costs are concentrated among few people) isolate beneficiaries as well as those assuming the cost. Each set of actors, in turn, treats the policy process as a zero sum game. Clientele politics (concentrated benefits; costs are distributed among many people) describe a policymaking environment wherein there are close relationships between policymakers, regulators, and regulated interests. Clientele politics personify iron triangle governance in that power and influence are isolated in the hands of well-connected elites. And even though very few individuals benefit from clientele politics, costs are nonetheless distributed across the whole of society. In the case of entrepreneurial politics (distributed benefits; concentrated costs), those hoping to benefit will lobby—often heavily—to persuade policymakers to regulate in the public interest. However, those who would bear the costs of these policies will oppose these efforts and will be equally ambitious in
their desire to persuade policymakers to protect their interests. Not surprisingly, then, entrepreneurial politics create a highly contentious political process. Finally, majoritarian politics (distributed benefits; distributed costs) create loose groups of policy advocates, who often lobby for a range of symbolic and substantive policy statements. This lack of organization tends to result in weak and vague policy outputs, as minimal pressure is actually imposed on policymaking institutions. Moreover, such issues are typically more abstract, more ideological, and involve more mass-based political appeals.

Others have sought to address the unit-of-analysis problem not by dismissing Lowi’s scheme and offering an entirely new model, but by attempting to fix it. So it is that a number of scholars have added categories to Lowi’s original typology (Anderson 1997, 1997b; Heckathron and Maser 1990; Miller 1990; Spitzer 1987, 1989). Anderson (1997), for example, argued that a typology that rests solely on coercive power is inadequate and that an additional “layer” should be included in Lowi’s typology to account for “suasion.” Suasion is a milder form of power based on government’s ability to persuade—not force—individuals to follow certain demands. In the eyes of many, including Lowi (1997) himself, such an alteration would logically result in new types, although Anderson (1997b) refrained from formally specifying a specific addition. Smith (2002) presented an alternative solution to the unit-of-analysis dilemma by arguing that the typologies themselves should be recast as “taxonomies.” Whereas typologies classify policy elements based on conceptual categories, taxonomies classify based on empirically observable characteristics, thus alleviating the concern about groupings derived from subjective categories.

Lowi (1988, 1997) vehemently opposed any additions or alterations to his work on the grounds that these changes would muddy his intellectual project, thus detracting from its theoretical elegance. Consistent with Lowi, this study proceeds from the standpoint that the utility of policy typologies arises from their simplicity. Indeed, even those who reject Lowi’s scheme do not reject
the basic notion that distinguishing between policies by type offers a useful organizational device for elucidating discernible policymaking dynamics (Sabatier 1991; Greenberg et al. 1977). Unit-of-analysis concerns do not overshadow the importance of this contribution. Moreover, as explained in greater detail below, the position developed in this study is that anticipatory policies are made unique by their temporal context. Such a proposition thus shares the basic assumption that policy causes politics, but ultimately ignores the coercion-based scheme adopted by Lowi.

Regarding the concern that public policy typologies lack valid empirical measures, Cobb and Elder (1977) offer a solution in the form of an entirely alternative model. Specifically, whereas Lowi’s (1964, 1972) model focuses on policy content, Cobb and Elder instead focus on the expansion and containment of conflict. They argue that, unlike policy types, conflict is an empirical phenomenon. Yet, although these authors make a viable argument as to the limitations of policy content-driven methodology, their argument still does not dismiss the utility of typologies in general as an organizational device. Moreover, the questions they identify pertaining to the expansion and contraction of conflict are central to this thesis and its adoption of a stages approach to policymaking. The policy cycle is partially founded on the idea that movement through the various policymaking stages results from the dynamic expressions of conflict and compromise among organized interests with a role, at times, for the general public.

To be sure, there is reason for concern that the classification of policies is based on arbitrary perceptions of what constitutes one policy type versus another. One could similarly argue that the distinction between acting in an anticipatory fashion versus a reactive fashion is equally subjective. For example, was the policymaking process associated with raising the debt ceiling in the summer of 2012 an attempt to anticipate a looming deadline or a reaction to the threat of credit downgrade (or some combination of the two)? Although concerns about subjectivity are reasonable, Smith (2002) points out: “Social scientists routinely measure mental or social constructions and individual
perceptions and draw generalized conclusions about policy from them” (p. 382). Ideology, for example, is a mental construct commonly assumed to have predictive power and measured based on an artificial scale (i.e., “liberal” or “conservative”). “Culture” is another example of this type of theorizing. In sum, the methodological difficulties associated with typologies are hardly unique and are in fact inherent to the measuring of many social concepts.

Thus, despite past scholarly critiques, policy typologies remain as one of the most lasting analytical tools in public policy. This much is reflected in the rich body of scholarship that has used them to illustrate distinctive patterns of policy change. Scores of studies have built on Lowi’s (1964, 1972) original scheme (Frohock 1979; Shull 1983; Starling 1988; Salisbury 1968; Ripley and Franklin 1986, 1991; Heckathorn and Master 1990). Spitzer (1987) advocated that Lowi’s policy types be split in half to represent cases of pure categorical fit versus cases where policies types bled into other categories. Thus, Spitzer’s revision would identify a pure redistributive policy and a mixed redistributive policy. Spitzer explains the difference: “A pure redistributive policy is one that involves a direct transfer between classes (a relatively uncommon phenomenon in American politics), whereas mixed cases reveal some degree of policy disaggregation (in a distributive sense), as with the area redevelopment policy, or the Housing and Urban Development acts of 1965 and 1968” (p. 680). He further identified different policymaking patterns relative to whether a policy was mixed or pure. For example, the scope of policy conflict tended to be lower in the case of mixed regulatory policy relative to pure regulatory policy. He also found the president had much less influence in cases of mixed redistributive policy versus pure redistributive policy.

Kellow (1988), while criticizing Spitzer for compromising the theoretical simplicity of Lowi’s work, offered a refined matrix accounting for public/private costs and public/private benefits. He also argued that Lowi’s constituent policy type should be discarded and instead be replaced by two new types of regulatory policy—public interest regulation and private interest regulation. Kellow’s
revision, then, maintained Lowi’s original typology by clarifying the two different targets of benefits and costs—public versus private actors. Kellow maintained that private interest regulatory type will create “classic pluralist struggles” whereas the public interest regulatory type will entail “consumer and environmental politics which often sees the adoption of placebo policies which are sufficient to cause the evaporation of support for the public interest group while leaving the regulated interest unscathed because of implementation failure” (pp. 718-719).

Tatalovich and Daynes (1988; 1988b) also offered a variant on Lowi’s regulatory policy type termed social regulatory policy. According to these authors, the last several decades have witnessed a proliferation of policies aimed at regulating or policing private lives; therefore regulation should not be solely construed as focused on economic interests. Social regulatory policy centers on “a moral and normative debate about the place of the individual in the community” (1988b, p. 2). Issue examples include abortion, gun control, affirmative action, school prayer, and pornography. The defining characteristics of social regulatory policy are conflicts about “non-economic, moral values, militant single-issue groups, and an activist judiciary” (1988, p. 210 emphasis included in original).

Tatalovich and Daynes conclude:

The ultimate problem of social regulatory policy is that consensus building is more difficult to achieve compared to any other policy arena. With Social Security, the income tax, or other redistributive policies, their conflict potential can be reduced through implementation. But there is no obvious way to mute moral disagreements either at the policymaking stage or during administration…Given that experience, we might conclude that conflicts about social regulatory policy will persist until they simply become irrelevant with the passage of time, when a de facto settlement in public opinion is achieved. At that juncture, once again the social mores of the U.S. people and the law of social regulatory policy will reinforce one another. (p. 225)

Others have combined Lowi’s typology with different theoretical constructs (McCool 1995). Frohock’s (1979) textbook merges Lowi’s typology with systems theory and the stagist model. He directly borrows Lowi’s regulatory, distributive, and redistributive policies and also adds two additional types—capitalization and ethical. Capitalization policy is partially a variant of distributive
policies in that both types distribute goods and services to a specific segment of the population. However, unlike distributive policies, which provide goods and services for consumption by citizen consumers (e.g., Medicare, Medicaid, the Food Stamp Program, Veterans Administration programs), capitalization policy aims at maximizing production goals. Such policy can be delivered either through subsidies to specific industries or by means of funds allocated to state and local governments, depending on the target. Finally, ethical policy, similar to Tatalovich and Daynes’s (1988a) social regulatory policy type, sets out to “establish the correct practice for some moral issue” (p. 14).

Frohock (1979) has applied this policy typology to an input-output/stagist model. Frohock’s inputs include the perception and identification of issue, organization, demand, support, and apathy. Different variations in these inputs will, according to Frohock, lead to one of the five policy types listed above. Finally, these different policy types produce different policy outputs, including the application, enforcement, interpretation, evaluation, legitimation, modification/adjustment, and retreat/disavowal (termination) of policy. Frohock’s model provides a high level of generality in offering a useful synthesis of the stagist model and policy typologies. Most importantly for this current study, it aptly demonstrates the compatibility of the stages approach and policy types.

Frohock (1979) is not the only scholar to apply policy typologies to the policymaking stages (Shull 1983; Starling 1988; Salisbury 1968; Ripley and Franklin 1986, 1991). For example, Shull (1983) applies Lowi’s typology to the policy cycle, but pays particularly close attention to two actors—Congress and the U.S. President. Shull finds variation in the influence of Congress and the President across the stages. Congress generally dominates formal processes, like policy initiation and formulation. By contrast, the president can exert considerable power over the agenda setting process. Even more specifically, Shull observed differences between the President and Congress
with regard to policy type. For example, Presidents initiate most distributive policy and enjoy the greatest success in this area.

Ripley and Franklin (1986, 1991) expand Lowi’s typology to distinguish between domestic and foreign and defense policy types. Their domestic policy areas include distributive policy, competitive regulatory, protective regulatory, and redistributive policy. Ripley and Franklin’s conceptualization of distributive and redistributive policies is virtually identical to Lowi’s description. Protective regulatory policies “are designed to protect the public by setting the conditions under which various private activities can be undertaken” (1991, p. 21). Specifically, harmful conditions (e.g., air pollution) are prohibited while helpful conditions (e.g., the publication of true interest rates on loans) are required. Competitive regulatory policies are “aimed at limiting the provision of specific goods and services to one or a few designated deliverers, who are chosen from a larger number of competing potential designated deliverers” (p. 21).

Ripley and Franklin also described three types of foreign policy areas—structural foreign policy, strategic foreign policy, and crisis foreign policy. Structural foreign policy deals with the organization, procurement, and deployment of military personnel. Strategic foreign policy asserts and designs the basic military and foreign policy stance of the United States toward other nations. Finally, crisis foreign policies “are responses to immediate problems that are perceived to be serious, that have burst on the policy makers with little or no warning, and that demand immediate attention” (p. 24). Ripley and Franklin applied their typology to the policy formulation stage (1991) as well as the implementation (1986) stage.

Hayes (1978) radically recast Lowi’s scheme by separating the demand and supply patterns of public policies. Demand patterns, which are intended to highlight the degree of interest group conflict, can range from consensual (low conflict among interest groups) to conflictual (high conflict among interest groups). Hayes also identified supply patterns, which represent different legislative or
policy responses to demands. The three supply patterns are rule-of-law, which is an explicit material allocation; policy without law, which establishes implicit policy interventions or symbolic policies; and no policy, which represents instances when a legislative body chooses not to devise any policy at all.

Hayes (1978) derived six policy types—non-interference, self-regulation, distribution, non-decision, regulation, and redistribution. Non-interference (consensual demand, no bill) is best described a laissez-faire politics, in that there is really no political process and, by and large, no one seeks to politicize the issue. Self-regulation (consensual, policy-without-law) refers to situations where groups seek policy that will permanently legitimize their autonomy from government regulation—they want to police themselves. Distribution (consensual, rule-of-law) concerns situations in which groups seek benefits from Congress and, quite often, get their way (e.g., pork barrel politics). Non-decisions (conflictual, no bill) involve “entrenched elites [who] influence community values and political institutions to limit the agenda of actual-decision making” to issues that are non-threatening to their interests (p. 148). Regulation policy (conflictual, policy-without-law) is action that takes place when pressure builds to change the status quo, but contending forces are typically strong enough to force Congress to adopt only symbolic policy. Finally, redistribution policy (conflictual, rule-of-law) requires Congress to make an “explicit choice among contending groups” (p. 152).

Hansen (1983) applied the logic of economics to policy typologies, distinguishing between a policy’s effect on individual utility or income, which can range from positive to negative, and the types of goods provided, which can range from public to divisible. The three types identified under her divisible collective goods category partially dovetail with Lowi’s scheme in that she labels them distributive, redistributive, and coercive policy types. However, her actual definition of these types is fundamentally different from Lowi’s. Distributive policies are said to have the highest positive effect
on utility or income (i.e., jobs, patronage, pork barrel spending) whereas coercive policies produce a negative effect on utility (i.e., taxes, the draft, eminent domain). Policies that provide public goods include positive-sum, zero-sum, and negative-sum. Public good policies are different because, unlike private policies, they procure largely indivisible or collective outputs. Positive-sum policies have the greatest positive effect on utility (i.e., economic growth, national defense against foreign aggressors), zero-sum policies have a neutral effect on personal utility (i.e., moderate inflation, pollution controls), and negative sum have a negative effect on utility (i.e., defense spending, dependence on foreign oil).

A number of other typologies rival Lowi’s work. Edelman (1964) argued that the differences between various policy types lie not in the policies themselves, but in the language used to construct and articulate problems. Edelman demonstrated that, in reality, government activity is often symbolic and does little to procure actual benefits or goods. His typology distinguishes between material and symbolic policies. Material policies confer actual resources or substantive power to individuals. Material policies may also impose costs on those individuals adversely affected by the enacted policy. Symbolic policies, by contrast, are generally devoid of material impacts and have no real tangible advantages or disadvantages. Instead, they appeal to certain social values, and often invoke themes like “patriotism,” “social justice,” and “equity,” to name a few. They are used either to divert public attention, or to satiate public demand in cases when no substantive benefits are being provided (Theodoulou 1995, p. 7).

Anderson (2003) contrasted substantive and procedural policies. Substantive policies, much like material policies, confer advantages and disadvantages (costs and benefits) on individuals. They dictate that government perform certain tangible activities, such as building highways, prohibiting drug use, or sending rockets into space. Procedural policies determine how something is going to be done and who is going to take action. Examples include “laws providing for the creation of
administrative agencies, determining the matters over which they have jurisdiction, specifying the processes and techniques that they can use in carrying out their programs, and providing for presidential, judicial, and other controls over their operations” (p. 6). Of course, procedural policies can have substantive impacts because “how something is done or who takes the action may help determine what is actually done” (p. 7).

Wade and Curry (1970) distinguished between policies dealing with the provision of public goods and those dealing with the provision of private goods. Collective goods are indivisible, meaning they cannot be delivered unless everyone reaps their benefits. These goods cannot be provided to some individuals or groups but not others. The textbook example of a collective good is national defense. If national defense is provided, then everyone will benefit; if not, everyone loses. In this regard the national defense is not divisible and, therefore, individuals may choose to “free ride” off its provision. Private goods, by contrast, are divisible, because they can be broken into component parts and purchased by individuals in a private marketplace. While private actors and businesses usually provide these goods, government may opt to provide them in certain instances, as it has in examples like the postal service, crop insurance, and public parks.

Hogwood’s (1987) typology examines various cost and benefits, which he addresses based on three criteria—the possibility of different policy outcomes, forms of bargaining and conflict, and the range of options. Based on these criteria, he differentiates between principle, lumpy, cuts/redistribution, and increase issues. Principle issues are highly polarized. They delve into questions of right or wrong, them or us, all or nothing, win or lose. Classic examples include religious, moral, and constitutional questions. Lumpy issues involve goods that are indivisible. Examples include national defense, airports, and power stations. Issues pertaining to cuts or redistribution concern “who gets what, who gets more, and who gets less” (Parsons 1995, p. 133). The most common example is debates about budgetary appropriations. Finally, with regard to
increase issues, everyone is a winner (the proverbial pie simply expands), although some participants may benefit more than others.

Forgoing the multidimensional policy typology scheme altogether, Schulman (1980) examined the policymaking pattern associated with one specific policy type, “large-scale policy.” He argued that large-scale policies have discernible qualitative properties, most notably their largeness of scale. Unlike many policies, which can be broken into separate parts or units, large-scale policies entail “the provision of indivisible payoffs by indivisible means” (p. 10, emphasis in the original). In other words, these policies must be delivered in large lump sums, otherwise they cannot be provided at all. Examples include space exploration, the war on cancer, and the war on poverty.

Large-scale policies create a distinctive policy process. Schulman (1980) argued they require “go/no-go,” “all or nothing” decisions. These types of decisions demand significant and often long-term political commitments, thus foreclosing the possibility of marginal or incremental adjustments over time. In turn, they tend to create a highly volatile policy environment. Unlike most policies, which can reach a relative state of equilibrium between support and acceptance after their enactment, large-scale policies necessitate that proponents perpetually mobilize support. Large-scale policies are significant commitments. Therefore, consensus must be regularly fostered, lest the original output be rescinded. Suffice it to say, such a dynamic makes it exceedingly difficult for these policies to thrive. Equally important, this depiction challenges the pervasive notion of incremental policymaking, which assumes minor alterations can be made in policy across time. Aside from the fact that incremental policies allow for design adjustments, they also allow advocates to satisfy or satiate opponents’ demands. Large-scale policy is devoid of this luxury.

Schulman’s (1980) work is important to this study for two reasons. First, it depicts the feasibility of abandoning multidimensional policy schemes in favor of a more narrow focus on a single policy type. Schulman’s perspective is that large-scale policy is fundamentally different from
most policy types and, as such, warrants special attention. In a similar fashion, one can possibly say that anticipatory policy represents a departure from the norm of reactive policy. Second, Schulman’s work is unique in that it spotlighted a policy type based not on criteria associated with the study of policymaking or policy jargon per se (i.e., the distribution of resources, extent of coercion, etc.) but, as indicated above, qualitative properties—the relative “largeness” or scale. Writes Schulman:

Perhaps no physical characteristic can as conclusively condition an organism’s relationship with its environment as those pertaining to scale. The scale of an organism can directly affect its environmental demands and at the same time condition its response and defense capacities. The relative scale of environmental object can, in turn, affect the behavior of the organism by triggering or eluding its attention, signaling danger or suggesting vulnerability. (p. 1)

Schulman’s policy type, and his analogy to living organisms, is unique, at least as far as policy typologies go. To clarify, size—or largeness—represents a far more empirical, or at least universally recognized, designation than, for example, “regulatory,” “distributive,” “redistributive,” which are terms ultimately derived from theoretical constructs. The framework in this present study revolves around another kind of recognizable attribute, that of temporality. Policies are distinguished according to whether the event they set out to address has or has not occurred. The sense of time is inherent to the human condition, not a construct of policy theory. It would take us far beyond the scope of this work to analyze, or even speculate about, the methodological implications of classifying policy types based on “size” or “time,” as opposed to an approach rooted in more theoretical constructs. Even so, this particular parallel between the current work and that of Schulman’s is at least worth noting.

However, with regard to anticipatory policymaking, it is scholars applying the concept of “policy styles” who present perhaps the most relevant typology of all. Policy style is a concept that was originally used in the 1980s to explain differences in environmental and risk policy across western European countries. Richardson, Gustafsson, and Jordon (1982) argued that different countries developed different policy styles or, as noted before, “standard operating procedures” for
formulating and implementing public policies. A country’s policy style is largely influenced by “the deep values rooted in societies” (Calef and Goble 2007, p. 3).

Richardson et al. (1982) concurred with Lowi (1964, 1972) and other proponents of policy typologies, noting that these scholars “are absolutely correct in pointing out that all policies are not handled in the same way” (p. 5). Richardson et al. presented a typology of national policy styles based on two features: (1) the government’s approach to problem solving, which ranges from anticipatory (or active) to reactive; and (2) the government’s relationship to other actors involved in the policymaking process, which ranges from consensus seeking to impositional. Anticipatory problem solving tries proactively to address issues before they blossom into full-blown problems, while reactive problem solving tends to respond to events and issues as they arise. The consensus-seeking style strives for a pluralist decision process, fostering widespread agreement between interested parties, while impositional style unilaterally imposes decision on society.

Using this matrix, Richardson et al. (1982) offered four types of policy styles—(1) anticipatory-consensual; (2) reactive-consensual; (3) reactive-impositional; and (4) anticipatory-impositional. Depending on the style, considerable differences are observed in the interaction between and within policy communities. In the case of the anticipatory-consensual style, the government will conduct a great deal of policy planning and elicit considerable input from policy communities. The reactive-consensual style also create a pluralistic environment, but instead of proactive planning the government will typically react to existing problems and pursue an incremental policymaking process. Incrementalism and reflexive governance are also hallmarks of the reactive-impositional style. However, in this case, the government will impose its decisions, as opposed to seeking consensus. Finally, with regard to the anticipatory-impositional style, government will pursue a great deal of planning, but often impose its decisions on the pretext that it has superior foresight capabilities.
These styles are by no means rigid. Policymaking styles have been shown to vary over time and across different sectors. For example, Jordan and Richardson (1987) observed, although Britain’s style is best described as reactive-consensual, a period of reactive-impositional occurred during Margaret Thatcher’s reign as prime minister. Similarly, in countries following an anticipatory-consensual style or an anticipatory-impositional style, the planning process often includes activities contradictory to the style. It is not uncommon for powerful organized interests operating within an anticipatory-impositional regime to demand and obtain some form of bargaining and compromise process with the government—even though such a process is the exact converse of an impositional style. Also, strong interests may prompt the normally inclusive anticipatory-consensual governments to conduct some business in secrecy or “behind closed doors,” because this is often the only way to bring closure to the policymaking process (Jordan and Richardson 1987, p. 180; Parsons 1995).

Richardson et al.’s (1982) typology has been widely applied to western European countries. West Germany (Dyson 1982), Norway (Olsen et al. 1982), Britain (Jordan and Richardson 1982), France (Hayward 1982), Sweden (Ruin 1982), and the Netherlands (van Putten 1982) are all examined in Richardson’s (1982) original edited volume, Policy Styles in Western Europe. A number of these states have since been revisited, including Britain (Jordan and Richardson 1983, 1987; Cairney 2008), Sweden (Hinnfors 1997), and France (Calef and Goble 2007), while other studies have added new cases, such as Canada (Manzer 1984), Japan (Neary 1992), and even the state of California (Calef and Goble 2007), to name a few of the more prominent examples. Vogel (1986) observed distinctive “national styles of regulation,” a term used to denote that even though policy outcomes are often quite similar, distinctive policymaking patterns can still be observed. Recent scholarship has questioned whether increased economic integration, international legal norms and constraints, and the transfer of technological knowledge has diminished the extent to which European nations can truly differ in terms of their policy style, a trend known as policy convergence (Bennett 1991;
The policy styles literature is not without critics. Rose (1984), and later Parsons (1995), offered the most poignant critiques by arguing that, despite its theoretical simplicity and usefulness as an organizational device, the concept of policy styles reveals very little about what governments actually do and, more importantly, “with what effects and outcome” (Parsons 1995, p. 188). This critique implies that policy styles tell us very little about policy change, or the process through which governments enact and implement substantive policy reforms. Second, citing the U.S. and Britain as examples, Vogel (1986) points out that, while two countries may differ a great deal in terms of their style, there is often little variation in terms of their actual policy outputs. Indeed, even Richardson and Jordan (1979) concede that the convergence of styles described previously represents a potential theoretical shortcoming.

The literature on policy styles obviously dovetails closely with this present work. Without question, the policy type proposed here shares far more similarities to Richardson’s (1982) policy style typology than to Lowi’s (1964, 1972) coercion-based scheme. Policy styles boldly illustrate the influence of temporality on the policymaking process (see also Peak 1971). The literature on typologies assumes that different patterns of policymaking can be discerned and that these patterns are inextricably linked to different types of policy issues. Yet Richardson’s concept of policy styles recognizes not only distinctive patterns of policymaking, but shows that these very same patterns of conflict are often influenced by the need to act with anticipation.

However, despite this important similarity, the present work is not a test of policy styles theory. For one, the concept of policy styles is primarily a means of comparing the policymaking activities of nation states. This study is not concerned with drawing cross-national comparisons. In this regard, concerns about convergence and differences of outcome are not relevant. Similarly,
whereas Richardson’s (1982) focus is countries, this work focuses its attention on the policymaking process within the U.S. in particular. Much like Frohock (1979) and Ripley and Franklin (1986, 1991), who integrate the concept of policy typologies into their analysis of specific policymaking stages, this study uses the policy cycle model to organize its investigation of the anticipatory type. To some extent, this methodological distinction addresses the concerns of Rose (1984) and Parsons (1995) that policy styles tell us very little about the proverbial “inner-workings” of governments. Although the stagist model is not without limitations, questions relating to the causes of policy change are paramount. It is within this context that we can now turn to the next stream of literature applied in this analysis, the literature on the policymaking cycle.

The Policymaking Cycle

Like the literature on policy typologies, the policymaking cycle model constitutes one of the most enduring analytical tools in public policy. The policymaking cycle, as implied in its name, conceptualizes a cyclical policy process, beginning with the identification and definition of policymaking issues and continuing through to the implementation and evaluation of public policies. Although this process generally begins in the issue identification and problem definition stage, which is discussed in greater detail below, most agree that issues can enter the policy cycle at any stage. Moreover, the process of policymaking is ongoing and does not end with the implementation and evaluation of policies. Indeed, the latter stages of this process—after legislation has been enacted—provide ample opportunities for opponents to thwart policy change (Anderson 2003; Parson 1995; Peters 2012; Howlett and Ramesh 2003).

The policy cycle is often criticized as an oversimplified view of the policymaking process (Stone 2002; Sabatier and Jenkins-Smith 1993; Nakamura 1987; Colebatch 2006). Critics charge that the policy process is rarely linear or rational, as implied by the policy cycle. Instead, policies can
transcend multiple stages and are often redirected to earlier stages in the process. Some policies skip entire stages in light of political pressures or new information. Perhaps more commonly, many policies straddle various stages simultaneously. Sabatier and Weible (2007) add that the stagist framework offers few explanations as to what drives a policy’s movement from one stage to the next while offering few falsifiable hypotheses regarding this trajectory. By dividing the policy process into distinct units of activity, they observe, the policy cycle encourages scholars to focus on each stage individually, instead of considering the causal forces that promote movement through the stages overall.

Of course, these criticisms are often used to justify alternative models. Sabatier and Jenkins-Smith (1993), for example, offer an alternative approach that depicts policy change and evolution as being driven by changes in the predominant “belief systems” of entrenched policy subsystems and organized interests. Clearly the stagist model, like all theoretical constructs, is not without its limitations. However, these limitations, while important, do not overshadow the enormous theoretical power of this construct. The stagist model provides arguably the most effective conceptual instrument for reducing the inherent complexities of the policy process and is thus the dominant paradigm within the discipline (Colebatch 2006). Parsons (1995) summarizes the importance of the stagist model:

The strength of the stagist approach is that it affords a rational structure within which we may consider the multiplicity of reality. Each stage therefore provides a context within which we can deploy different frames.

If we put aside the stagist model the choice is either a bewildering array of ideas, frameworks and theories, or the acceptance of another alternative model. In broad terms, therefore, the stagist framework does allow us to analyse the complexities of the real world, with the proviso that, when we deploy it as a heuristic device, we must remember that it has all the limitations of any map or metaphor. (p. 80)

This study is consistent with Parson’s view and employs the stagist model as a useful organizing heuristic. What is more, while it does not fully overcome the shortcomings identified by Sabatier and
Jenkins-Smith (1993) and others, this thesis examines public policies across the entirety of their life cycle—across all stages in the policy process. Such an approach, as opposed to simply focusing on one specific stage, offers a far more encompassing view of the policymaking process and thus addresses the concern that a stagist approach limits our ability to identify causal mechanisms by segmenting our scope of analysis.

The policymaking process typically begins with identification of social conditions. At this stage, a condition—a source of concern—has entered social consciousness, meaning it has attracted the attention of the general public, the media, and perhaps even policymakers. In many ways, the identification of issues represents the proverbial embryonic state of public policymaking. It does not necessarily follow that conditions identified at this point will be deemed worthy of actual government attention and will formally enter the policy cycle. For this to happen, social conditions must be converted into actual policy “problems” (Anderson 2003; Birkland 2011). Anderson (2003) defines a problem as “a condition or situation that produces needs or dissatisfaction among people and for which relief or redress by governmental action is sought” (p. 81).

The conversion of a condition into a problem is not an organic progression. Instead, it is calculated and strategic, resulting from a process known as “problem definition” (Schattschneider 1960; Rochefort and Cobb 1994; Stone 2002). Rochefort and Cobb describe problem definition as a political discourse that is used “to explain, to describe, to recommend, and, above all, to persuade” (1994, p. 15). Problem definition assigns meaning to social conditions. It serves a number of absolutely critical functions. For one, problem definition helps determine whether the identified condition is suitable for government’s attention—that is, whether it is deemed worthy of being called a policy problem. Problem definition debates commonly focus on a number of recurrent themes (Rochefort and Cobb 1994). What is the scope and severity of the problem? What is the nature of population impacted? Is the situation worthy of government attention and assistance?
What is the incidence, or number of cases, of the problem at hand? Is the incidence growing or declining? Is this a new a new or “novel” problem, or is it something we’re accustomed to dealing with? Is this problem a crisis? To what extent do members of a public audience see this problem as impinging on their personal interests? Perhaps most importantly, what is the cause of a given problem? These questions, as well as a host of others, are typically considered within the context of problem definition debates.

Problem definition claims are often communicated through a complex mix of narratives and rhetorical devices that together constitute what scholars call political discourse. Stone (2002) provides an overview of many of these linguistic devices. She describes a political realm—the “polis”—wherein individuals strategically draw on metaphors, synecdoche (using a part to represent a whole), narrative stories, measurement discourse, as well as a host of other narrative tools. For example, metaphors use one thing (better known subject) to mean another thing, and draw comparisons between the two. A “living organism” metaphor implies that problematic communities or social groups have a life of their own, and thus cannot be addressed by prescriptive policy intervention. Stone also describes narrative stories as a tool of political language, noting that our policy debates tend to have a clear beginning, middle, and end. For example, stories of “stymied progress” imply that while a specific policy intervention or action was once working, something—some sort of barrier—has impeded its progress. If accepted, any of these devices can have considerable implications regarding the outcome of a policy debate. If we accept that certain communities have a self-determining life of their own, for example, then we must also accept the proposition that government intervention is in fact futile—that government should ignore the problem in question. By contrast, the story of stymied progress would lead us to a logical solution—remove the blockage.
Rochefort and DeLeo (2011) analyze how organized interests often draw on analogies to support their definitional claims. Unlike metaphors, which fail to clarify or explain the precise similarity between two subjects, analogies present a logical narrative as to why two things should, in fact, be taken as similar. They present six analogy types: (1) historical analogies, which compare a contemporary circumstance and some situation from an earlier time; (2) moral analogies, which compare two issues or situations in terms of ethics and value dimensions; (3) causal/mechanistic/programmatic analogies, which compare two problems with respect to causes, nature, and impacts, as well as programmatic solutions; (4) legal analogies, which compare two issues in terms of legal implications and reasoning; (5) political analogies, which compare the political context of policymaking in two situations—partisan conflict, electoral factors, interest-group behavior, public opinion, etc.; and (6) social analogies, which compare the social context in which two different policy issues are embedded. Stone (2002), and Rochefort and DeLeo (2011), demonstrate that problem definition claims are communicated via a dizzying array of rhetorical tools and narratives, all of which can serve to support stakeholder interests.

The process of problem definition is pervaded by interest group conflict. Schattschneider (1960) argues that the definition of policy problems arguably represents the most important aspect of the policymaking process:

Political conflict is not like an intercollegiate debate in which the opponents agree in advance on a definition of issues. As a matter of fact, the definition of alternatives is the supreme instrument of political power, the antagonists can rarely agree on what the issues are because power is involved in the definition. He who determines what politics is about runs the country, because the definition of alternatives is the choice of conflicts, and the choice of conflicts allocates power. (p. 60)

Schattschneider, then, recognized problem definition to be far more than a mere exercise in description. Instead, the narratives in play provide organized interests with an opportunity to present logical or emotionally appealing solutions or remedies to the described problem. And because
procuring a desired policy output—a preferred solution—is the ultimate end of political conflict, it follows that organized interests will struggle to control the predominant definitions or images of policy problems. Definitions therefore lend themselves to, even predispose, certain solutions. Considering the importance of this process, it is not surprising that interest groups and policymakers will struggle vehemently to obtain ownership or control of the dominant definition of a problem (Rochefort and Cobb 1994). Because problem definitions are largely socially constructed, one might assume the empirical or qualitative characteristics of a problem matter little, but the reality of the definitional process is more complex, a mixture of objective and subjective facts and claims.

Regarding anticipatory problems, there is reason to expect a distinctive twist to the problem definition process. Most glaringly, how do organized interest go about describing a problem that does not exist? How can they define elements like the scope, severity, impacted populations, and cause when, in fact, these features are typically unknown or speculative? How does the uncertainty associated with anticipatory problems influence the construction of narratives that support an interest’s cause? To what extent will organized interests strive to limit the uncertainty associated with anticipatory problems? What sorts of strategic definitional claims and tools of political language will they select?

Problem definition is inextricably linked to the next stage in the policymaking process, agenda setting. Agenda setting is the process through which issues are identified and selected for consideration by a decision making body—be it a legislature, bureaucratic agency, court, or chief executive (Cobb and Elder 1977; Baumgartner and Jones 1993; Kingdon 2003). Cobb and Elder (1977) distinguish between two types of agendas. The first agenda type, the systemic agenda, consists of all issues that warrant public attention and fall within government’s jurisdiction. The second agenda type, the institutional agenda, consists of all issues that government decision makers are
actively considering (p. 14). Subsequent scholarship (e.g., Kingdon 2003) concerns the process through which problems move from the systemic to institutional agenda.

A number of mechanisms influence a problem’s ascent onto the institutional agenda. Kingdon (2003) identifies three—indicators, feedback, and triggering events. Indicators refer to measures or metrics of a problem. They include fairly objective quantitative measures (e.g., the number of cases of a disease) and written reports outlining the dimensions of a particular problem (e.g., a report produced by a congressional committee, a think-tank, or an academic scholar). Indicators tend not to have an immediate catalytic effect and often need to accumulate before an issue is conferred agenda status. Birkland (2006) writes that certain “problems become known slowly, as indicators of problems accumulate and become more evident” (p. 7).

Similarly, feedback, a concept examined in greater detail later, refers to information on the performance of existing programs. Feedback, which is normally generated after our policy has been implemented, can bring new problems to light by underscoring shortcomings in an existing policy (Kingdon 2003). Because feedback is largely a byproduct of the implementation and evaluation stages, we will return to this concept in a moment.

Focusing events have attracted considerable scholarly attention (Birkland 1997, 2006; Kingdon 2003; Baumgartner and Jones 1993; Cobb and Elder 1977). Birkland defines a focusing event as one that is “sudden, relatively rare, can be reasonably defined as harmful or revealing the possibility of future harms, inflicts harms or suggests potential harms that are or could be concentrated on a definable geographical area or community of interest, and that is known to policy makers and the public virtually simultaneously” (1997, p. 22). Focusing events are significant in that they can catalyze problems onto the institutional agenda. While Birkland describes focusing events as man-made (e.g., terrorist attacks, nuclear meltdowns, plane crashes) or naturally occurring (e.g., hurricanes, tsunamis, tornados) disasters, Kingdon (2003) opts for a slightly more encompassing
view that includes not only disasters but important personal experiences as well. For example, a highly visible celebrity’s death might bring attention to a specific disease or health disorder. Most importantly, focusing events allow certain issues to leapfrog “everything standing in the way of prominence on the agenda” (Kingdon 2003, p. 96).

Focusing events, indicators, and feedback represent features of a policy problem. However, as indicated in our discussion of problem definition, policy problems are, in many regards, socially constructed. Thus, even these seemingly empirical representations will be subject to strategic manipulation and different interpretations. Kingdon (2003) notes that although indicators are largely objective, debate will abound as to what these measures actually say about the nature of a problem. Do the indicators demonstrate worsening or improvement? What is the rate of change in the problem? What sorts of solutions do they imply? Similarly, because indicators are such powerful descriptive devices, the viability of these measures, as well as the very methods used to gather them, become objects of attack.

The interpretation and definition of focusing events is equally important in determining whether or not a problem cracks the institutional agenda, as well as the types of solutions identified. Kingdon (2003) underscores a number of common themes relating to the interpretation of focusing events. First, a focusing event may serve to reinforce preexisting perceptions of a problem. In this regard, they often represent confirmation of our biggest fears (e.g., an airplane crash confirms the inadequacy of Federal Aviation Authority (FAA) regulations). Second, focusing events may come to represent an early warning of a potential problem that, if left unaddressed, can lead to pervasive and widespread harm. Birkland (1997) describes this very scenario in his analysis of the Three Mile Island (TMI) nuclear accident. He noted that the problem definition debate initiated in the wake of TMI was noticeably “conjectural.” Unlike many other disasters he studied, the TMI incident was largely an intangible event. Specifically, no one was killed, no property was damaged, and no wildlife
habitat was destroyed. The policy debate that surrounded this event was, in turn, conjectural as policymakers primarily focused their attention on the probability of a related disaster in the future. Finally, Kingdon (2003) notes that on occasion a focusing event can only influence a problem definition debate if it occurs in combination with another similar event:

If one bridge collapse, one aviation accident, or one railroad bankruptcy isn’t sufficient to create a sense of a general problem, then several occurring close together might be. Awareness of a problem sometimes comes only with the second crisis, not the first, because the second cannot be dismissed as an isolated fluke, as the first could. (p. 98)

Both Kingdon (2003) and Birkland (1997, 2006) agree that the power of focusing events is largely rooted in their aggregative quality. A focusing event tends to be marked by significant loss of life, property, or economy, making it something that policymakers can ill afford to ignore. For problem definers, this aggregation of destruction presents a strategic opportunity to convey a problem as a crisis or something that requires immediate government attention and action (Rochefort and Cobb 1994).

By the same token, problem definition represents an important tool for keeping items off the policy agenda. Hirschman (1991) argues that most claims of agenda denial follow one of three patterns. A perversity thesis argues that any proposed reform will backfire and actually make the problem conditions worse. Second, a futility thesis holds any reform attempt is doomed from the start, as government intervention cannot influence the particular area in question. Finally, the jeopardy thesis argues that any intervention will spawn new problems worse, in fact, than the ones currently plaguing society.

Cobb and Ross (1997) offer four interest group strategies of agenda denial. Low-cost strategies involve outright denial that a problem exists; recognition that a problem exists but redefining it as an isolated incident (antipatterning); and refusal to formally recognize the legitimacy of the group or groups advocating for agenda space. Medium-cost strategies include formally
attacking the claimants or initiator or, if this fails, placating their cause. Attacks on the initiator often involve disputing the facts of the case, claiming that the issue is not of public concern, attacking the group’s credibility, claiming that the concern represents an isolated incident, as well as various forms of wanton deception (e.g., releasing false data or associating opposition groups with false stereotypes). Placation, by contrast, involves admitting the existence of a problem but blocking the initiators’ proposed solution. Cobb and Ross further identify various forms of placation, including creating a committee to study the problem, co-opting the people advocating a solution, and/or remedying one small aspect of the problem as a way to demonstrate commitment (thus narrowing the scope of the problem through redefinition or “tokenism”), to name a few approaches. Finally, high-cost strategies might involve a slew of threats, such as threatening to sue, withholding electoral support, imposing economic damage, and/or even using physical violence.

Demonstrating a problem’s existence is generally not enough to warrant space on the crowded institutional agenda. Instead, those appealing for agenda space must also show that a viable solution exists. In any given policy area, solutions are likely plentiful, as groups of specialists—often referred to as policy communities—are perpetually developing and presenting remedies that suit their political needs (Kingdon 2003). Policy solutions often require the help of committed individuals or policy entrepreneurs in order to gain agenda space (Mintrom 2000; Kingdon 2003; Baumgartner and Jones 1993). Policy entrepreneurs are individuals who are willing “to invest their resources—time energy, reputation, and sometimes money—in the hope of a future return” (Kingdon 2003, p. 122). Policy entrepreneurs can be “outsiders”—individuals representing interest groups, private citizens, or social advocates—or “insiders”—individuals working within the formal auspices of government, such as chief executives, legislators, and bureaucrats (Donnelly 2009). Beyond promoting a particular solution, policy entrepreneurs will devote considerable energy to the
Finally, the agenda setting process does not occur within a vacuum. It is, in fact, influenced by an array of environmental factors. Changes in public opinion, the composition of government, political alliances, and electoral realignments and shifts all will have a dramatic effect on the agenda setting process (Kingdon 2003). Of particular importance is the role of the media. The media help to identify, define, and interpret problems, bringing them to the attention of policymakers and the public alike. Indeed in selecting to cover—or not cover—a certain topic, the media, in effect, determine which issues will receive attention (Parsons 1995). Baumgartner and Jones substantiated the agenda-setting role of the media when they observed that “Each time there is a surge of media interest in a given topic, we can expect some degree of policy change” (1993, p. 20). Through the media, problem definers are provided with a vehicle to project their definitions of a given policy problem to a wide audience. Simultaneously, the media actively engages problem definers and may be more sympathetic to certain definitions than others.

It is hard to imagine anticipatory problems will neatly conform to any of the established patterns of agenda setting. Because they do not exist (at least not in the present), anticipatory problems cannot reveal themselves through focusing events. And, of course, prior to the enactment of any policy, feedback cannot constitute a viable mechanism for problem definition. What sorts of mechanisms, then, exist for anticipatory problems to seize policymaker’s attention? Indicators? To what extent will organized interests posit solutions for problems that don’t technically exist? How will policy entrepreneurs and others navigate this process? These are important questions to guide empirical research.

The next stage in our process, policy formulation and adoption, refers to the process of developing courses of action to deal with a given problem (Theodoulou 1995; Howlett and Ramesh...
Proposals are often developed before a problem enters the policy formulation stage, as interest groups present solutions throughout the process of problem definition and agenda setting (Kingdon 2003). However, policymakers will cast a far more critical eye on potential solutions during the policy formulation stage. Anderson (2003) identifies a number of factors that influence the likelihood of a proposal's success:

First, is the proposal technically sound? Is it directed at the problem’s causes? To what extent will it resolve or lessen the problem? Second, are its budgetary costs reasonable or acceptable? ...Third, is the proposal politically acceptable? Can it win the needed support of legislators or other public officials? Fourth, if the proposal becomes laws, will it be agreeable to the public? (p. 102)

While these questions are by no means groundbreaking and are likely present during the public conversation over problem definition and agenda setting, their importance becomes magnified within the context of the policy formulation stage.

The procurement of policy decisions and the eventual adoption of public policy is inextricably linked to the policy venue considering the issue. Policy venues refer to institutional locations with decision-making authority (Immergut 1990; Pralle 2006; 2006b; Baumgartner and Jones 1991; Baumgartner and Jones 1993; Weible 2008). Venues have distinct rules, constituencies, incentives, jurisdictions, decision-making procedures, and even cultures that shape both access to and the nature of the policy processes that take place within (Pralle 2003; Baumgartner and Jones 1993; Weible 2008). The American policymaking system, with its division and separation of powers, provides for a wide variety of policymaking venues (Baumgartner and Jones 1993; Bowman 2002). For example, venues can include legislative committees and subcommittees, executives, courts, and administrative agencies, at both the state and federal levels of government (Thorburn 1985; Weible 2008; Emerson et al. 2003). Institutions with narrow or ad-hoc decision making authority, such as scientific panels, can also constitute legitimate policy venues (Timmermans and Scholten 2006).
By virtue of their authority to act, venues are drivers of policy formulation and adoption. Within the U.S. Congress, the vast majority of legislation adopted is developed within one or more of the many committees or subcommittees that make up the federal government’s legislative arm (Light 1995; Forina 1989; Arnold 1992). The mission, norms, rules, culture, and decision-making processes of a given venue dictate that it will bias toward certain policy solutions. Policy venues thus are said to support specific policy “images” (Baumgartner and Jones 1993; Pralle 2006; Kingdon 2003; Sabatier and Jenkins-Smith 1993). For example, bureaucratic agencies whose mission centers on crime and criminal justice will likely see substance abuse as a form of deviant behavior whereas an agency whose mission centers on public health will likely see substance abuse as a mental disease. Depending on which image is supported, the policy output might be radically different—ranging from incarcerating addicts to providing them with free medical care and assistance. To summarize, certain venues are more receptive to certain types of policy principles over others, which, in turn, prescribe the foundational or underlying bases for considering an issue (Bosso 1987; Pralle 2006b).

Given these critical differences, organized interests try to ensure that their pet-problems are located in venues favorable to their cause. Venue shopping is the process through which organized interests seek out venues that will support their policy goals (Baumgartner and Jones 1993; Pralle 2006, 2006b). Advocacy groups must frame their policy solutions and problem definitions according to the norms, morés, rules, and customs of the venue they seek to enter. Of course, these claims will be countered by opposing groups, who use the same strategies of agenda denial noted above to impede the strategies of opponents (Schattschneider 1960; Cobb and Elder 1977).

While various constellations of actors and participants (often referred to as policy “subsystems”) can serve to influence the formulation of policy options, the actual rendering of a decision—the adoption of a specific course of action—falls squarely on formal actors. These actors are more often than not legislators, but may also include chief executives (governors or the
president), judges, and in some instances bureaucrats (Howlett and Ramesh 2003; Anderson 2003). Howlett and Ramesh (2003) note that the policy formulation and adoption stage ultimately culminates in one of three choices—negative decisions, positive decisions, and non-decisions. Positive decisions produce substantive policy change or alterations to the status quo. Positive decisions result in new public policies. Negative decisions represent situations of “arrested policy cycles” (p. 165). In the case of negative decisions, policy proposals are rejected and do not move beyond the policy adoption or deliberation process. Non-decisions, by contrast, are situations where a proposal never actually makes it past the agenda setting or formulation stage, meaning the proposed course of action is never subject to formal policy deliberation.

Scholars have yet to consider the implications of anticipatory problems with respect to the policy formulation and adoption stage. American policymaking institutions are widely portrayed as overly reactive in creating policy in response to existing social ills. Anticipatory policy challenges this depiction. How will policies formulated and adopted to address anticipatory problems differ from typical reactive policies? What legislative mechanisms exist for crafting proactive policies? Will policymakers concede the inherent uncertainty associated their proposals? Will the uncertainty surrounding these problems interfere with the selection of a venue?

Assuming the policy formulation and adoption stage produces positive action, a policy will then enter the next stage of the cycle, the implementation stage. During the implementation stage, an adopted policy is carried out or applied (Anderson 2003; Howlett and Ramesh 2003; Parsons 1995; Goggin et al. 1990). Bureaucratic agencies are generally vested with legal authority to implement public policies, although in some instances legislation may rely on the courts, pressure groups (e.g., “watchdog” entities), or community organizations to participate in the implementation process. Thus, the implementation stage shifts our proverbial “analytical lens” to the administrative arena (Anderson 2003, p. 211).
Scholars once assumed that political conflict ceased after a policy was adopted or, perhaps more commonly, defeated. The classic Wilsonian perspective depicts politics and administration—and, by extension, implementation—as independent of one another. In other words, “administration…takes over where policy ends” (Parsons 1995, p. 462). In reality, this could not be further from the truth. Many debates and conflicts from previous stages bleed into the implementation stage (Howlett and Ramesh 2003). At the same time, new political disputes will arise (Bardach 1977; Anderson 2003). Moreover, implementers do not blindly carry out the policy demands of legislators. Instead, they operate in a complex environment that requires them to engage in their own policymaking function (often through the drafting and enacting of rules and regulations), interact with a wide array of stakeholders, maneuver to maintain funding, and offer services to diverse client populations.

Peters (2012) argues that policy implementation is rife with potential pitfalls, and we are in fact *lucky* if our public policies are carried out. For example, legislation is often vague and unclear in its intent. Vague legislation may be seen as a potential opportunity for the implementing agency to aggrandize its power through its own distinctive interpretation of a new statute. Vague legislation may even empower the agency to devise administrative law. However, the same situation can impose huge pressures on implementing agencies, as organized interests will strive to convince the agency to embrace an interpretation favoring their goals. Where legislation is not vague, it is often flawed and unworkable, a reflection of legislators’ willingness to grapple with complex problems beyond their expertise or in areas where information is limited. In addition, agencies are often inextricably linked to certain interest groups and actors, on whom they rely as clients, consumers, and, in some instances, colleagues and collaborators. These mutually symbiotic relationships require the agency to remain highly sensitive to interest group concerns, thus imposing another constraint on the process of implementation. Finally, the agencies themselves can produce barriers to successful
implementation. Disunity among staff, or communication difficulties, has been shown to derail even the best-intentioned implementation efforts.

Bardach (1977) encourages us to view the implementation stage as a series of games, all of which revolve around power relationships. He argues that implementation is such an inherently messy and complex process, it is virtually impossible to come up with a unifying theory. Attention should instead be directed toward key players and, more specifically, their stakes, strategies and tactics, level of communication, and desired outcomes. The various interactions between these players will accumulate to produce some sort of policy outcome. Sabatier (1986) encourages us to see these actors as representing different policy subsystems, or constellations of participants who dominate certain policy arenas. Simply put, better organized, financed, and informed subsystems will often have an easier time implementing and influencing public policy. Moreover, policies with well-defined goals are often easier to carry out than policies with “fuzzy” or unclear mandates.

In sum, the implementation stage is just as politically charged and conflict-ridden as prior phases in the policy process. Despite cautions against overgeneralization, Gunn (1978) offers ten conditions typically, but not always, associated with successful implementation. First, circumstances external to the implementing agency—be they political, social, or otherwise—should not impose crippling constraints. Second, programs require adequate time and sufficient resources. Third, there must be no constraints on the availability of overall resources. Fourth, the policy being implemented must be premised on a valid theory of cause and effect. Fifth, this theory must be direct, with few intervening links. Sixth, there should be a single implementing agency that does not need to rely on other agencies for success. In the event that other agencies are involved, interdependencies should be limited in both number and importance. Seventh, there should be complete understanding of, and agreement with, the objectives of the policy being implemented. Eighth, in moving towards the objectives, it should be possible to specify the tasks that need to be performed by each participant in
order to achieve the objective. Ninth, there should be coordination and communication across the various organizational elements or agencies involved in implementing the program. Finally, those in authority should be able to demand and obtain obedience.

Just as they seem to create distinctive wrinkles vis-à-vis the problem definition-through-policy formulation stages, so too do anticipatory problems raise questions regarding the implementation process. What are the political and pragmatic implications of implementing policy that sets out to address a problem that does not yet exist? Most anticipatory policy will presumably try to ready the nation for a potential threat, demanding that agencies reach an adequate level of “preparedness.” How will agencies gauge the adequacy of their implementation efforts in the absence of a clear problem against which they can test their interventions? Moreover, should an anticipatory problem fail to manifest itself for an extended period of time, what sorts of difficulties will arise in terms of maintaining an adequate level of readiness? Can preparedness be an ongoing activity, or is it merely an end achieved through, and comfortably confined to, the implementation process? And if the feared problem does occur, will implementing agencies continue to invest their time and effort in a preparedness policy? Finally, will the potentially protracted period between the beginning of the implementation stage and the emergence of the anticipatory problem result in a protracted political conflict? Will opponents of the original policy seize on this period as an opportunity to reverse the losses incurred in the formulation stage?

The final stage in the policy cycle refers to the evaluation of policy. Policy evaluations are conducted by an array of actors including think-tanks, interest groups, the media, congressional committees, administrative agencies, and presidential commissions, to name a few (Anderson 2003). At its most basic level, policy evaluation concerns whether a policy has achieved or is achieving its stated goals, as well as the costs of a policy relative to its benefits (Parsons 1995). In this regard, evaluation is generally seen as a retrospective exercise, although it is not uncommon for
policymakers to attempt to forecast the likely impact of a given policy (Anderson 2003; Fischer
2006; Bobrow and Dryzek 1987).

When considered within the theoretical context of the stagist model, policy evaluation is
depicted as the last stage in the policy cycle, occurring after or at least during the implementation
process. In practice, however, policy evaluation occurs throughout the policymaking cycle and may
in fact “identify problems or shortcomings that cause recycling of the policy process (problem
definition, formulation, adoption, and so on)” (Anderson 2003, p. 245). Palumbo (1987) argues the
evaluation stage overlays the policy cycle, informing and influencing policymaking at each stage.
During the agenda setting and problem definition stages, for example, policy evaluation can play an
important part in forecasting the scope and severity of a problem, as well as the populations likely to
be impacted by a given policy intervention. Similarly, evaluation plays a critical role in projecting the
likely costs and benefits of various policy interventions, thus making it an important instrument of
policy formulation and adoption.

Policy evaluation, and indeed public policy in general, is in many ways based on assertions of
cause and effect relationships. For a policy to be deemed “successful,” demonstrable changes in the
problem condition must be shown to have been caused by the introduction of the given policy
output. Establishing clear causal relationships is obviously difficult. Anderson (2003) notes that
public policies are not implemented in a laboratory, but in an ever-changing social environment.
Because this environment is in a constant state of flux, intervening variables are often introduced
that may serve to blur the lines of causality. According to evidence, states that implement mandatory
periodic automobile inspections tend to have lower vehicular fatality rates than those that do not.
While this finding would certainly imply a successful policy, it does not account for differences in
population density, weather conditions, and the percentage of young drivers, all of which might
constitute better explanatory variables. Not surprisingly, the measurements used to establish causal
relations—indeed all measurements associated with the evaluation process—are often highly contested. Political conflict will often surround the correct measures and the interpretation of those measures, because organized interests will attempt to use the evaluation stage as an opportunity to reverse or sustain existing policy.

Establishing causal relations between a policy and the problem it sets out to solve is thus a very complex and contested process, even when the problem in question is familiar and relatively common. Anticipatory problems, it seems, only serve to magnify these difficulties. How can evaluators measure the impact of policy intervention when the problem in need of solution is not even manifest? Will a lack of empirical indicators of success or failure make the evaluation stage obsolete, or will organized interests present alternative—perhaps prospective—measures of success?

Policy evaluation also produces policy feedback, or information about the operation of existing programs (Kingdon 2003; Easton 1965). Kingdon (2003) shows that feedback messages can impact existing policy narratives and promote policy change by indicating the implementation of a policy doesn’t square with intent, fails to meet stated goals, is too costly, or has produced negative unanticipated consequences (pp. 101-103). Feedback is especially important for bureaucrats hoping to promote policy change. Writes Kingdon (2003):

> The power of bureaucrats often is manifested in the implementation activity. Because careerists are so involved in administration, they have little time left for pushing new ideas. Through feedback from the operation of programs, however, implementation can lead to innovation. If bureaucrats find a program is not going well in some particular, that recognition might feed into a policy change. But even in that case, there is some incentive to protect the existing program rather than to open it up to criticism and a possible Pandora’s box of changes. (p. 31)

Feedback thus has the capacity to promote policy change, although drastic overhauls are unlikely given the policymaking system’s institutional bias towards stasis. Weiss (1977) agrees with Kingdon, noting that policy feedback may serve to alter the way issues are framed as well the definitions forwarded by organized interests. Like Kingdon, Weiss also indicates
there is little empirical evidence to support the contention that feedback in-and-of-itself can stimulate policy change.

Hogwood and Peters (1983) argue that not only can feedback prompt policy innovation, it can also prompt policy maintenance or, even more dramatically, policy termination. Policy maintenance simply refers to minor alterations in existing policy. These changes may help to ensure the policy continues to meet its intended goals. The practice of policy maintenance can range from continued or increased monetary support to substantive alterations in an authorizing statute. Policy termination, by contrast, refers to a calculated decision to end a policy. The most common mechanism for termination is elimination of expenditure or budgetary lines. Scholarship has demonstrated that outright policy termination is a rarity. Bardach (1976) highlights considerable political disadvantages to terminating a public policy. Policy termination involves, to some extent, admitting one was wrong. Policy termination also tends to create brutal political conflicts because organized interests often come to rely on existing policies. And because policies often represent significant financial investments, termination can also be interpreted as an indicator of waste. Why did we sink all of those resources in a policy that was ultimately eliminated? Finally, policy termination offers little, if any, political payoff. Voters tend to reward policy innovation and change, not termination. Policymakers therefore have very little incentive to immerse themselves in conflict, wasting precious political capital on a battle to eliminate an existing program.

Yet one issue of concern in this study is whether anticipatory policy might challenge some of these norms. Will policymakers continue to support an anticipatory policy if the problem being anticipated does not occur within a “reasonable” timeframe? On the flipside, will policymakers continue to support a preparedness policy after the problem it sets out to make ready for occurs?
Conversely, assuming that policy is not terminated, will policymakers and bureaucrats choose to alter or recalibrate the policy through a process of policy maintenance? How will these changes be made in the face of limited feedback on program performance (assuming the anticipatory problem fails to manifest, of course)? Clearly, anticipatory policy problems raise distinctive questions with regard to the termination process.

**The Road Ahead: An Outline of Forthcoming Case Studies**

The next three chapters offer case studies in the respective areas of nanotechnology development, H5N1 avian influenza, and global warming. As indicated in Chapter 1, each of these cases focuses on an anticipatory problem that is, relatively speaking, at a different stage in its evolution as a policy problem. Thus, each case pays close attention to a particular stage in the anticipatory policymaking process—be it the identification/forecasting, preparedness, or mitigation/avoidance stage.

The first case explores the health and environmental implications of nanotechnology. In many ways, the nanotechnology problem is the least evolved, or developed, of the three cases. Given the relative newness of the technology, policy efforts have centered almost entirely on the first stage of the anticipatory policy process—identification and forecasting. Policymakers do not know what, exactly, the potential risks of the technology may be, let alone the best way to prepare for them. For the most part, then, the nanotechnology case focuses on efforts to create a governing framework capable of identifying those risks, although some consideration is given to preparedness policy vis à vis the creation of regulatory policy.

In our second case, the H5N1 avian influenza example, consideration is again given to the forecasting and identification of problem indicators. These indicators are generally assumed to be measures of H5N1 cases and deaths, which are thought to be indicative of the probability that the
virus will mutate into an airborne, pandemic influenza. However, unlike nanotechnology, this case focuses primarily on the enactment of preparedness measures. Once the influenza became recognized as a legitimate problem, policymakers spent considerable time devising plans to ready the nation for what many felt was a looming pandemic. This case chronicles the policy dynamics of that process.

The final case study, global warming, spans the entirety of the anticipatory policymaking process but focuses predominantly on the last stage—mitigation and avoidance. In many respects, this stage should be viewed as an alternative to the task of preparedness. Whereas policy enactment in the preparedness stage seeks to brace the country for the inevitable, this policy effort in the avoidance/mitigation stage, at least in the case of global warming, seeks to ensure that a certain ill-fated event does not occur. With global warming, the “problem” that policymakers are trying to avoid is the advent of a tipping point, after which we will face permanent and irreversible climate changes.

Each case study is structured to include a number of sub-sections. The cases begin with a general introduction or overview of the underlying theme. In the next section, an outline of the dimensions of the policy problem is provided. This section is not intended to explicate the politics of the policy problem, only to provide a basic description of its main features. From here, the case studies transition into a detailed examination of the policymaking process surrounding the anticipatory problem in question. Careful attention is given, first, to the discourse surrounding policy conflict, particularly the definitional strategies and narrative framing employed by political actors operating both inside and outside of government in their attempts to stunt or promote policy change. The next section examines the policy interventions proposed in response to the identified problem. While the cases focus on Congress and the Executive Office of the President, bureaucratic and regulatory activity is also examined where appropriate. Finally, as already noted, the
policymaking process does not end with adoption or rejection of public policies. All case studies will analyze implementation of the various enacted policies, including any regulatory or rule making procedures that might have influenced an implementing agency’s capacity to carry out the orders set by Congress and the President.

This thesis does not intend to test any specific policy typology that has been proposed by scholars, although it will be informed throughout by the method of analysis used in previous research on this topic. This means giving attention to the kinds of variables and outcomes in the policy typology literature—agenda-setting patterns, interest-group mobilization, formal and informal interactions within the legislative arena, bureaucratic involvement, presidential leadership—found to be important by previous researchers in distinguishing how policy is made for one issue area versus another. In carrying out this analysis, the overarching schema is the policy cycle because, whatever shortcomings it may possess when taken too rigidly in either a descriptive or predictive sense, there is no better structuring concept for tracking public policy change as a developmental sequence.

Taken together, then, both the policy typology literature and the concept of the policy cycle provide guidance with respect to the substantive focus of the following case studies as well as their narrative form. Above all, however, the question each case study attempts to answer is the same: What are the special patterns, across the different stages of the policymaking process, that are associated with issues defined by their anticipatory character? Figure 2-1 provides an abstract representation of the way the two streams of literature reviewed in this chapter interweave to provide an orienting framework for execution of the following case studies. The full theoretical payoff of this approach will not come until Chapter 6, when the distinctive features of the anticipatory policy type can be discussed systematically based on the case study material.
One closing note is in order. While each case study adheres to the general timeline or sequence of actual events, the case studies are not always, or purely, chronological. While the stages model conceptualizes a linear model of policymaking, the policymaking process is, at times, a dynamic and often discontinuous path of institutional, group, and individual behaviors. For example, in each and every stage new definitions and competing policy proposals might emerge, while older narratives and policies are discarded. Similarly, even after a substantive piece of legislation has been enacted—authorizing a bureaucratic entity to implement a policy response—it is often true that new and revised policy proposals will surface and be enacted by legislators in years to come. In other words, no policy adoption event reliably signals the “end” of the policy debate, and the case studies provided here will backtrack, circle, and pursue tangents, as necessary, in making sense of the nature and outcome of the policy process for my selected issues.
Chapter 3
No Small Matter: Balancing the Risks and Benefits of Nanotechnology

Nanotechnology refers to the manipulation or control of matter at a subatomic level. The defining feature of nanotechnology is its scale—a single nanometer is one-billionth the size of a meter. Nanotechnology engineering often creates structures as tiny as 100 nanometers in size. At the “nanoscale,” scientists are able to alter the very building blocks of everyday materials. Nanotechnology’s significance—its promise—is in part derived from the fact that matter as we know it behaves in fundamentally different ways at the nanoscale. Stable in bulk, aluminum exhibits explosive properties at the nanoscale. Gold shows hues of red, blue, and even green. Even zinc oxide, which is normally an opaque substance used to block ultraviolet rays, is transparent at the nanoscale (O’Donnell and Isaacs 2010). More importantly, scientists believe that by working from the bottom up—from the nanoscale upwards—they can construct new materials and other matter, harnessing the new and unique properties found at nanoscale in ways unimaginable at the atomic level. In other words, nanotechnology allows scientists to control the very building blocks of the material world.

For students of public policy, the nanotechnology case epitomizes the proverbial balancing act that accompanies any new (let alone potentially revolutionary) technology. On the one hand, nanotechnology promises enormous social and economic benefits. From improved medical delivery devices to faster communications, more durable materials to longer lasting batteries, the possible products created and enhanced by nanotechnology are seemingly endless. American policymakers have an enormous incentive to leverage the country’s robust research and development capacity, establishing the U.S. as a global leader in this emerging field. According to Michael Holman, research director of the Lux-Research, a Boston-based research firm that studies the likely economic impact of nanotechnology, the global market for nano-containing products may reach $2.5 trillion by 2014 (in 2005, the market already stood at $254 billion). Further, Mihail Roco, senior
nanotechnology advisor at the National Science Foundation (NSF), estimates that nanotechnology will create at least 1 million jobs worldwide by 2015 (Schneider 2010).

On the other hand, history has shown that even the most beneficial technological developments can bring negative consequences for human health, the environment, and society in general (McGinn 1990; More 2000). Ever since the federal government formally involved itself in the research and development of nanotechnology with the creation of the National Nanotechnology Initiative (NNI) in 2000, policymakers, scientists, public health specialists, and environmental activists alike have expressed concerns about the potential implications of nanotechnology. At present, science has yet to demonstrate definitively any risks associated with this new technology, but warning signs abound. Accordingly, a concerted effort is afoot to forecast and anticipate the potential risks associated with nanotechnology prior to its full integration into society.

The nanotechnology case represents anticipatory policymaking in its most extreme form. Even today, many of nanotechnology’s risks have yet to be conclusively verified. In fact, many would argue nanotechnology’s potential risks have not even been discovered, let alone studied and confirmed. However, the simple fact that these risks could exist has fueled calls for government to take proactive steps to identify these threats—to simply understand what these risks might be—in advance. In this regard, the nanotechnology debate largely centers on the steps needed to position government to actually identify and process these risks, as opposed to how best to prepare for a looming and known danger. This particular aspect of the nanotechnology debate makes it different from both the avian influenza and global warming debates. In these latter cases, a relatively known risk—i.e., a deadly pathogen, or permanent atmospheric changes—has been identified, although policymakers cannot accurately determine when, where, how, or to what extent the dangers will occur. Thus, one could persuasively argue that the nanotechnology debate embodies greater
uncertainty, at least with regard to the characterization of risk. As such, nanotechnology constitutes an optimal starting point for my discussion of anticipatory policymaking.

Finally, just as policymakers anticipate nanotechnology might bring about harms, so too do they anticipate enormous benefits. Indeed, despite its troubling health, environmental, and even social implications, nanotechnology is overwhelmingly regarded as a positive development. To this end, the nanotechnology case explores the inherent balancing act associated with promoting a new technology. And while this chapter primarily focuses on the steps taken to anticipate nanotechnology’s health and environmental dangers, the importance of the countervailing narrative simply cannot be dismissed from this study.

To what extent has the federal government attempted to strike a balance between perceived benefits and potential risks? How has the considerable uncertainty associated with nanotechnology’s risks influence this process? What sorts of mechanisms—if any—does the federal government use to minimize this uncertainty? These questions, as well as those relating to the distinctive policymaking dynamics of anticipatory problems, are investigated below.

**Dimensions of the Problem**

No universally accepted definition of nanotechnology exists. Broadly speaking, nanotechnology can be defined as the manipulation and engineering of matter at a subatomic level (National Science Foundation 2012). Most discussions tend to underscore three key features. First, many equate nanotechnology with “smallness.” Nanotechnology, in fact, is generally viewed as dealing with structures of 1-100 nanometers in scale, although more complex nanostructures will be larger. A single nanometer is one billionth of a meter, smaller than an atom, so nanotechnology essentially involves the manipulation of subatomic particles.
Second, many observe that matter behaves in fundamentally different ways at the “nanoscale.” The uses of these novel particles are manifold, ranging from enhanced rocket propulsion to more effective sunscreens; advanced drug delivery devices to new types of precious jewels (O’Donnell and Isaacs 2010). Nanotechnology allows humankind to access an array of truly novel—unthinkable and once unattainable—materials and properties.

Third and perhaps most importantly, scientists predict nanotechnology will allow them to control and manipulate the very atoms that make-up matter as we know it. This is perhaps the most extraordinary aspect of nanotechnology. Through nanotechnology, scientists can engineer at a molecular level and “deliberately shape new structures, atom by atom” (McCray 2005, p. 178). This exceptional level of control and precision, coupled with the fact that atoms behave in fundamentally different ways at the nano-scale, promises to result in a plethora of new and perhaps even revolutionary structures. Nanotechnology is seen as an opportunity for mankind to harness and ultimately reconstruct the molecular world (McCray 2005).

Nanotechnology is not a singular technology *per se*. Instead, the tools of nanotechnology are used in a wide array of fields, ranging from national defense to health care, transportation and energy to communications. What is more, while nanotechnology proponents have promised fundamentally new products and devices in the future, the technology has largely been used to enhance existing product and technologies, such as batteries, computer memory systems, and a variety of drug delivery devices (Sargent 2011).

Nanotechnology enthusiasts claim the technology will confer enormous social and economic benefits in the coming years. Countless examples of potential and existing products greatly enhanced or created using nanotechnological engineering exist. Health technologists have been studying ways to use carbon nanotubes as biomarkers of cancerous tumors. Once injected, these trained particles can affix themselves to, and illuminate, cellular changes that represent precursors to cancer
otherwise undetectable. Similarly, scientists are working on developing nanoparticles that can target cancer cells and deliver medical treatments, like chemotherapy. Scientists not only hope that such a system might be a more effective way of administering cancer drugs, but that it might also spare patients harmful side effects typically associated with having harsh chemicals course through one’s entire body (Sargent 2011).

Other examples outside of the medical technology field are equally intriguing. Solar panels fitted with nano-engineered panels are believed to be far more efficient at sunlight conversion. Some have argued that nanotechnology-enhanced desalinization filters might offer affordable and portable water cleansing systems, eventually bringing universal access to clean water. Computer scientists are also hopeful that nanotechnology could considerably expand the storage space of traditional memory devices, leading to President Bill Clinton’s famous observation that the entire library of Congress may one day be fitted on a memory device the size of a sugar cube (Sargent 2011; National Science and Technology Council 2000).

In light of these potentially groundbreaking products, it is not surprising that the projected economic impact of nanotechnology is enormous. Michael Holman of Lux Research believes the global market for products containing nanotechnology could reach $2.5 trillion by 2014. Others estimate nanotechnology will create roughly 1 million jobs worldwide by 2015 (Schneider 2010).

The same features that make nanotechnology so promising, however, are also cause for concern. Nanotechnology’s novelty poses distinctive risks, the likes of which have not been experienced at a molecular level. Professor Robert Schiestl of UCLA School of Public Health notes: “The difference in size is vital to understanding the risk from the same chemical. Titanium dioxide is chemically inert and has been safely used in the body for decades for joint replacements and other surgical applications. But when the very same chemical is nano-sized, it can cause illness and death” (Schneider 2010, para. 32). Many commentators have come to see nanotechnology as a “double
edged sword,” promising not only enormous benefits but frightening risks as well. John H. Sargent, Jr., Specialist in Science and Technology Policy at the Congressional Research Service, summarizes this dilemma:

On the one hand, some are concerned that nanoscale particles may enter and accumulate in vital organs, such as the lungs and brains, potentially causing harm or death to humans and animals, and that the diffusion of nanoscale particles in the environment might harm ecosystems. On the other hand, some believe that nanotechnology has the potential to deliver important EHS (Environmental, Health, and Safety) benefits such as reducing energy consumption, pollution, and greenhouse gas emissions; remediating environmental damage; curing, managing, or preventing diseases; and offering new safety enhancing materials that are stronger, self-repairing, and able to adapt to provide protection. (Sargent 2011b, p. A1)

Sargent introduces some of the most pressing issues associated with nanotechnology. Scientists and public health experts alike have raised concerns about nanotechnology’s ability to penetrate the blood-brain barrier structure that essentially protects the brain from harmful substances. When inhaled, nanoparticles have been shown to cross this barrier and perhaps even accumulate in the brain. To be sure, scientists have yet to establish this poses an actual risk to human health (Sargent 2011b). Nonetheless, for obvious reasons, the ability of nanoparticles to cross the blood-brain barrier—something that no other known molecule has been shown to do—is unsettling (“Nanotechnology Risks…” 2008).

Similarly, Benedicte Trouiller, a molecular biologist at UCLA’s School of Public Health, found that, in laboratory tests, nano-titanium dioxide damaged and destroyed the DNA and chromosomes of lab animals. The degree of DNA damage can be “linked to all the big killers of man, namely cancer, heart disease and aging,” claims Professor Schiestl, who worked with Trouiller at the UCLA lab (Schneider 2010, para. 3). Other studies have suggested that inhaled nanoparticles produce lung damage alarmingly similar to the effects of asbestos, the fibrous molecule commonly found in insulation, and cause cancers of mesothelioma and asbestosis (a chronic inflammatory condition that typically affects the lungs) (Stimers 2008).
So it is that nanotechnology represents an endeavor of enormous promise that simultaneously suggests extreme caution. Yet, on both accounts, uncertainty remains. As of this writing, few if any of the suspected health and environmental risks have been indisputably confirmed. Similarly, many of the most significant and promising benefits of nanotechnology have yet to come to fruition. In turn, the policymaking debate surrounding nanotechnology is marked by speculation. Below, I will investigate the policymaking dynamics associated with anticipating both the desired and feared outcomes, as policymakers strive to balance risk against reward.

**Discourse of Conflict**

The policy discourse surrounding nanotechnology reflects the kind of balance that must be struck when supporting an active public sector role in the promotion of a new technology (Fisher and Mahajan 2006). Policymakers face considerable pressure, particularly from industry and academia, to ensure America becomes a global leader in nanotechnology research, development, marketing, and commercialization. Technological leadership is important not only to the country’s economy, it can also bolster the overall geopolitical standing of the U.S. by ensuring American companies represent forerunners of industry on the global stage. At the same time, however, policymakers and other public sector actors are responsible for protecting public health and welfare. They must ensure the technologies they are promoting do not cause harm. Beyond this ethical responsibility, even the perception of harm can cause public backlash and effectively undercut attempts to promote a new technology. Policymakers hoping to pave the way for new technological advances must take heed to cultivate public support and acceptance (Sandler and Kay 2006).

At least initially, the proverbial pendulum swinging between benefit maximization and risk minimization was tipped heavily in favor of the former. Even today, the predominant policy narrative surrounding nanotechnology invokes utopian dreams and unabashedly optimistic
predictions fueled by a pervasive desire to ensure American superiority. This narrative is rarely overshadowed by environmental, health, and safety concerns.

The conceptual origins of nanotechnology stem from a speech delivered to the American Physical Society by Nobel Prize winning theoretical physicist Richard Feynman in 1959. Aptly entitled “There’s Plenty of Room at the Bottom,” Feynman’s speech boldly speculated that science would eventually harness the capacity to manipulate and reconfigure the very building blocks of matter, atoms. Feynman proclaimed: “[U]ltimately—in the great future—we can arrange the atoms the way we want; the very atoms, all the way down!” (Qtd. in Hunt and Mehta 2006, p. 2). Fifteen years later, in 1974, Japanese scientist Taniguchi Nori coined the phrase “nanotechnology” in reference to a scientific technique that could be used to control matter at the level of a nanometer (Hunt and Mehta 2006).

Throughout the 1960s and 1970s, scientists made headway toward constructing tools that would eventually make Feynman’s dream a reality. A major breakthrough came in 1986, when Gerb Binning and Heinrich Rohrer, two researchers working at the IBM research laboratory in Zurich, developed a scanning tunneling microscope. The microscope, which later earned the researchers a Nobel Prize, allowed researchers to observe individual atoms for the first time. Armed with this new technology, researchers Donald Eigler and Erhard Schweizer published a paper in Nature in 1990 in which they reported having successfully moved individual atoms around. This represented the first time matter was manipulated at the atomic level (McCray 2005; Eigler and Schweizer 1990).

Many observers see K. Eric Drexler, a student and later a teacher at Massachusetts Institute of Technology (MIT), as one of the most important catalysts of nanotechnology’s ascent to the policy agenda (Baum 2003; McCray 2005). Drexler, it seems, represents nanotechnology’s first policy entrepreneur (Kingdon 2003). Throughout the 1980s and 1990s, he published a series of books trumpeting nanotechnology’s promise. His most famous book, Engines of Creation (1987), described
what Drexler called assemblers, or semi-autonomous nanoscale machines, capable of self-replicating and producing almost any material or object. The book, which was largely written for a general audience, cast nanotechnology in a fairly accessible—and positive—light. Drexler envisioned a world where assemblers would drastically improve everyday living conditions, offering new and improved materials and goods. These assemblers could be manipulated to create structures from the bottom-up, providing mankind with ultimate control over the material world. (Ironically, Drexler’s utopian story was flipped on its proverbial head years later and used to communicate a horrifying portrayal of nanotechnology—a world overrun by aggressive and unstoppable “nanobots” [Center for Responsible Nanotechnology 2005]) Drexler was later tapped by then–U.S. Senator Albert Gore (D-TN) to speak at a congressional hearing devoted to “New Technologies for a Sustainable World.” During the hearing, Drexler stated “molecule-by-molecule control” could become “the basis of a manufacturing technology that is cleaner and more efficient than anything we know today” (Qtd. in McCray 2005, p. 183).

If Drexler was largely responsible for communicating a mainstream and accessible image of nanotechnology to the public and the policymaking community, it was Mihail Roco who translated that portrayal into a tangible research agenda for the federal government. Indeed, Roco, a mechanical engineer who began working at the National Science Foundation (NSF) in the 1990s, was long captivated by the promise of nanotechnology. Upon his arrival at the NSF, he founded a research program dedicated to studying nano-particle synthesis and quickly orchestrated a strategy for developing an interagency effort dedicated entirely to nanotechnology R&D (McCray 2005).

In 1997, Roco spearheaded the creation of, and later chaired, the Interagency Working Group on Nanoscience, Engineering, and Technology (IWGN). The IWGN was responsible for reporting directly to the National Science and Technology Council (NSTC), a cabinet level body established by President Clinton in 1997 to coordinate science and technology policy at the
executive level. Over the next several years, the IWGN formulated its vision for a sweeping, multi-agency nanotechnology R&D effort, which they came to call the “National Nanotechnology Initiative.” Amidst growing Congressional interest in repositioning the country’s long-term science and technology strategy, combined with an uptick in scientific interest in nanotechnology in particular, Roco pitched his idea for the NNI to a handful of the Clinton Administration’s top scientific and economic advisors in 1999. The scientific community’s enthusiasm about nanotechnology was largely fueled by the belief that only an extraordinarily promising project would stir the imagination and, most importantly, wallet of Congress. That meeting was followed by a concerted effort to educate Congress on the promise of nanotechnology, a campaign that included distribution of brochures describing a future filled with nano-enhanced products as well as various presentations at Congressional hearings (McCray 2010).

The efforts of Roco and his colleagues paid off. In 2000, President Clinton declared nanotechnology a top priority for his administration. On January 21, 2000, in a speech delivered before the California Institute of Technology, President Clinton discussed his vision of the federal government’s role in facilitating the progress of nanotechnology. A watershed moment in formation of America’s nanotechnology sector, President Clinton’s address echoed the same utopian ideals evoked by Feynman 50 years prior. Stated Clinton:

Imagine the possibilities: materials with ten times the strength of steel and only a small fraction of the weight—shrinking all the information housed in the library of Congress into a device the size of a sugar cube—detecting cancerous tumors when they are only a few cells in size. Some of our research goals may take 20 or more years to achieve, but that is precisely why there is an important role for the federal government. (Qtd. in National Science and Technology Council 2000, p. 11)

Later that month, in his State of the Union address, President Clinton announced the multi-million dollar, multi-agency National Nanotechnology Initiative (NNI). Clinton submitted a FY 2001 budget request of nearly $495 million to support the NNI proposal and augment the government’s
investment in nanotechnology R&D (National Science and Technology Council 2000). In years to follow, Roco continued to represent the most active policy entrepreneur in the nanotechnology debate, focusing most of his effort on securing a permanent statutory authorization for the NNI from Congress. In fact, in 2003 Forbes magazine recognized him as the first among “Nanotechnology’s Power Brokers” (National Science Foundation 2012).

The same optimism associated with the early era of nanotechnology dominated congressional debate surrounding the proposed NNI appropriation. Neal Lane, President Clinton’s Science Advisor, stated: “If I were asked for an area of science and engineering that will most likely produce the breakthroughs of tomorrow, I would point to nanoscale science and engineering” (Qtd. in McCray 2005, p. 186). Richard Smalley, Rice University scientist and Nobel Prize winner, added: “There is a growing sense in the scientific and technical community that we are about to enter a golden new era” (Qtd. in McCray 2005, p. 187). Famed technologist and nanotechnology enthusiast Ray Kurzweil heaped exceptionally high praise on the new technology, effectively implying that nanotechnology constitutes a “cure-all” solution to many of society’s most pressing ills. According to Kurzweil, “Nanotechnology and related advanced technologies of the 2020s will bring us the opportunity to overcome age-old problems, including pollution, poverty, disease, and aging” (Qtd. in Fisher and Majahan 2006, p. 6).

Congress overwhelmingly approved the NNI budgetary proposal. Of the $495 million requested, Congress voted $465 million, $150 million of which was to be dispensed by the NSF in the form of research grants. An additional $90 million was appropriated for basic research to be directed toward scientists and teams of researchers. The NNI’s focus on research grants epitomized the post-Cold War shift in science and technology policy (McCray 2005). No longer would the federal government be solely responsible for research and development. Instead, much of this
responsibility would be delegated to teams of private scientists and researchers—often working in academic and private settings—who would receive federal backing.

The National Science and Technology Council (NSTC) describes the NNI’s mission as follows:

A future in which the ability to understand and control matter on the nanoscale leads to a revolution of technology and industry. The NNI will expedite the discovery, development, and deployment of nanotechnology in order to achieve responsible and sustainable economic benefits, to enhance the quality of life, and to promote national security. (Qtd. in Sargent 2011c, p. 7)

NNI does not have a centralized funding source. Instead, funding goes to a number of participating agencies. The original recipients included the National Science Foundation (NSF); the Department of Defense (DOD); the Department of Energy (DOE); the Department of Commerce (DOC); National Institute of Standards and Technology (NIST); the National Aeronautics and Space Administration (NASA); and the Department of Health and Human Services’ National Institutes of Health (NIH). By 2010, the number of participating agencies grew to 25, and 14 received specific appropriations to conduct and/or fund nanotechnology R&D (Sargent 2011c, p. 4). Since its initial funding in FY2001, the NNI’s annual appropriations have grown four-fold, reaching an estimated $1.8 billion in FY2010 (Sargent 2011c).

With the launch of the NNI, the Clinton Administration seized ownership of the predominant narrative surrounding nanotechnology. Various press releases, as well as NNI’s website, bore the title “National Nanotechnology Initiative: Leading the Way to the Next Industrial Revolution” (White House 2001). Analogizing the NNI, and nanotechnology in general, to the Industrial Revolution allowed the Clinton Administration to present a highly positive and widely understandable problem definition. In their analysis of the social dimensions of the NNI, Sandler and Kay (2006) summarized the logic of this Industrial Revolution analogy as follows:
Labeling nanotechnology as "revolutionary" promotes a general attitude toward nanotechnology by trading on a common line of reasoning: technological revolutions are constituted by significant technological progress; technological progress enables comfort, ease, health, longevity, security, and wealth; therefore, technological revolutions are social goods. Thus, to claim that nanotechnology is revolutionary invites a positive socio-ethical evaluation of it, not just a positive scientific or technological one. (p. 675)

This analogy is one of the most pervasive depictions of nanotechnology. Kay and Bosso (2005) note that, as of 2005, there were “more than a half million articles, reports, and web sites that characterize nanotechnology research and development as ‘the new,’ the ‘next,’ or ‘another’ Industrial Revolution” (p. 2).

Analogy serves a vital function in limiting the inherent uncertainty associated with anticipatory problems. Unlike existing technologies, whose benefits—or risks—are known, nanotechnology is in its nascent, if not embryonic, stages. Policymakers can only speculate as to what changes it might bring to bear. By analogizing nanotechnology to a past event or situation, such as the Industrial Revolution, policymakers have been able to frame the issue in familiar terms, as opposed to simply conceding to the uncertainties. Somewhat paradoxically, nanotechnology was thus portrayed as both a novel and familiar technology. It was capable of spawning radically innovative products and materials, but ultimately represented the latest iteration in a long line of life-changing technological advances.

More than anything, however, nanotechnology was portrayed as an overwhelmingly good thing. Policy actors on both sides of the aisle, not just the Clinton Administration, were enthusiastic. At the 2002 NanoBusiness Conference in New York City, former-House Speaker Newt Gingrich (R-GA) called nanotechnology "the investment with the largest payoff over the next 50 years" (Di Justo 2002, para. 1). He even went so far as to praise the Clinton Administration by calling the NNI "one of the better things the government has done" (para. 4).
It seems that, at least for nanotechnology proponents, the only potential “problem” at this time was the federal government’s failure to ensure the U.S. was as a global leader in the nanotechnology field. At a 1999 hearing at the U.S. House of Representative’s Subcommittee on Basic Research, a subcommittee of the Committee on Science, scores of presenters spoke of the importance of securing U.S. leadership in the nanotechnology field while warning that a number of other nations stood poised to compete for this position. Ralph C. Merkle, a research scientist at the XEROX Palo Alto Research Center, testified: “Economic progress and military readiness in the 21st century will depend fundamentally on maintaining a competitive position in nanotechnology” (Subcommittee on Basic Research 1999, p. 10). Merkle added that developing nanotechnology will “be a major project, just as developing nuclear weapons or lunar rockets were major projects.” Therefore, federal government support was essential. In his opening statement, Representative Nick Smith, Chairman of the Subcommittee on Basic Research, warned: “Unfortunately, while progress has been made, the United States does not dominate nanotechnology. A significant amount of research is currently underway in Europe, especially Japan” (Subcommittee on Basic Research 1999, p. 1). Eugene Wong, Assistant Director for Engineering at the National Science Foundation, raised these same concerns: “I think the United States is in the forefront of this new science and technology area, but the other countries, the other developed nations, are not far behind. It is an area of great focus for all the developed countries in the world; for European countries as well as Japan” (Subcommittee on Basic Research 1999, p. 11). Other presenters struck the same theme: not only is nanotechnology not a problem, it represents a critical technological development. Failure to secure a leading global role in this field could have dire economic and perhaps even military implications. Significant government support was in order.

Still, not everyone succumbed to the overarching techno-optimism of the Washington science and technology establishment. Soon after the NNI was enacted, a broad assortment of non-
governmental organizations and interest groups began to voice concerns about the government’s seemingly blind faith in the so-called “nano-revolution.” Countervailing narratives cast a skeptical light by presenting dystopian depictions of the new technology and challenging the rhetorical devices used by nanotechnology proponents.

For their part, detractors proved equally adept at manipulating the political discourse with colorful language and analogies as a mean of undermining this nanotechnology. Some took aim at the next Industrial Revolution analogy. Georgia Miller of Friends of the Earth Australia, an international environmental advocacy firm that aggressively advocated for attention to the potential health, environmental, and social risks, of nanotechnology, asked: “What would a ‘post-revolutionary’ nanotech world look like? Given that past revolutions have resulted in winners, losers, and massive social upheaval is anyone planning to manage this revolution to mitigate its most adverse consequences?” (Miller 2008, p. 216). The World Council of Churches, an international “fellowship” of hundreds of churches and clergies, argued that the Industrial Revolution analogy was not an entirely promising comparison because “major new technologies, at least initially, destabilize marginalized peoples while the wealthy anticipate, manipulate and ride the wave’s crest” (World Council of Churches 2005, para. 6).

In the weeks leading up to Congress’s approval of the NNI budget line, Bill Joy, one of the co-founders of Sun Microsystems, published an article in Wired magazine describing what has come to be known as the “grey goo” scenario. Contrasting the positive depiction of self-replicating machines presented by Drexler, Joy imagined a scenario wherein uncontrolled, self-replicating nanorobots might destroy entire ecosystems and effectively turn the natural world into a mass of grey goo (McCray 2005, p. 190). Concerns with nanotechnology garnered even more mainstream attention in 2002 when it was featured in Michael Crichton’s best selling novel Prey. Crichton’s book, which was intended to serve as another in a long line of warnings from this author regarding the
reckless pursuit of superscience and advanced technology, offers yet another doomsday scenario and
conjures up swarms of nano-robots replicating en masse and hunting humans.

Perhaps the most influential counter-narrative from opponents put forward an analogy between nanotechnology and Genetically Modified Organisms (GMOs). GMOs are organisms that have been altered through genetic engineering techniques, such as recombinant DNA technology. These techniques allow scientists to reconstruct or enhance organisms in order to provide them with, or accentuate, certain desired traits. Not surprisingly, the science of genetic modification is especially pervasive in the agriculture industry because it allows scientists to create crops enhanced with beneficial characteristics. Such enhancements include greater resistance to pests, longer shelf life, and higher nutritional value. Ken Rosebro, staff editor at Organic Consumers Association, a nonprofit organization that advocates for, among other things, food safety, sustainability, decreased use of genetic engineering, and “de-industrialization” of the food chain, asserted: “Both [GMOs and nanotechnology] manipulate fundamental levels of nature where the potential for negative unforeseen consequences is great” (Rosebro 2006, para. 23). In other words, opponents held that nanotechnology, like GMOs, violated the sanctity of living things while threatening unforeseeable risks.

The GMO analogy also represented a cautionary tale for policymakers who counted on achieving public support of nanotechnology. Beginning in the mid-to-late 1990s, a significant backlash against GMOs occurred worldwide among members of the general public as well as environmental advocacy and consumer safety groups. The backlash was predicated on the moralistic objections raised above, as well as widespread sentiment that governments were introducing a new and potentially transformative technology without considering public perceptions and concerns. In this light, elected officials were seen as pandering to industry while ignoring the needs of the broader community. In a comment at once analytical and argumentative, Doubleday
stated that “It is a view shared by many governments and policy analysts that how science policy handles the public dimensions of nanotechnology will be a critical test of whether lessons have been learned from the global controversy over GM foods” (2007, p. 212). The lesson here is quite simple: failure to consider public opinion could result in an outright consumer revolution.

If analogy is a narrative tool for using lessons from the past or other familiar contexts to make sense of a novel situation, then the various forms of implied comparison described above—however far fetched and extreme at times—all were expressions of a core mindset shared by those concerned with nanotechnology. What alarmed this group was the fact that the scientific community simply could not confirm nanotechnology was safe.

Most nano-opponents (and even many groups that gave qualified support to the technology) wanted the government to take proactive measures to minimize the uncertainty associated with nanotechnology and, to the extent possible, forecast potential dangers before nano-products became released onto the market. Nanotechnology coordinator in the Environmental Protection Agency’s (EPA) Office of Pollution Prevention and Toxics, Jim Atwood, summarized this logic as follows: “There is so much uncertainty about the questions of safety. We can’t tell you how safe or unsafe nanomaterials are. There is just too much that we don’t yet know” (Schneider 2010, para. 15).

Outside of the most extreme nanotechnology opponents, few argued for an outright ban or moratorium on the technology. Instead, most participants argued that the so-called lessons of the past dictated caution. Patty Lovera, assistant director of Food & Water Watch, a non-governmental organization that focuses on government accountability relating to water and food, argued: “The unsettling track record of other technological breakthroughs—like asbestos, DDT, PCBs and radiation—should give regulators pause as they consider the growing commercial presence of nanotech products. [A] wait-and-see approach puts consumers and the environment at risk” (Qtd. in Schneider 2010, para. 33).
The two poles in the debate were set. On the one hand, utopian predictions and the
demands of global R&D drove a narrative calling for government investment in nanotechnology.
On the other hand, opponents believed that history had shown few new technologies to be purely
beneficial, while some have resulted in dark, unintended consequences. This latter group urged
greater government consideration of the worst-case scenarios being associated with this technology.
Both lines of reasoning were highly anticipatory and, as such, marked by extreme uncertainty. At
least initially, many economic and social benefits of nanotechnology were not manifest in the
present, but only anticipated to occur sometime in the future. Similarly, few if any current risks had
been substantiated. In fact, by most accounts, scientists had no concrete ideas about what these risks
might actually entail in the first place. In sum, policymakers faced enormous pressure to act with
prescience in order to minimize speculative risks without stunting development of a incredibly
promising technology. Striking such a balance would not be an easy task.

**Agenda Setting, Policy Formulation, and Enactment**

As evidenced above, the nanotechnology problem definition debate was polarized. At one
extreme, the dominant narrative described nanotechnology as arguably the most promising
technology of the modern era. Indeed, the “problem” was not the technology *per se*, but that the U.S.
was not positioned to emerge as a world leader in this field. The role for government therefore was
to promote technology research and development. On the other hand, many observers worried that
for all its promise nanotechnology *might* also pose extraordinary risks. This definition conceded these
risks were largely unknown, but nonetheless maintained that history has shown all technological
innovations constitute a “double-edged sword.” And while the most extreme variants of this
definition might have advocated for an outright moratorium on nanotechnology, most detractors
held that the main “problem” at hand was a lack of information or uncertainty. Specifically, just as
there was an onus on government to develop a national infrastructure capable of promoting R&D growth, so too was there an onus to ensure anticipation of risks.

These two poles in the problem definition debate manifested themselves in the agenda setting and policy formulation processes. Nanotechnology surfaced on the institutional agenda of Congress on at least two separate, albeit somewhat overlapping, occasions. In the first round of policy activity, which occurred soon after the enactment of the NNI in 2001 and completed in roughly 2004, Congress set out solidify the U.S. position as a global leader in nanotechnology R&D. This phase, while surely not without dissenters, was dominated by an openly optimistic view of nanotechnology. Enthusiasts advocated for Congress to adopt legislation formally codifying the federal government’s commitment to nanotechnology, particularly by specifying the NNI’s programmatic responsibilities and funding source. This nanotechnology advocacy coalition ultimately got its wish when, at the end of 2003, Congress passed the 21st Century Nanotechnology Research and Development Act.

The second round of agenda setting activity primarily centered on the 110th (2007-2008) and 111th (2009-2010) Congresses. During this phase, attention was focused on concerns that the federal government should take heed to anticipate the potential risks associated with nanotechnology. By and large, groups argued that the federal government needed to reduce the substantial gap in funding between basic R&D, which received the vast majority of dollars, and research on health and safety concerns. Some even advocated amending the 21st Century Nanotechnology Research and Development Act to make it better suited for risk anticipation. This section examines both rounds of policymaking.
Establishing a Nanotechnology Research Infrastructure

The creation of the NNI in 2001 provided an important role for the U.S. national government in stewarding nanotechnology development. Thanks in large part to the hard work of a slew of committed issue entrepreneurs, like Mihail Roco and Eric Drexler, an infrastructure for facilitating nanotechnology research and development was established within the executive branch. Despite this obvious victory, nanotechnology enthusiasts recognized that an organizational infrastructure alone could not bring about the technological revolution envisioned. Instead, a permanent—or at least long-term—commitment from the federal government was required. Most importantly, nanotechnology proponents hoped to persuade Congress to develop legislation codifying the U.S. commitment to nanotechnology research and development, and specifying a lasting funding stream for the NNI.

A variety of measures can be used to account quantitatively for agenda activity. Specifically, this work tracks the number of times a particular problem was mentioned in the Congressional Record and congressional hearings as well as the number of bills introduced to address a particular problem. (The number of bills is not always presented as a figure but is instead discussed in the text alone.)

The Congressional Record is an official recording of the proceedings of the U.S. Congress and is therefore a good barometer of Congressional concern. Similarly, because much of Congress’s work occurs in committee settings, congressional hearing activity usually reflects concern. Data pertaining to Congressional Record and hearing activity was derived from the U.S. Government Printing Office’s website, which provides a running record of U.S. Congressional legislation, hearing activity, Congressional Record activity, appropriations measures, as well as a number of other policymaking activities. A simple query of the term “nanotechnology” was used to generate this data.

Similarly, the number of bills introduced in a given session can be seen as an indicator of institutional interest. The data used to create the figures pertaining to legislation come from the
Library of Congress’s “Thomas.gov” website. “Thomas” provides a public available search engine that allows users to, among other things, search for bill summaries and statuses by Congressional session. Again, data were generated by a simple key term search. Because appropriation measures are occasionally analyzed separately, all bills relating to appropriations were removed. I also removed all duplicate search results from my final tally. For example, “Thomas” retrieves counts of all House and Senate actions on the same bill, thus treating each action as if it were a separate bill and thus exaggerating the number of actual “new” policy proposals.

The measures analyzed have been utilized as indicators of policy change and agenda setting in other studies (Birkland 1997; Baumgartner and Jones 1993). Other scholars, however, tend to combine various indicators into more sophisticated measures of agenda density or change, which are then used to make causal inferences. In presenting these basic descriptive statistics, my intent is not to present a causal relationship but simply to provide a broad overview of a number of agenda setting trends. These numbers, which tell us little about agenda attention relative to other items being considered by Congress, at best provide a snapshot of the overall agenda setting process. Therefore, they should not be interpreted as definitive measures of institutional attention or concern. Nonetheless, given the robust qualitative examination accompanying and following these figures, basic measures of Congressional Record, hearing, and legislation activity can help illuminate broad patterns of agenda presence.

Figure 3-1 shows the number of mentions of nanotechnology in the Congressional Record and indicates a dramatic uptick in attention to nanotechnology in the wake of enactment of the NNI in 2001. In 2001, the number of mentions stood at 25. By 2002, that number increased to 33 before exploding in 2003, a year which saw 94 mentions. During this initial phase of agenda setting and policy formulation, this burst in activity was acute. Just one year after the 2003 boom, the number of Congressional Record mentions fell to 33.
Figure 3-2, which shows the number of times the word nanotechnology was mentioned in Congressional hearings, also indicates a rapid rise to agenda prominence. Hearing activity slowly built in 2001 (17 mentions) and 2002 (24 mentions) before, once again, exploding in 2003 (53 mentions). A downtick in attention was observed in 2004, a year that saw nanotechnology mentioned 39 times in Congressional hearings. Taken together, Figures 3-1 and 3-2 show the issue of nanotechnology research and development rose to, and fell from, the policy agenda in dramatic fashion, as virtually all policymaking activity occurred in one year—2003.
The surge in agenda activity observed in the wake of the NNI’s creation, and in 2003 in particular, was spearheaded by a well-organized but eclectic mix of stakeholders and interests, including representatives from industry, academia, and government bureaucracy, to name a few. No group better exemplified this trend than the NanoBusiness Alliance, which was formed as an industry association representing corporations, universities, investors, and other stakeholders working in nanotechnology research and manufacturing. The NanoBusiness Alliance was arguably the most active lobbyist for formal Congressional authorization of the NNI, and credits itself for stewarding the 21st Century Nanotechnology Research and Development Act through Congress (The NanoBusiness Alliance 2012). Mark Modzelewski, leader and founder of the NanoBusiness Alliance, modeled the group after the Biotechnology Industry Organization, a trade organization representing the biotechnology industry. Modzelewski brandished clear “insider” credentials, having worked for the Clinton Administration. He also added a bipartisan flavor to the group by appointing former House Speaker Newt Gingrich as honorary chairman (Keiper 2003).

This diversity of participants working through groups like the NanoBusiness Alliance is, as demonstrated later in this work, a key feature of anticipatory policy problems, which tend to accommodate decentralized interest group participation. In many ways, the interest group participation evidenced in the nanotechnology case mirrors Richardson, Gustafsson, and Jordan’s (1982) anticipatory-consensual policy type, in that government elites formulated long-term planning policy but accommodated input from a wide array of stakeholders. Of course, in the nanotechnology case these groups participated not out of altruism, but because they, at least in part, saw nanotechnology as an opportunity to secure government funding. To be sure, all of these industries and actors were loosely related in that they hoped to harness nanotechnology to benefit their particular field. However, their claims of “relevance” to the nanotechnology policy debate were bolstered by the enormous uncertainty associated with anticipatory policy problems in general.
Because no one knew what, exactly, a “nano-enhanced” future might look like, stakeholders from an array of sectors could propose narratives describing considerable advances in their field—provided the government gave them adequate funding of course. Thus, the inherent uncertainty associated with nanotechnology allowed a plethora of interests to step-up to the proverbial trough that is government funding.

Others have observed this trend. Lindquist, Mosher-Howe, and Liu (2010) found a plethora of organized interests sought to link nanotechnology as a solution to many existing problems (see also Rochefort and Cobb 1994). In other words, nanotechnology was not a problem to be solved, but a problem solver. They write:

Simultaneously, nanotechnology emerged as an important scientific concept strategically used by a variety of public and private groups to garner resources from the U.S. government for research. With so many interests seeking money, as a result of the attention and promise for funding for anything nano-related, it also set off attempts to strategically create and control definitions of nanotechnology and of the problems that could be solved by the technology. (Lindquist et al. 2010, p. 255)

McCray echoed this contention in noting that nanotechnology was seen as a “technological fix” that could raise “the material standard of living worldwide, while decreasing resource consumption and environmental impact” (2005, p. 183). He added: “Topics that politicians care most about—health, the economy, and national security—all looked to benefit from nanotechnology” (p. 183). As noted above, this receptiveness to a multiplicity of interests was manifest in the NNI itself, which lacked a centralized funding source and consisted of an array of federal agencies. Nanotechnology, it seems, could mean anything to anyone.

Within Congress, nanotechnology R&D was largely seen as a science and technology issue, and committees with jurisdiction over this particular domain spearheaded most policy activity at this time. The House Committee on Science and Technology and the Senate Committee on Commerce, Science, and Transportation (referred to as the House or Senate “Science Committee” hereafter),
both of which have broad mandates of jurisdiction over science and technology issues, represented the preeminent policymaking venues throughout both stages of the agenda setting process. Many of the major hearings relating to nanotechnology, especially during the first phase of the agenda setting process, were held in one of these two committees. The Science Committees also led efforts to draft legislation formally authorizing the NNI. Their dominance over this issue was largely a matter of jurisdiction—both committees are responsible for overseeing and developing laws relating to science and technology R&D policy (Committee on Commerce, Science, and Transportation 2012; Committee on Science and Technology 2012).

This isn’t to say that the Science Committees were the only venues to consider the nanotechnology issue. Instead, just as nanotechnology accommodated participation from an array of stakeholders and interests, so too did it afford participation from a multitude of other committees. For example, nanotechnology received a great deal of attention in both the House and Senate Armed Services committees, which saw the technology as an important part of future defense projects. A 2001 hearing in the Senate Committee on Armed Services described nanotechnology as a key technology area for the U.S. military and even solicited input from prominent researchers in the field (Subcommittee on Emerging Threats and Capabilities 2001). Nanotechnology was discussed in other settings as well. The Senate Committee on Health, Education, Labor, and Pensions (HELP) debated frequently addressed topics relating to nanotechnology, including the technology’s ability to cure life threatening diseases (see, for example, HELP 2008) and the regulatory difficulties it created for agencies like the Food and Drug Administration (FDA) (see, for example, HELP 2006). Even the House Committee on Agriculture examined nanotechnology’s ability to improve crop production (Subcommittee on Rural Development, Research, Biotechnology, and Foreign Agriculture 2011). These are but a sampling of the venues that, either directly or indirectly, considered nanotechnology. Thus, although most policy activities were guided by the Science
committees, nanotechnology was marked by a fairly decentralized agenda setting process, a testament to the uncertainty typically associated with anticipatory problems.

Still, most activity occurred with the House and Senate Science Committees, which were highly receptive and sympathetic to advocates’ calls for greater federal investment and involvement in nanotechnology. Adam Keiper of *The New Atlantis*, an online journal dedicated to science and technology issues, reported that Congress, in general, simply “couldn’t resist” the nanotechnology hype spawned by creation of the NNI in 2001 (2003, para. 62). Senator George Allen (R-VA), a member of the Senate Science Committee, reported that by 2001, “the committee quickly recognized that the fields of nanoscience, nanoengineering, and nanotechnology have the real potential to transform almost every aspect of our lives and commerce” (Allen n.d., para. 2). Allen volunteered that he was fully committed to advocating for nanotechnology research and development, “as it will take many years of sustained investment both in our education system and in basic research labs for this field to achieve its full potential as we adapt, innovate, and improve” (para. 10).

In light of these strong sentiments, Congress quickly took to the task of legislating nanotechnology policy, affording the issue space on the institutional agenda. In January 2003, Senator Ron Wyden (D-OR) introduced the 21st Century Nanotechnology Research and Development Act (S. 189), which, as noted above, reaffirmed and expanded the national government’s role in promoting nanotechnology R&D. In February 2003, Representative Sherwood Boehlert (R-NY), then Chairman of the House Science Committee, introduced a similar bill in the House, the Nanotechnology Research and Development Act of 2003.

Throughout 2003, both the House Committee on Science and the Senate Committee on Science held a series of hearings soliciting professional and interest group input on the pending statutes. In the nearly three years since the NNI’s creation, Congress had ample reason to believe the
R&D framework established by the multi-agency effort was, in fact, going to pay dividends. In the wake of the NNI's establishment, a slew of policy indicators and measurements served to confirm the notion that the U.S. was poised to lead the nanotechnology revolution. References to nanotechnology in peer-reviewed scientific journals had more than doubled, from 3,500 in 1997 to more than 10,000 in 2002. More glaringly, the number of patents for nanotechnology products increased from 2,000 in 1995 to 6,425 in 2002 (Fisher and Majahan 2006, p. 8).

Still, these indicators were not enough to induce complacency, as a number of countervailing measures challenged whether the U.S. had a “commanding lead” in this sector. Concerns about the U.S. global position were rife throughout the policy formulation and agenda setting process of 2003. Representative George Allen (R-VA) voiced concerns relating to competition from other countries and called on his colleagues in the House and Senate to ensure the U.S. did not fall behind in this vital sector:

I think that we all ought to recognize that we are not alone in this country being interested in nanotechnology. Indeed, when one will look at the global picture, we are falling a bit behind, insofar as our research and development in nanotechnology, and we're facing some stiff foreign competition in nanotech research from Japan, the European Union, Russia, Korea, and China. Now, this Nation, the United States, has been at the forefront of almost every important transformative technology since the industrial revolution, and we must continue to lead the world in the nanotechnology revolution, in my estimation.

[O]ur role, as elected leaders, should be to creator to foster the conditions precedent for our researchers and innovators to compete and contribute and succeed, both domestically and internationally. I am not here to say that we ought to guarantee anyone's success, but the Government's role is to make sure the field is fertile, our tax policies, our research policies, our regulatory policies, allow the creative minds in the private sector, in our colleges and universities, as well as in some of our Federal Government Agencies, to reach their full potential. (Committee on Commerce, Science, and Transportation 2003, p. 1)

Alan Marty, Executive-in-Residence at JP Morgan Partners, seconded Representative Allen’s concerns by noting: “Unlike many past waves of technological development, nanotechnology is not dominated by the United States. In several areas of nanotechnology the U.S. is being outpaced by
foreign competition. Japan, EU, Russia, Korea, and China are all significant players in the field of nanotechnology” (Subcommittee on Science, Technology, and Space 2003, p. 60). Dr. James Murday, Chief Scientist, Acting, Office of Naval Research, told members of the Senate Committee on Science that the 18,000 articles published on nanotechnology in 2002 are “roughly divided; one-third in the Asian theater, one-third in the U.S., and one-third in Europe. That says, in terms of quantities, we are one-third” (Committee on Commerce, Science, and Transportation 2003, p. 28). Suffice it to say, few policymakers were comfortable with the fact that the U.S. was but one of several key powers on the global nanotechnology stage.

Despite evident consensus on the need to sustain U.S. leadership in technology research and development, concerns nonetheless were heard about the inherent uncertainty associated with nanotechnology. Dr. Thomas N. Theis, Director of Physical Science, IBM Research Division, Thomas J. Watson Research Center, urged policymakers “to anticipate that there will be societal implications, not every one of them necessarily good and comfortable, for any rapidly advancing technology. We see this across the board. It is not a particular attribute of nanotechnology, so we need to accompany our research effort with efforts to anticipate and manage those implications” (Committee on Science 2003, p. 31). Senator Frank Lautenberg (D-NJ) offered this nervous observation:

All nanotechnological advances, even the most beneficent, have what are called ‘externalities.’ The automobile, for instance, represented an enormous improvement over horse-drawn carriages. But each year, thousands of people are killed in auto accidents and hundreds of thousands more are hurt. Moreover, cars are a leading cause of greenhouse gas emissions.

I'm not suggesting that we would be better off without cars—far from it. My point is that there will be adverse consequences stemming from the development of nanotechnology.

It may not be possible to anticipate all of the unintended consequences of developing nanotechnology, but we should try… Clearly, the earlier we grapple with the ethical issues and harmful consequences related to nanotechnology, the better off
we will be at mitigating them. (Committee on Commerce, Science, and Transportation 2003, p. 72)

While Congress was first and foremost concerned with ensuring U.S. leadership in the field of nanotechnology, most agreed this development did not justify wholesale disregard of the technology’s potential risks. Thus, even though nanotechnology was overwhelmingly seen as a “good thing” at this time, risk minimization also represented a goal—albeit a secondary goal—of the U.S. Congress.

The 21st Century Nanotechnology Research and Development Act sailed through Congress, passing both chambers with near unanimous bipartisan support in November 2003 (Cresanti 2007). From the White House came a highly optimistic forecast: “Nanotechnology offers the promise of breakthroughs that will revolutionize the way we detect and treat disease, monitor and protect the environment, produce and store energy, and build complex structures as small as an electronic circuit or as large as an airplane” (Mark 2003, para. 6).

The 21st Century Nanotechnology Research and Development Act represents a notable example of anticipatory policymaking. The Act established the National Nanotechnology Program (NNP), while authorizing $3.7 billion for nanotechnology research and development from FY2005 to FY2008. (This funding stream would be up for reauthorization in 2008.) Economic incentives in the form of funding and grants represented a logical policy instrument for incentivizing industry and academia to pursue great R&D in the area of nanotechnology.

While the Act did not specify the NNP’s objectives, it did promulgate eleven “Program Activities,” which would be achieved through various agencies and councils. Specifically, the Act required the NNP to:

1. Develop a fundamental understanding of the manipulation of matter at the nanoscale;
2. Offer grants to researchers working in interdisciplinary teams;
3. Establish a network of technology user centers and facilities;

4. Establish interdisciplinary nanotechnology research centers. This particular provision was significant in that these academic institutions and national research laboratories would drive nanotechnology R&D;

5. Ensure global leadership in nanotechnology;

6. Advance U.S. “productivity and industrial competitiveness” through long-term investments in nanotechnology R&D;

7. Accelerate the deployment and application of nanotechnology in the private sector. This Activity, coupled with Activities 5 and 6, was said to mandate a “first-to-the-market” approach to R&D. Legislators expected an accelerated commercialization of nanotechnology products. Merely underwriting R&D would not suffice. Instead Congress demanded that research be quickly translated into commercial products. These Activities clashed with calls for a more precautionary approach to nanotechnology development, as it called for an expedited commercialization process (Fisher and Mahajan 2006);

8. Encourage interdisciplinary research and ensure “that processes for solicitation and evaluation of proposals under the Program encourage interdisciplinary projects” (P.L. 108—105, Sec. 2.b.8);

9. Provide training programs that promote a culture of interdisciplinary research;

10. Ensure the “ethical, legal, environmental, and other appropriate societal concerns” associated with nanotechnology are considered (P.L. 108—105, Sec. 2.b.10). Activity 10 formally establishes a proactive approach to considering nanotechnology’s potential risks and is thus critical to this case;

11. Encourage that nanotechnology be applied to existing processes and technologies.
The Act further specified appropriations for the NSF, Department of Energy (DOE), National Aeronautics and Space Administration (NASA), National Institute of Standards and Technology, and Environmental Protection Agency (EPA). Again, the multiplicity of participating agencies is an obvious outgrowth of nanotechnology’s uncertainty, which allowed the issue to straddle various policymaking domains. The President was responsible for implementing the NNP, with the help of a newly formed Nanotechnology Coordination Office and appropriate agencies. Additional program management responsibilities were given to the National Science and Technology Council, a cabinet level council that advises the White House on science and technology issues and coordinates policy in this area. Otherwise, very little detail was provided regarding administrative responsibilities.

Indeed, the Act was relatively vague and brief, amounting to a mere 10 pages.

The 21st Century Nanotechnology Research and Development Act highlights policymaking dynamics associated that arise in dealing with anticipatory policy problems in a number of regards. Perhaps most notably, because they have yet to occur, anticipatory problems cannot be addressed through a remedial policy design. In the case nanotechnology, the 21st Century Nanotechnology Research and Development Act amounted to a plan or a strategy for achieving a future policy end. The program goals established in the eleven activities are relatively vague and set a broad course of action. They attempt to move the country to achieving a future end, but, because that end is marked by incredible uncertainty, offer little in the way of detail. Policymakers may have even seen the 21st Century Nanotechnology Research and Development Act as a work in progress. Indeed, Congress did not even specify a permanent funding stream for NNP operations, instead capping allocations at five years. While not entirely uncommon for bills that include funding measures, the sunset provision, which required the Act to be revisited in 2008, also implies Congress was hesitant to commit to a long-term policy. This type of long-ranging planning is unsurprising when legislating for problems that have yet to occur.
All plans or strategies are aimed at achieving a desired end and, as expected given the policy discourse dominating this period, the overriding goal of this Act was to stimulate R&D. Still, careful analysis reveals a preoccupation with minimizing uncertainty, particularly with regard to nanotechnology’s potential risks. Activity 10 established an anticipatory approach to addressing the health, environmental, and social implications of nanotechnology. It mandates that the NNP shall be responsible for: “ensuring that ethical, legal, environmental, and other appropriate societal concerns, including the potential use of nanotechnology in enhancing human intelligence and in developing artificial intelligence which exceeds human capacity are considered” (P.L. 108—105, Sec. 2.b.10).

Activity 10 further outlines a four-pronged approach to achieving these ends. First, it requires the establishment of a research program to identify societal concerns, mandating that this research be widely disseminated. Second, it requires the interdisciplinary research centers noted in Activity 4 to consider the social implications of nanotechnology. Third, it calls for scientists to consider the societal, ethical, and environmental dangers of nanotechnology during the R&D process. Finally, it requires regular public input and discourse on the potential social implications of nanotechnology.

Beyond Activity 10, other provisions imply a proactive policymaking approach. Three of these provisions require the production of reviews, reports, and evaluations. Specifically, these measures essentially mandated that elected officials—Congress and the President—be regularly updated on the status of the NNP. Although these reviews were in fact intended to analyze the extent to which all program goals were being met, the Act specifically notes that Activity 10’s goals must be accounted for in all evaluations. As indicated above, program management was vested in The Council. As part of this responsibility, the National Science and Technology Council is required to submit and annual report to both the Senate and House Committees on Science. This report should assess the progress being made toward all NNP activities, including Activity 10. Similarly, the Act established a National Nanotechnology Advisory Panel, consisting primarily of academics and
industry representatives, which was responsible for advising the President on matters relating to nanotechnology. The panel must report “whether societal, ethical, legal, environmental, and workforce concerns are adequately address by the Program” (Sec. 4 SSC(4)). Finally, Section 5 requires the National Research Council to conduct a triennial external review. As part of this review, the NRC must produce “an evaluation of the extent to which the Program has adequately considered ethical, legal, and social concerns.” The Act asked the NRC to produce a one-time study “for ensuring the responsible development of nanotechnology.”

Finally, Sec. 9 of the 21st Century Nanotechnology Research and Development Act created a $5 million American Nanotechnology Preparedness Center. The American Nanotechnology Preparedness Center has two charges. First, the Preparedness Center is responsible for conducting, coordinating, collecting, and disseminating studies on “the societal, ethical, environmental, educational, legal, and workforce implications of nanotechnology.” Charge two was by far the most anticipatory provision in the Act, requiring that the Preparedness Center “identify anticipated issues related to the responsible research, development, and application of nanotechnology, as well as provide recommendations for preventing or addressing such issues.” This second charge is perhaps the starkest example of anticipatory policy in the entire Act. The Network for Nanotechnology in Society consists of centers at the University of California, Santa Barbara, with participation from Harvard University and the University of South Carolina (Sargent 2011b, 2011c).

Many observers maintain that Activity 10 represents a revolutionary approach to regulatory policy by demanding that scientists and engineers anticipate and respond to potential threats during the R&D process as opposed to waiting for them to emerge after products have been marketed. Fisher and Mahajan (2006) stated: “By prescribing the integration of societal and technical concerns during nanotechnology R&D, the Act could mark a radical shift in [science and technology] policy in so far as it allows consideration of societal concerns to influence technical activities and outcomes”
Indeed, Activity 10 inspired a host of applied models, all of which were set out to integrate anticipation into the R&D process. For example, scholars working at the NSF-funded Center for Nanotechnology in Society at Arizona State University tested an “upstream engagement” approach to “real time technology assessment” that physically embedded social scientists and philosophers within laboratory settings in order to foster discourse about the likely implications of new technology (Guston and Sarewitz 2002). The American Nanotechnology Preparedness Center is directly charged with not only anticipating potential risks but also developing solutions to these threats. Whereas Activity 10 “loosely” established anticipation as a goal, the creation of a research center dedicated to anticipation represents—at least in theory—a tangible commitment to prescience.

The 21st Century Nanotechnology Research and Development Act represents a fairly clear effort at anticipatory policymaking. Other aspects of nanotechnology policy are an outgrowth of its acute uncertainty. While the Act is concerned with simply understanding—not necessarily addressing—any risks associated with nanotechnology, it offered a multitude of avenues for gathering indicators or measures of the nanotechnology problem. Indicators represent an important driver of policy change in that they help bring problems to policymakers’ attention (Kingdon 2003). In the case of 21st Century Nanotechnology Research and Development Act, the gathering of indicators was a central policy goal unto itself, an effort to equip policymaking institutions with the information needed to make informed policy making decisions as technology unfolded and possible adverse effects became better understood. Left unstated was the assumption that any research demonstrating that nanotechnology posed acute risks would prompt Congress or some regulatory body to act.

Second, the 21st Century Nanotechnology Research and Development Act is equally committed to ensuring the production of feedback or information on the current performance of a
policy or program (Kingdon 2003). As indicated above, the Act mandates a minimum of three performance updates, ranging from annual reviews to external program evaluations. More importantly, all of these measures must be reported to either the President or Congress. Like indicators, feedback also constitutes a potentially important driver of policy change. Again, while the Act does not specify any requirement for future changes, one would assume that revelations about programmatic shortcomings might prompt alterations.

*Agenda Catalysts*

The agenda setting, policy formulation, enactment processes associated with the 21st Century Nanotechnology Research and Development Act are best described as rapid, acute, and relatively conflict free. As evidenced in our various measures of agenda attention, nanotechnology rocketed to the top of the institutional agenda in 2003, a year marked by considerable upticks in *Congressional Record* and hearing activity as well as a flurry of policy action vis-à-vis the formulation of the 21st Century Nanotechnology Research and Development Act. What is more, while some observers cautioned against diving headlong into R&D without, at the very least, acknowledging nanotechnology’s potential risks, their concerns did little to slow the policymaking process.

Although this particular agenda setting dynamic deviates from the incremental pattern typically associated with policy change, it is not entirely novel. Baumgartner and Jones (1993) argued policy change often follows a pattern of punctuated equilibrium wherein preexisting policy monopolies are rapidly dissolved, and new institutions and actors emerge to exert dominance over a policy area. These punctuations are rapid—some might argue radical—and policy change occurs in quick succession in response to a larger shift in belief systems and policy images. Superficially, the policymaking pattern leading to the enactment of the 21st Century Nanotechnology Research and Development Act appears to follow this trend. However, closer analysis reveals anticipatory
problems—or at least nascent problems, like nanotechnology—do not entirely conform to Baumgartner and Jones’s theory in that they are ultimately devoid of a preexisting state of equilibrium. Put differently, the nanotechnology domain was devoid of a prior dominant policy monopoly, a prerequisite for equilibrium. Indeed, because nanotechnology represented an almost entirely novel problem, there were no institutional structures and policy monopolies to dissolve—there was no state of equilibrium to disrupt.

A better explanation of this policymaking pattern might argue that Congressional action was partially a response to a prior event. Specifically, the construction and subsequent funding of the NNI largely dictated that Congress act. The NNI transformed nanotechnology from an amorphous and largely uncertain idea, to an important and federally funded research endeavor. This research endeavor, and the preceding policymaking process that led to its creation, spawned a newly organized network of policy stakeholders who could lobby Congress for new and expanded funding. In this regard, the creation of the NNI might be construed a “focusing event,” in that it served to catalyze nanotechnology onto the Congressional agenda (Birkland 1997, 2006; Kingdon 2003). Coupled with the other agenda forces described below, the NNI compelled Congress to act on the nanotechnology issue, unless it hoped to vacate the government’s involvement in nanotechnology altogether. Thus, this analysis seems to recast our conceptual understanding of focusing events, which are generally assumed to be “negative” things (e.g., natural or manmade disasters) (Birkland 1997, 2006). The creation of NNI, a largely positive event, nonetheless amounted to an acute and abrupt process of policy change in that policymakers fashioned the 21st Century Nanotechnology Research and Development Act in relatively quick fashion. This trend—rapid policy change soon after the onset of an event—is, generally speaking, what we would expect to observe in the wake of a “typical” focusing event. Moreover, a general state of consensus among stakeholders amounted to
a relatively conflict-free policymaking process, as most participants recognized the need for more permanent Congressional involvement.

Although the media do not coordinate formal policymaking institution, scholars have observed a general correlation between media coverage and policymaker attention on an issue (McCombs 2004). Accordingly, this chapter, together with the remaining case studies, will present figures offering a depiction of the extent to which each of my three anticipatory problems was covered in *The New York Times*. Tracking media coverage of an issue, particularly in *The New York Times*, is a common practice among policy scholars (Birkland 1997). Because the figures presented in this study are purely descriptive, these data cannot be interpreted to imply causation and are, again, only intended to provide a “snapshot” of media coverage trends.

![Figure 3-3: Number of Stories Published in The New York Times on Nanotechnology, 1997-2004](image)

The NNI alone did not propel nanotechnology onto the institutional agenda; in fact, other factors converged to promote this activity. Figure 3-3, which shows the number of stories published in *The New York Times* containing the word “nanotechnology” between the years 1997 and 2004, documents a growing media interest in nanotechnology after 2001. In 2001, *The New York Times*
published 32 stories containing the word nanotechnology. By 2002 that number increased to 49, before peaking in 2003 at 67. This pattern is very similar to the observed pattern of Congressional attention, although a downtick in media attention is not observed in 2004. Opinion polls from this period also indicate a favorable view of the nanotechnology, at least among those individuals who were aware of the new technology. A 2002 internet survey revealed more than 57% of respondents felt that “human beings will benefit greatly from nanotechnology” (Bainbridge 2002, p. 563). Other surveys, however, showed large segments of the general public were largely unaware of nanotechnology. Roco (2003) cites survey data showing that, in 2003, 32% of those questioned in U.S. opinion polls responded “don’t know” on the topic of nanotechnology. However, “of those who know the majority thinks that nanotechnology will improve the quality of life” (p. 187).

And, of course, a policy narrative depicting nanotechnology as an enormously promising technology, capable of improving virtually every facet of society, reinforced calls for policy action. The pervasiveness of this definitional claim was boldly evidenced in the overwhelming support for the 21st Century Nanotechnology Research and Development Act. Finally, a well-organized and diverse constellation of organized interests helped to perpetuate this depiction while encouraging policymakers to take swift and decisive action.

Although the 21st Century Nanotechnology Research and Development Act constitutes a watershed moment in the nanotechnology domain, our story of anticipatory policymaking does not end with its enactment. In the wake of its passage in 2003, growing concerns with the potential dangers associated with nanotechnology began to simmer in Congress. In particular, observers argued that the proverbial pendulum between risk minimization and R&D had swung too far in favor of the latter, and that Congress had to balance this divide. The following section chronicles the dynamics of this debate.
Asserting Risk

Almost five years after the 21st Century Nanotechnology Research and Development Act was enacted, nanotechnology re-emerged as a top agenda item in the 110th Congress (2007-2008) and 111th Congress (2009-2010). To be sure, the 21st Century Nanotechnology Research and Development Act, and nanotechnology in general, never fully faded from Congress’s institutional memory. Throughout the 2005-2006 Congressional session, a series of hearings were held in both the Senate and House Science committees. Most of these hearings were held pursuant to the reporting and review requirement established in the 21st Century Nanotechnology Research and Development Act (e.g., the House Committee on Science held a hearing in 2006 entitled “Research on Environmental and Safety Impacts of Nanotechnology: What are the Federal Agencies Doing?” [Committee on Science 2003]).

Indeed, congressional attention to nanotechnology surged again coincident with the effort to reauthorize the Act. Figure 3-4 shows the number of times nanotechnology was mentioned in the Congressional Record between the years 2005 and 2012, the period associated with our second round of policy activity. Figure 3-4 depicts an agenda setting process that differed considerably from the initial round of policymaking. This second round of policy was marked not by an abrupt surge and decline in attention, but a period of incremental and sustained concern. In 2007, the number of mentions peaked at 74. However, that number held in 2008 (73 mentions) and remained relatively high in 2009 (62 mentions) as well.
This pattern is also evidenced in Figure 3-5, which shows the number of nanotechnology mentions in congressional committee hearings between the years 2005 and 2012. Figure 3-5 demonstrates hearing activity was even more sustained and protracted than the *Congressional Record*. In 2005, 72 mentions were recorded. This level of hearing activity was sustained for nearly four years, as no fewer than 61 mentions (2009) were recorded between the years 2006 and 2009. The years 2011 and 2012 have seen a precipitous decline in nanotechnology-related policy activity. This dip in concern is likely a testament to the fact that, as described below, the 110th and 111th Congresses altered the 21st Century Nanotechnology Research and Development Act to better accommodate risk research. In other words, the concerns that led to the uptick in attention were, at least in part, alleviated.
The relatively incremental and sustained pattern of agenda attention evidenced in Figures 3-4 and 3-5 is precisely the dynamic hypothesized to occur when legislating anticipatory problems. As noted before, scholars have implied that, in certain policy domains, problems will reveal themselves slowly and over an extended period of time through the accumulation of various indicators (Birkland 2006). As these indicators amass and quantify, policymakers can procure policies that precede the onset of the actual problem event. Nanotechnology’s extended tenure on the institutional agenda certainly implies this pattern typified the risk debate. Because nanotechnology’s dangers had yet to fully manifest at this time (indeed, had yet to even be identified), policymakers were granted an extended timeframe to work through a logical policy response. This being said, had nanotechnology been responsible for some sort of actual disaster (e.g., as with the outbreak of “mad cow” disease in Europe in the 1990s), Congress would have been compelled to react—as opposed to anticipate—and quickly fashion legislation.

The differences in terms of agenda setting patterns between this second round of policymaking, which focused on risk minimization, and the prior round, which focused on stimulating R&D, further illustrate the distinctive temporal dimensions of anticipatory problems. In
the first round of policymaking, a very real and somewhat manifest problem was identified in the sense that various indicators implied the U.S. was on the verge of falling behind other countries in terms of nanotechnology R&D. The presence of the problem coupled with the advent of the NNI necessitated that policymakers act quickly. What is more, the the 21st Century Nanotechnology Research and Development Act was, by and large, a “distributive policy” type, in that government made new resources available to external stakeholders. Distributive policies tend not to inflict harm—financial or otherwise—to any one group and are thus marked by low political conflict (Lowi 1964, 1972). As such, it is not at all surprising that 21st Century Nanotechnology Research and Development Act encountered few roadblocks in Congress and was able to move through the institution relatively quickly.

Risk minimization, by contrast, did not set out to solve a clearly identifiable policy problem. Considerable debate surrounded what, exactly, the potential dangers of nanotechnology were to begin with, let alone their broader health, environmental, and even social implications. Moreover, given the technology’s newness, most agreed these dangers would not be realized until sometime in the future, although the 21st Century Nanotechnology Research and Development Act compelled regulators and scientists to at least entertain different problem scenarios in the present. In either case, the lack of an immediate problem accommodated an extended policy debate, which is inherent to anticipatory problems. Moreover, risk minimization would likely require regulatory policy instruments, meaning government would have to control private actors’ handling and development of nanotechnology. This type of policy, while not necessarily marked by high public visibility, was always likely to engender far more political conflict, as industry groups tend to rail against provisions believed to be harmful to profit margins (Lowi 1964, 1972). Thus, this second round of policymaking would likely be devoid of the widespread consensus associated with the first round, another factor resulting in prolonged policy debate.
Evidence from this period further shows the existence of various policy indicators, which served to suggest the possibility that nanotechnology posed a risk to human health and the environment. In many policy domains, indicators are represented vis-à-vis quantitative measures, which come to be accepted as metrics of a given problem (MacRae 1985). As evidenced in the following chapter, for example, human influenza cases and deaths are commonly accepted as indicators of the likelihood of pandemic (DeLeo 2010). As such, the accumulation of these measures can serve to stimulate policy action over time, precisely the dynamic hypothesized by Birkland (2006) in his discussion of domains not prone to disaster, and, for that matter, precisely the pattern associated with anticipatory problems.

In the nanotechnology case, however, scientific knowledge had not necessarily advanced to a place where raw measures or counts of specific problem were available. Instead, the most accessible indicators of nanotechnology’s risks were various scientific studies published during this period. By 2005, a fairly sophisticated risk assessment infrastructure was in place. For example, in 2005, the Woodrow Wilson International Center for Scholars and the Pew Charitable Trusts partnered to form the Project on Emerging Technologies (PEN). PEN was organized to “to ensure that as nanotechnologies advance, possible risks are minimized” (Project on Emerging Technologies 2012, para. 1). PEN’s leaders, most notably David Rejeski, the group’s Director, and Andrew Maynard, the group’s Chief Science Advisor, came to represent two of the foremost policy entrepreneurs at this time. Both individuals were unrelenting in their quest for stronger risk regulation, regularly appearing before the House and Senate Science Committees. In fact, Maynard was so respected within the nanotechnology community that his personal blog, “2020 Science,” represented an important venue of information exchange in its own right. Members of the nanotechnology community regularly frequented his page, interacting with Maynard through the “comments” section and even offering
“guest” postings themselves. As of this writing, Maynard’s blog has more than 800 followers on Facebook alone (See, for example, Maynard 2012).

Given this heightened interest in studying and understanding nanotechnology’s dangers, which was, at least in part, spurred on by the 21st Century Nanotechnology Research and Development Act’s requirement that risks be considered in conjunction with R&D, the period between 2003 and the second burst of policy activity in 2007 was marked by a proliferation of studies documenting the new technology’s potentially negative externalities. As early as 2005, *Washington Post* reporter Rick Weiss observed: “Amid growing evidence that some of the tiniest materials ever engineered pose potentially big environmental, health, and safety risks, momentum is building in Congress, environmental circles and in industry itself to beef up federal oversight of the new materials, which are already showing up in dozens of consumer products” (Weiss 2005, para. 1).

By the second round of agenda setting activity, it was abundantly clear that the very same characteristics that made nanotechnology so promising posed its greatest risks. Matter behaves in fundamentally different ways at the nanoscale. And while this radical departure from the tried-and-true norms of the atomic scale promised innovations, it was also linked to a plethora of new health and environmental concerns. That nanotechnology possesses the capacity to permeate biological systems otherwise un-transmissible by normal sized particles was one of the most notable findings of this period. Although many felt this characteristic represented a unique opportunity to deliver drugs (e.g., cancer treatment) to the brain (Silva 2007), others were petrified by the thought of nanoparticles accumulating in individuals’ brains (Helland 2004). Similarly, scientists confirmed nanoparticles’ ability to permeate the placenta of pregnant women as well as human lung tissue (Helland 2004). Concerns were heightened by findings implying that nanotechnology had potentially toxic effects. In 2004, environmental scientist Dr. Eva Oberdörster (2004) found exposing fish to nanoparticles for only 48 hours resulted in severe brain damage.
Few findings did more to galvanize opponents than the proposition that nanotechnology could produce asbestos-like damages on the lungs. In 2004, NASA researchers found that when carbon nanotubes reached the lungs they were more toxic than both carbon black and quartz. A year later, in 2005, researchers at University of Texas, El Paso, demonstrated the cell toxicity of carbon-nanotubes was identical to that of chrysotile asbestos (Dang 2006).

Unlike the “blood-brain” barrier discovery, which was a first in the world of environmental and biological science, the asbestos analogy allowed problem definers to associate nanotechnology with a highly negative experience from the past. For obvious reasons, the asbestos finding fueled intense debate within the insurance industry and among worker protection groups. Speaking before the International Congress of Nanotechnology in 2005, Attorney John C. Monica, Jr., warned of a potential deluge of product liability cases similar to the “asbestos litigation crisis” of the 1990s.

Stated Monica:

[N]o industry—including the nanotechnology industry—is beyond the reach of American trial lawyers. Concerns about potential health and safety hazards posed by nanomaterials are being raised among labor unions and environmentalists; trial lawyers cannot be far behind. Some have even begun to compare nanotechnology to asbestos, a material plagued by $70 billion in litigation over the past three decades. (Qtd. in Davidson 2005, para. 6)

In the legal world, this nanotechnology-asbestos analogy has come under intense scrutiny. Supported by a growing body of medical evidence (some of it dating back as far as the early 1900s) that asbestos inhalation causes lung cancer and mesothelioma, a wave of asbestos-related litigation took place in the 1970s and 1980s. Typically, plaintiffs charged the asbestos industry with suppressing knowledge of the hazardous effects of its products. Cases became so numerous and costly, it was dubbed the “asbestos litigation crisis era” by members of the legal community. In a 2005 report published in Nanotechnology Law & Business, Monica and colleagues underscored the relevance for nanotechnology: “Some critics have already made the asbestos analogy when
discussing carbon nanotubes, which are currently one of the most commercially promising and widely researched nanomaterials. The asbestos litigation crisis provides a useful case study to explain the importance of keeping products liability law in mind from the beginning of a product’s life cycle to the end” (Monica et al. 2006, pp. 55-56).

Thus, nanotechnology’s ascent back onto the agenda was partially driven by a wealth of indicators underscoring the technology’s possible risks. These indicators were perpetuated and communicated by interest groups, like PEN concerned with the technology’s dangers. However, while these indicators implied the possibility of future problems, they failed to decisively demonstrate nanotechnology posed an immediate threat. In the absence of an immediate danger, therefore, policymakers had the “luxury” of engaging in a protracted policy formulation process.

Beyond these indicators a multitude of evaluative reports and reviews mandated by the 21st Century Nanotechnology Research and Development Act produced a growing body of evidence—feedback—indicating systemic policy failure on the part of regulatory agencies. In December 2008, the NRC concluded that the 18 government agencies charged with assessing chemical safety, including the EPA and FDA, failed to prove nanoparticles are not dangerous. Their report stated that nanotechnology risk research needs to be “proactive—identifying possible risks and ways to mitigate risks before the technology has a widespread commercial presence” (Qtd. in Biello 2008, para. 3).

By this time, implementation efforts had been underway for close to five years, creating a fundamentally different policymaking environment from 2004. With relative success now a far more measurable or quantifiable concept, many observers felt the NNP had failed to make good on its promise to consider health and environmental risks. “The government agencies responsible for protecting the public from the adverse effects of these technologies seem worn and tattered,” wrote former EPA assistant administrator Clarence Davies in a PEN commissioned study (Davies 2009, p.
Commenting on the failure of government agencies to consider and act on nanotechnology’s risks, Jaydee Hanson, senior policy analyst for the Center for Food Safety, asked: “How long should the public have to wait before the government takes protective action? Must the bodies stack up first?” (Schneider 2010, para. 7).

To most observers the core problem was uncertainty. Without conclusive scientific proof as to the dangers of nanotechnology the government agencies responsible for protecting human health and the environment could not adopt nano-specific regulations. Keith Blakely, Chief Executive Office NanoDynamics, Inc., a private company that uses nanotechnology to, among other things, produce “clean” energy, argued that reducing uncertainty was important not only for protecting human health but for ensuring business could thrive and prosper as well:

In looking at the Nanotech space from an EHS perspective it is clear that we must drastically reduce uncertainty surrounding environmental, health, and safety issues of nanomaterials. This is important not only for the safety of the public but also for the success of nanotech industries that depend on consumers not harboring unfounded or ill-informed fears that will keep them from buying nanotech products. Today, not enough fundamental toxicity research has been done on nanoparticles to decisively determine what hazards they may pose to workers, the public, and the environment—or how such hazards, should they exist, might be mitigated. (Committee on Science 2005, p. 130)

To some extent, nanotechnology was always destined to be, what Fox (2007) calls, a “recurring” agenda item (p. 98). By limiting expenditure lines to a four-year increment (2005-2008), the 21st Century Nanotechnology Research and Development Act essentially imposed sunset requirements on all funding provisions. While the bulk of the Act did not require reauthorization, a renewed policy debate was destined to occur in 2008. At the very least, Congress was required to reconsider and reapprove all funding. Even so, what made the period between roughly 2007 and 2010 unique was that the 110th and 111th Congresses placed nanotechnology on the agenda not merely because law makers wanted to investigate an existing statute (although this investigatory function was not doubt present), but because they were willing to entertain substantive changes to
funding allocations as well as the actual content of the 21st Century Nanotechnology Research and Development Act in response to the growing body of scientific knowledge anticipating future dangers.

The growing body of evidence and indicators of nanotechnology’s risks prompted a barrage of policy demands. Some groups even called for an outright ban on all nanotechnology products. Friends of the Earth advocated a precautionary approach to nanotechnology and called for a “moratorium on the further commercial release of sunscreens, cosmetics and personal care products that contain engineered nanomaterials, and the withdrawal of such products currently on the market, until adequate, peer-reviewed safety studies have been completed” (Qtd. in Sargent 2011b, p. 15). UCLA Professor Robert Schiestl argued nanotechnology “should be removed from food and drugs, and there’s definitely no reason for it in cosmetic products” (Qtd. in Roslin 2011, para. 7). The ETC Group also called for a moratorium, indicating that “Given the concerns raised over nanoparticle contamination in living organisms, Heads of State… should declare an immediate moratorium on commercial production of new nanomaterials and launch a transparent global process for evaluating the socio-economic, health and environmental implications of the technology” (Qtd. in Sargent 2011b, p. 15) Of course, the moratorium proposal did not go unopposed. Under Secretary of Commerce for Technology Phillip J. Bond responded in this way:

Those who would have us stop in our tracks argue that it is the only ethical choice. I disagree. In fact, I believe a halt, or even a slowdown would be the most unethical of choices...Given the promise of nanotechnology, how can our attempt to harness its power at the earliest opportunity—to alleviate so many of our earthly ills—be anything other than ethical? Conversely, how can a choice not to attempt to harness its power be anything other than unethical? (Sargent 2011b, p.16)

Many groups, and in particular PEN, however, opted for a more moderated political strategy, arguing the problem was not that nanotechnology imposed risks, but that government—despite the provisions codified in the 21st Century Research and Development Act—simply had not
done *enough* to anticipate and prepare for these risks. This argument also drew on an assortment of problem indicators. However, in this instance, organized interests presented metrics and measures of resource allocation and market trends, as opposed to solely focusing on alarming scientific findings. These groups argued the amount of federal money spent on health and environmental concerns was disproportionately lower than the amount spent on R&D. What is more, they added, the need for a better understanding of nanotechnology’s health and environmental risks was heightened because larger numbers of products containing nanotechnology were entering the marketplace. PEN’s David Rejeski (2008) succinctly summarized these concerns:

> Over the past seven years, the nanotechnology industry has grown at a rapid pace. Our Project has found that new nanotechnology consumer products are entering the market at the rate of three to four per week. The reauthorization of the Nanotechnology R&D Act provides us with a key opportunity to rethink our strategy when it comes to our investment in nanotechnology R&D, ensuring that the United States remains a world leader in nanotechnology, and also ensuring that nanotechnology is developed in a responsible way. We recently analyzed purported nanotechnology risk-relevant research published by the NNI and found that only $13 million, or about 1 percent, of the total $1.4 billion federal investment in nanotechnology R&D in 2006 went towards highly relevant EHS [Environmental, Health, and Safety] research. More funding for EHS research, tied to strategic priorities, is the first step towards ensuring that the risks of nanotechnology are understood and managed to avoid unnecessary harm to workers, consumers, and the environment. (para. 1)

This basic argument justified calls for greater funding of health and safety research. The Environmental Defense Fund, a non-profit environmental advocacy group, called for $100 million or more in funding to study environmental, health, and safety risks (Sargent 2011b, p.14). Of course, some policymakers balked at the notion that the U.S. was not spending enough on health and safety. White House Office of Science and Technology Policy (OSTP) director John Marburger stated that the U.S. “leads the world not only in spending for nanotechnology development, but also, by an even larger margin, in its investment in research to understand the potential health and safety issues” (Qtd. in Sargent 2011b, p. 12).
Against this backdrop, the House Committee on Science held a hearing on April 16, 2008, dedicated to soliciting input on a proposal to amend the 21st Century Nanotechnology Research and Development Act. Organized interests and policymakers alike overwhelmingly agreed the federal government had to take proactive measures to identify the potential environmental, health, and safety threats associated with nanotechnology. Few presenters more succinctly summarized these concerns than PEN science advisor Andrew Maynard. During one portion of his comments, fittingly titled “The Need for Foresight,” Maynard stated:

Moving towards the nanotechnology future without a clear understanding of the possible risks, and how to manage them, is like driving blindfolded. The more we are able to see where the bends in the road occur, the better we will be able to navigate around them to realize safe, sustainable and successful nanotechnology applications. But to see and navigate the bends requires the foresight provided by strategic science. (Committee on Science 2008, p. 41)

And, how, exactly would this uncertainty be reduced? Proponents of greater precaution argued that, at the very least, regulatory agencies as well as academic scientists and researchers needed more money to investigate and anticipate nanotechnology’s risks. Maynard himself estimated that between an additional $20 million and $100 million per year should be invested over and above current funding levels, which stood at above $60 million a year in 2008 (Maynard 2010).

Concerns with uncertainty and the current status of the 21st Century Nanotechnology Research and Development Act quickly found traction in Congress. In his opening statement to the committee, Chairman of the House Committee on Science Bart Gordon (D-TN), who authored the proposal to amend the 21st Century Nanotechnology Research and Development Act, highlighted the importance of using sound science to guide policymaking activity:

The science base is not now available to pin down what types of engineered nanomaterials may be dangerous, although early studies show some are potentially harmful. We don't yet know what characteristics of these materials are most significant to determine their effect on living things or the environment, nor do we even have the instruments for effectively monitoring the presence of such materials.
in the air or water.

Although the NNI has from its beginning realized the need to include activities for increasing understanding of the environmental and safety aspects of nanotechnology, it has been slow to put in place a well-designed, adequately-funded, and effectively executed research program.

The environmental and safety component of NNI must be improved by quickly developing and implementing a strategic research plan that specifies near-term and long-term goals, sets milestones and timeframes for meeting near-term goals, clarifies agencies' roles in implementing the plan, and allocates sufficient resources to accomplish the goals.

This is the essential first step for the development of nanotechnology to ensure that sound science guides the formulation of regulatory rules and requirements. It will reduce the current uncertainty that inhibits commercial development of nanotechnology and will provide a sound basis for future rule making. (Committee on Science 2008, p. 10)

Such efforts paid off. In the years to follow, policymakers dramatically increased funding for safety research. In 2008, PEN estimated that only about $13 million was spent on risk research (Rejeski 2008). In FY2009, funding for environmental, health, and safety research rose to $74.5 million. By FY2010, that number increased by 24% to $91.6 million. The Obama Administration’s FY2011 budget proposed to increase funding for health and safety research again, this time to the tune of $116.9 million (Sargent 2011c, p. 20). Proponents of greater federal recognition of nanotechnology’s risks were elated. In response to a 2009 bump in funding for the National Institute for Occupational Safety and Health (NIOSH), Maynard (2009) proclaimed: “The unthinkable has happened!” (para. 1). He speculated, “Maybe it’s the new administration. Maybe people are eventually waking up to the fact that successful nanotechnology depends on safe workplaces” (para. 7).

Policymakers, led by members of the House and Senate Science Committees, also sought to amend the core of the 21st Century Nanotechnology Research and Development Act. Lending further support to the proposition that the original Act was seen as a work in progress, the proposed
Amendments, which were introduced in near identical form in both the House and the Senate, served to clarify and sharpen many key provisions relating to risk. In fact, the House version, entitled the “National Nanotechnology Initiative Amendments Act of 2008” (H.R. 5940), offered more than 32 pages of amendments, whereas the original 21st Century Nanotechnology Research and Development Act (P.L. 108-153) had only been 10 pages in length.

While detailed review of this statute is not necessary, a number of H.R. 5940’s provisions represented direct attempts to strengthen the government’s capacity to anticipate. One provision mandated the National Nanotechnology Coordination Office to maintain a public database of all NNI funded projects relating to environmental, health, and safety projects. The database was intended to serve as a centralized source of information for regulators and other risk assessors looking to make sense of, and interpret, the disparate studies relating to nanotechnology’s safety. The amendments also required the National Nanotechnology Advisory Panel to establish a separate subpanel to assess whether the NNI was sufficiently considering health, environmental, and social concerns. Further administrative restructuring required the associate director of the White House Office of Science and Technology Policy to serve as Coordinator for the Societal Dimensions of Nanotechnology. The Coordinator’s responsibilities included establishing annual research plans for federal nanotechnology environmental, health, and safety activities, monitoring all agency-level environmental health and safety efforts, and encouraging public-private partnerships to support environmental, health, and safety research.

The Senate version (S. 3274), like the House version, also established a separate subpanel on environmental, health, and safety concerns, and required a Coordinator for Societal Dimensions of Nanotechnology. As in the House version, the Coordinator was tasked with developing plans, monitoring agency efforts, and promoting interdisciplinary research. S. 3274 also proposed a number of measures not directly integrated into the House bill. For example, the Senate version
called on the National Nanotechnology Program to solicit and draw on the advice of industry
groups when determining which nanoparticles and chemicals might pose risks. This cooperative
regulatory approach was, again, an outgrowth of nanotechnology’s enormous uncertainty. Logic
d dictated industry groups would be the first to identify many of nanotechnology’s risks and thus
would be well-positioned to help reduce scientific uncertainty (Marchant et al. n.d). Of course, the
viability of this approach would hinge on industry’s willingness to be forthright about these risks, a
bold assumption given that doing so might result in economic losses.

Taken together, the changes proposed in S. 3274 and H.R. 5940 indicate how anticipatory
policy is developed in a piecemeal or incremental fashion, and in response to reductions in
uncertainty across time. Indeed, many of these changes represent clear responses to perceived
shortcomings that were only revealed after the 21st Century Nanotechnology Research and
Development Act was enacted and implemented. Time, it would seem, allowed policymakers to
operate on a level involving more detail and understanding.

On June 5, 2008, H.R. 5940 passed the House by an overwhelming majority (407-6). Yet
securing the legislation’s passage in the Senate would prove—has proven—to be a difficult task.
Despite apparent momentum for stronger oversight of environmental, health, and safety issues, the
Senate Committee on Science did not report its bill to the floor before the end of the 2007-2008
session. An identical bill was introduced in the 111th Congress (2009-2010). And once again the
legislation passed the House, but stalled in the Senate Science Committee, which has yet to bring the
issue to a vote. Neither of these bills has been enacted.

A handful of other legislative proposals have attempted to address the environmental,
health, and safety concerns associated with nanotechnology, but not in a way nearly as sweeping as
the National Nanotechnology Initiative Amendment Acts of 2008 or 2009. Most notable was the
The Act amends the Federal Food, Drug, and Cosmetic Act to require that the Secretary of Health and Human Services establish a program within the FDA specifically dedicated to scientific investigation of the potential risks of nanoscale materials and, in particular, the implications of their interaction with biological systems. The bill was referred to the Senate Committee on Health, Education, Labor, and Pensions, but has yet to find its way to the Senate floor.

Despite these stalled statutory efforts, the second round of nanotechnology policymaking proved to be enormously fruitful for proponents of greater consideration of safety concerns, especially in terms of funding—the ultimate end of this second round of policy conflict. In response to the proposed 2011 funding increases, Maynard (2010) blogged: “We’re not out of the woods yet on ensuring we have the information needed to develop and use new nanotechnology-based materials and products safely. But it looks like the U.S. is making progress. And that’s good news for anyone hoping to see the emergence of strong nanotechnology-based solutions to a whole host of challenges” (para. 10).

But for the agencies responsible with protecting human health and the environment, promises of greater funding did not entirely eliminate the extraordinary difficulties associated with regulating nanotechnology. As implied above, in the years following the 2003 enactment of the 21st Century Nanotechnology Research and Development Act, a host of federal regulatory bodies struggled to determine how best to cope with the potential dangers of nanotechnology without imposing unnecessary barriers to innovation and basic research.

Agenda Catalysts

The second round of policy activity followed a far different agenda setting and policy formulation track than the first. Whereas the first round was marked by abrupt policy change, the second round of policymakers lasted for nearly four years—two sessions of Congress—as
policymakers gradually developed policies aimed at bolstering regulatory bodies and others’ capacity to minimize nanotechnology’s risks. What factors catalyzed nanotechnology onto the institutional agenda for a second time? And, of these factors, which ones best explain these two divergent agenda setting and policy formulation phases?

As indicated above, a critical feature of this second round of policymaking was the relatively slow accumulation of problem indicators. Unlike the first round, which saw nanotechnology leapfrog onto the institutional agenda in the wake of the NNI’s creation, we cannot point to any singular event that might have thrust risk regulation to the forefront of Congress’s institutional consciousness. Conversely, nanotechnology’s risks slowly revealed themselves—better yet implied themselves—as a growing body of scientific knowledge gradually built, coloring humankind’s understanding of the novel technology. These risks were, like all scientific discoveries, marked by uncertainty and by and large were not projected to occur until sometime in the future. Thus, policymakers were not compelled to act in haste but could in fact pursue an anticipatory policymaking process over time.

Structured feedback also played an important role in promoting policy change in this second round of policymaking. Bureaucrats and stakeholders relayed evidence of regulatory difficulties, while hamstrung regulatory agencies struggled to grapple with the enormous uncertainties and complexities of nanotechnology in the face of severe funding shortages. Such robust policy feedback, which was partially stimulated by the reporting requirements established in the 21st Century Nanotechnology Research and Development Act, was obviously not possible in the first round of policymaking given that, prior to 2001, the national government participated very little in nanotechnology R&D or risk regulation. Feedback is obviously central to the anticipatory policymaking process, given the uncertainty associated with these problems. A well-functioning governance regime should rely on new information to inform policy alterations across time. These
“feedback loops” are especially prominent in disaster domains, as preparedness policy is commonly developed in the face of extraordinary uncertainties (Baumgartner and Jones 1993). While nanotechnology does not necessarily fit the mold of a disaster policy, the anticipation of any future risk logically necessitates policy alterations across time and in response to new information.

Beyond indicators and feedback, policy change during the second round of policymaking was supported by a well-organized interest group structure. These groups varied in their interpretation of nanotechnology’s risks and overall ideological bent. Those groups that opted for a politically pragmatic solution to this problem, as opposed to an outright ban on all nanotechnologies, tended to have the most success persuading policymakers to act. While this strategy is by no means unique to anticipatory problems, one would expect that it is especially difficult to convince policymakers to support a policy that imposes significant immediate costs—economic or otherwise—to address a problem that may or may not arise sometime in the future. Thus, while policymakers were not averse to regulating nanotechnology’s risks, such action could not come at the expense of R&D and marketization. Not surprisingly, then, most policy proposals opted for considerable industry involvement in the risk management process. This type of policy design meshed well with the predominant definition of nanotechnology as a “double-edged sword,” in that it supported risk minimization efforts without threatening industry and research goals.

Figure 3-6, which shows the number of stories published in The New York Times on nanotechnology between the years 2005 and 2012, indicates an uptick in media attention during this second round of policymaking. In 2006 and 2007, two of the peak years of risk regulation policymaking, The New York Times published 63 and 59 stories respectively. While these numbers did not match the attention nanotechnology received in the first round (67 stories were published in 2003 and 2004), it indicates a level of relatively sustained attention and at least partially accounts for nanotechnology’s second rise to the institutional agenda. What is more, polls indicated a growing
public awareness of nanotechnology. For example, a 2009 poll conducted by Hart Research Associates revealed: “One in three (31%) adults has heard a lot (5%) or some (22%) about nanotechnology” (p. 1).

Implementation and Evaluation

The 21st Century Nanotechnology Research and Development Act created at least two, if not three, conflicting implementation goals. First, and certainly foremost, the Act sought to promote nanotechnology R&D. To this end, implementing agencies have been very successful. In 2012, PEN reported “more than 1,200 companies, universities, government laboratories, and other organizations across all 50 U.S. states and in the District of Columbia that are involved in nanotechnology research, development, and commercialization” (PEN 2012b, para. 1). This number constitutes a nearly 50% increase from 2010.

The second goal, which is closely related to R&D, called for rapid marketization of nanotechnology products. In the wake of the 21st Century Nanotechnology Research and Development Act’s enactment, great strides toward obtaining this goal were also made. Scores of

![Figure 3-6: Number of Stories Published in *The New York Times* on Nanotechnology, 2005-2012](image)

Source: Search for the term "nanotechnology" in Lexis-Nexis online database.
products containing nanotechnology were already reaching the marketplace by 2005. Analysts expect this trend to continue. Market forecasters BCC Research anticipate total worldwide revenues for nanotechnology, which stood at roughly $11.7 billion in 2009, will increase to more than $26 billion by 2015. Nanomaterials are expected to see the biggest bump, increasing from $9 billion in 2009 to $19.6 billion in 2015 (BCC 2010).

However, the final goal of the 21st Century Nanotechnology Research and Development Act has proven much more difficult to achieve. The Act mandated that a variety of agencies take steps to protect against the potential health and environmental risk associated with nanotechnology. This charge was twofold. First, it required funding of research on what these “risks” might be in the first place. Yet this charge proved extremely difficult to meet given the gap in funding between R&D, on the one hand, and health and safety research, on the other. Indeed, in FY 2006 funding for environmental, health, and safety research constituted only 2.8% ($37.7 million) of the NNI’s total budget. Even after Congress altered the 21st Nanotechnology Research and Development Act, risk research was still eclipsed by R&D-related activities. In FY 2010, only 5.1% ($91.6 million) was allocated for the study of environmental, health, and safety research (Sargent 2011, 2011c). Second, it required that the information gathered through this research be translated into action, meaning the agencies responsible for protecting human health and the environment would take proactive measures to ensure consumers are safe. The second charge could, at least in part, be met by adopting rules and regulations to guide private business and consumer action. Regulations could dictate an array of actions, ranging from the safe disposal of products containing nanotechnology to establishing standards indicating the amount of nanoparticles that can be safely inhaled.

In many ways, the demand that policymakers anticipate the health and environmental implications of nanotechnology clashed with the other two goals. Regulatory policy requires adequate understanding of the source of concern. Gathering this information requires time and
resources, and many believe nanotechnology’s potential risks are far too great to allow an extended delay. Beyond the funding shortages described above, the 21st Century Nanotechnology Research and Development Act’s first-to-the-market approach imposed enormous pressure on bureaucrats to come up with regulations quickly and in the absence of solid information. The World Economic Forum argued that, because of the enormous difficulties associated with ensuring adequate nanotechnology regulation, the new technology constituted one of the most significant technological risks facing the planet (World Economic Forum 2008, p. 51). J. Clarence Davies (2008), senior advisor to the PEN, summarized the dilemma as follows:

Many knowledgeable people think that it is premature to establish strong oversight of nanotechnology because we do not yet know enough about its possible adverse health effects. Certainly we have much to learn. We do not know enough about what effect might occur outside the laboratory, we do not understand which characteristics of nanomaterials determine the toxicity of the material and we do not understand how most materials travel in the environment….

[But] without an adequate oversight system cannot protect the public when adverse effects are identified. A lack of action invites significant damage to people or the environment, and/or a public reaction that impedes development of the technology. (p. 4)

Ultimately, regulators struggled to address the following question: Are the risks posed by nanotechnology truly unique, or are they same as the risks posed by existing chemicals? Policymakers and organized interests were divided. Moments after the President signed the 21st Century Nanotechnology Research and Development Act in 2003, John Marburger, Policy Director at the Office of Science and Technology Policy, stated: “The risks from nanotechnology do not differ substantially from those of other technology hazards, such as toxicity of new chemicals or new biological materials, or environmental impacts. I believe many of these concerns can be addressed with existing regulatory mechanisms. The new nanotechnology act specifies that these risks be investigated, widely discussed, and responsibly addressed” (Mikhail 2003, para. 6). Sean Murdock, former executive director of the NanoBusiness Alliance, agreed with Marburger: “The apparatus for
effective nanotechnology regulation is largely in place through various statutes and agencies” (Qtd. in Sargent 2011b, p. 25). Murdock added, however, that even though the regulatory apparatus was in place, agencies still lacked the appropriate “data and resources” to make regulatory decisions and would require further funding in years to come.

In the eyes of many, existing regulatory statutes simply would not—could not—suffice. How can a technology so revolutionary be expected to conform to existing rules? According to Davies, it cannot:

Nanotechnology is difficult to address using existing regulations. There are a number of existing laws—notably the Toxic Substances Control Act; the Occupational Safety and Health Act; the Food Drug and Cosmetic Act; and the major environmental laws (Clean Air Act, Clean Water Act, and Resource Conservation and Recovery Act)—that provide some legal basis for reviewing and regulating [nanotechnology] materials. However, all of these laws either suffer major shortcomings of legal authority, or from a gross lack of resources, or both. They provide a very weak basis for identifying and protecting the public from potential risk, especially as nanotechnologies become more complex in structure and function and the applications become more diverse. (Qtd. in Sargent 2011b, p. 25)

Steffen Foss Hansen of the Technical University of Denmark argued that, if bureaucrats and policymakers hoped to apply existing statutes and regulations to nanotechnology, then wholesale revisions would likely be in order. Foss Hansen estimated that “almost every aspect of the various laws and legislations along the life-cycle of products containing nanomaterials needs to be adapted so that nanomaterials are covered within the scope of the laws, definitions are applicable, etc.” (Berger 2007, para. 2). Politically, such alterations represented a daunting task. According to Foss Hansen, “the implications for the legislative process are many” (para. 2).

When it came to establishing a strong regulatory framework, however, both groups of observers recognized the stakes were high. “Get these rules wrong—and we’re not sure what they are yet—or ignore them, and we may cause unnecessary harm to people and the environment” commented Andrew Maynard (Schneider 2010b, para. 5). The schism between those advocating for new regulations versus those advocating for an incremental approach speaks to the difficulties
associated with implementing anticipatory policy. Gunn (1978) argues that successful implementation requires a valid theory of cause and effect, meaning programs and policies must be shown to somehow improve a problem condition. Nanotechnology strains this demand because, to a great extent, implementing agencies are, even at this time, unable to identify a tangible problem—let alone argue that a particular intervention was working.

As described during this chapter’s assessment of the agenda setting process, feedback communicating the dire effects of funding gaps prompted policymakers to revise original appropriations for health and environmental research. The same feedback also stimulated a series of proposals to amend the 21st Century Nanotechnology Research and Development Act. From an implementation and, more specifically evaluation, perspective, this reflects a pattern of policymaking known as policy maintenance. Hogwood and Peters (1983) refer to policy maintenance as minor alterations in a policy that allow it to meet programmatic goals. Injection of greater funding for risk research represents a clear response to agency concerns regarding the ability to understand the risks associated with nanotechnology. While many would likely argue that these allocations should have been greater to begin with, establishing appropriate funding levels was likely always going to be an exercise in conjecture—trial and error perhaps—given the sheer novelty associated with nanotechnology.

The inability to establish a causal relationship and the need for policy maintenance are an outgrowth of uncertainty. Uncertainty is partially to blame for the 21st Century Nanotechnology Research and Development Act’s failure to prescribe clear lines of authority and delineate leadership roles among implementing agencies. Interestingly, despite the fact that nanotechnology was able to find a permanent home—a policy venue—in Congress with relative ease, analysis of the implementation stage reveals enormous confusion as to which agency or organization had jurisdiction over this issue. Agencies ranging from the National Aeronautics and Space
Administration (NASA) to the Environmental Protection Agency (EPA), Food and Drug Administration (FDA) to Department of Defense (DOD), National Institute for Occupational Health (NIOSH) to Department of Energy (DOE) all grappled with nanotechnology regulation at one time or another.

While it is far beyond the scope of this study to examine each and every agency’s implementation and program evaluation experience, the remainder of this section will illustrate some of the above noted complexities by reviewing developments at the EPA, FDA, and NIOSH. All three of these agencies have been at the forefront of the debate surrounding how best to regulate nanotechnology’s risk and thus constitute ideal examples.

**Environmental Protection Agency (EPA)**

Perhaps the most active regulatory body has been the EPA, which has maintained both a research and regulatory function at least since the enactment of the NNI (Sargent 2011b). EPA was one of the earliest federal agencies to call for more information on the relative uncertainties surrounding nanotechnology in order “to establish a sound scientific basis for assessing and managing unreasonable risks that may result from the introduction of nanoscale materials into the environment” (Qtd. in Sargent 2011b, p. 33).

The self-proclaimed leader in research into the environmental and health effects of nanotechnology, EPA supports investigations of nanoparticle toxicology, exposure to humans, and transport, to name a few activities. Generally, this research is supported through private grants and fellowships offered on a competitive basis. EPA’s presumed authority to regulate nanomaterials stems from a number of existing statutes, including the Clean Air Act (CAA), Clean Water Act (CWA), Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and the Toxic Substances Control Act (TSCA). Together, these statutes amount to a broad writ of authority to protect against
environmental risks and toxins that may occur in air, water, land in general, or insecticides and other pest control chemicals. While these laws cumulatively provide EPA with at least theoretical regulatory authority over nanotechnology, most of the agency’s efforts have focused on the applicability of TCSA and, to a far lesser extent, FIFRA.

TSCA provides the EPA with authority to maintain an inventory of all chemicals and to regulate all “new” chemicals. Although this authority appears fairly straightforward and uncontroversial, nanoparticles have strained this regulatory structure. A central question is whether or not nanoparticles constitute new chemicals under TSCA. Despite their novel properties, nanoparticles are not chemicals in and of themselves, but are generally used in conjunction with existing chemicals, many of which are already regulated by TSCA.

The regulatory dilemmas engendered by this question are manifold. One of the most basic problems relates to the applicability of premanufacture information notices (PMNs). The PMN provision is essentially a gatekeeper function intended to identify potential chemical risks prior to their commercialization. TSCA authorizes EPA to require that producers of a new chemical provide the EPA with a PMN, after which EPA has 90 days to approve the chemical’s manufacture, require more information from the chemical’s producer, or restrict the chemical’s use. Because it is undetermined if nanoparticles should be viewed as new chemicals, regulators and producers alike were perplexed for some time as to whether they were required to adhere to PMN requirements (Environmental Protection Agency 2011b).

Given this confusion, the EPA began soliciting advice in 2005 through a series of public meetings. Specifically, the agency proposed establishing a voluntary pilot program for existing nanomaterials. Through this program, companies would be encouraged to willingly submit information on any nanoscale materials they produce. The program, called the Nanoscale Material Stewardship Program (NMSP), was formally established in 2008. Much like their counterparts in
Congress who saw the gathering and interpretation of valid risk indicators as essential to ensuring nanotechnology’s safety, EPA hoped the NSMP would allow them to gather data on nanotechnology manufacturers and their processes. Such information would be most beneficial when conducting risk assessments of the new technology. Over time, a total of 29 companies reported data on 123 nanomaterials through the program (Karanjia 2011).

Soon after launch of the NMSP, EPA returned to the question of whether or not nanomaterials constituted new chemicals subject to review under TSCA. In 2008, the EPA indicated it would be developing a “Significant New Use Rule” pursuant to section 5(a)(2) of TSCA allowing the agency to require persons and companies who manufacture, import, or process new nanoscale materials that integrate materials listed in the current TSCA inventory to submit notice to the EPA at least 90 days prior to any development activities. EPA also proposed an information gathering rule that would require individuals processing nanomaterials to submit information on production volume, methods of manufacturing and processing, exposure and release information, and available health and safety data. Finally, EPA proposed a rule to require testing for certain nanoscale materials already in commerce. The Agency added it was particularly concerned about carbon nanotubes, characterizing them as different from conventional carbon compounds and likely subject to regulation as a new chemical (Karanjia 2011; Hoffman 2008).

The proposed SNUR encountered opposition, facing a barrage of legal injunctions from nanotechnology producers who argued that such rules violated their right to maintain confidential trade secrets. In fact, the EPA withdrew a proposed SNUR in December 2010 amidst industry pressure (Schneider 2010b). Despite these objections, however, EPA eventually enacted a SNUR for carbon nanotubes requiring that all persons or companies notify the agency at least 90 days before producing carbon nanotubes. EPA also intends to regulate use of nanotechnology in pesticides through FIFRA, and only recently published pre-draft documents outlining some of the regulatory
approaches it is considering (Karanjia 2011).

Despite EPA actions, many environmental and public health experts have called for more wholesale reform of TSCA. While nanotechnology no doubt exacerbated concerns about the continued effectiveness of the statute, which has largely remained unchanged since first enacted more than 30 years ago, many environmentalists and other observers believe EPA has long been stymied by a lack of overall effectiveness. A primary gripe with the current statute is that it places the burden on EPA of proving a chemical safe, thus favoring industry. Herein lies the difficulty with regulating a highly uncertain anticipatory problem. It stands to reason that EPA will have—and has had—a very difficult time establishing nanoparticles as unsafe. Presently, EPA must prove a chemical poses a health threat before it can act to regulate the chemical, a requirement that clashes with the proactive regulatory approach outlined in the 21st Century Nanotechnology Research and Development Act. Further, EPA needs proof of danger before it can even request more information about a chemical (Goodman 2010). According to Wade Najjum, EPA’s assistant inspector general, “EPA’s procedures for handling confidential business information requests are predisposed to protect industry information rather than to provide public access to health and safety studies” (Qtd. in Schneider 2010b, para. 37). Indeed, since TSCA was enacted, EPA has only used the statute to evaluate a mere 200 chemicals, of which only five were eventually banned. EPA Administrator Lisa Jackson advocated for altering TSCA so as to shift the burden of proof to industry. Additionally, she called for mandatory reporting of all nanomaterials. Stated Jackson: “EPA should have the clear authority to establish safety standards that reflect the best available science…without the delays and obstacles currently in place, or excessive claims of confidential business information” (Qtd. in Schneider 2010b, para. 37).

Such calls for reform did not go unnoticed. In summer 2010, legislation to amend TSCA was introduced in both the House (Toxic Chemicals Safety Act, H.R. 5820) and the Senate (Safe
Chemicals Act of 2010, S. 3209) (Goodman 2010). While it is not the place of this work to analyze these bills in detail, both seek to strengthen the EPA’s regulatory capacity by amending TSCA and tightening the responsibilities of the chemical industry. Among the notable provisions were increased reporting requirements, a “right to know” provision that would allow the public to access information of manufacturing procedures, and a requirement that vulnerable populations be explicitly considered in risk assessment programs (Rosenberg 2010, 2011). At their core, both statutes would create a more anticipatory regulatory environment by encouraging the EPA to solicit critical information in advance.

Sponsoring Congresspersons described these bills as an opportunity to address the enormous regulatory inadequacies of the EPA. “America’s system for regulating industrial chemicals is broken,” stated Senator Frank Lautenberg (D-N.J.), sponsor of S. 3209 (Qtd. in Walsh 2010, para. 3). Lautenberg added: “Parents are afraid because hundreds of untested chemicals are found in their children’s bodies. EPA does not have the tools to act on dangerous chemicals, and the chemical industry has asked for stronger laws so that their customers are safe” (Qtd. in Goodman 2010, para. 3). Representative Henry Waxman (D-CA), co-sponsor of H.R. 5820, commented: “Reform of the Toxic Substances Control Act is long-overdue. Under [H.R. 5820], all chemicals will be reviewed for safety, dangerous chemicals will be restricted or eliminated, and new, safer chemicals will be developed more rapidly to move our economy toward a sustainable future” (Qtd. in “Chairman Rush…” 2010, para. 3).

Environmental and public health advocates applauded the legislation. Speaking at a conference on the day when Lautenberg’s bill was announced, Lisa Jackson stated that “I’m really thrilled to know today, today as we all sit here, in Congress for the first time we’re going to see the introduction of a modern TSCA act, a brand new environmental law to deal with chemicals that are finding their way into our bodies, into our environment” (Qtd. in Goodman 2010, para. 9). Andy
Igrejas, Director of Safer Chemicals, Healthy Families, a coalition of 250 environmental and public health groups, echoed Jackson’s sentiments in stating that H.R. 5820 “will reduce chronic disease in this country, a burden that scientists have increasingly linked to toxic chemicals found in our homes and places of work” (Qtd. in “Momentum Builds…” 2010, para. 2).

Still, not everyone welcomed the legislation with open arms. Industry groups countered that the legislation threatened to stifle innovation by creating an unworkable business environment. Cal Dooley, president and CEO of the American Chemistry Council, remarked: “[W]e are concerned that the bill’s proposed decision-making standard may be legally and technically impossible to meet. The proposed changes to the new chemicals program could hamper innovation in new products, processes and technologies.” (Qtd. in Goodman 2010, para. 14). The Society of Chemical Manufacturers & Affiliates, an association representing chemical manufacturers, voiced similar concerns indicating that H.R. 5280 would hamper innovation by imposing excessive regulatory burdens on chemical manufacturers (Sanchez 2010).

Neither of the proposals to amend TSCA has been enacted. Even so, the ongoing debate as to the application of existing regulatory statutes and implementation procedures to nanoparticles reflects the difficulties noted earlier in this section. While nanotechnology is clearly not the sole impetus for TSCA reform, it is a critical stressor. According to John DiLoreto of NanoReg News, an online publication that covers nanotechnology-related policy debates, “Nanotechnology has forced government regulators to take another look at TSCA in more than a few ways. All of the hype about nanomaterials exhibiting new and different properties draws into question the methods and data needed to assess potential risks” (2009, para. 4). If nothing else, nanotechnology magnified the propensity of the Agency to regulate from a position of reactivity rather than a proactive approach. Indeed, the requirement that EPA establish risk then act—as well as its rather draconian information reporting rules—represented a stark contrast to the proactive regulatory approach codified in the
21st Century Nanotechnology Research and Development Act. The experience of the EPA implies that while codifying anticipatory governance might be relatively straightforward, implementing it is exceedingly difficult, especially in the face of extreme uncertainty and longstanding administrative norms and rules.

Moreover, TSCA reform again speaks to the propensity of anticipatory problems to require policy maintenance, especially in the face of implementation difficulties. That nanotechnology played a critical part in prompting policymakers to consider altering TSCA for the first time in more than 30 years is significant. Nanotechnology, in other words, represents such an incredibly novel problem that it prompted not only policy revisions to the 21st Century Nanotechnology Research and Development Act, but to one of the most lasting and important environmental laws in the nation as well. Thus, the nanotechnology case suggests that successful implementation of anticipatory problems may necessitate significant changes in organizational behavior as well as a willingness to revisit authorizing statutes on a fairly regular basis.

**National Institute for Occupational Safety and Health (NIOSH)**

Although the EPA has been at the seeming epicenter of nanotechnology regulation, other agencies have encountered similar regulatory difficulties. NIOSH, the worker safety research arm of the Centers for Disease Control and Prevention (CDC), has scrambled to develop ways to protect workers who are handling nanotechnology. The Agency’s concerns largely derive from the widespread belief that workers, including scientists handling nanotechnology products in laboratories, are likely to be the first group exposed to the new technology’s risks. The Agency’s website summarizes:

> As with any new technology, the earliest and most extensive exposure to hazards is most likely to occur in the workplace. Workers within nanotechnology-related industries have the potential to be exposed to uniquely engineered materials with novel sizes, shapes, and physical and chemical properties. Occupational health risks
associated with manufacturing and using nanomaterials are not yet clearly understood. Minimal information is currently available on dominant exposure routes, potential exposure levels, and material toxicity of nanomaterials. (Centers for Disease Control and Prevention 2011, para. 2)

Paul Schulte, manager of the NIOSH Nanotechnology Research Center, elaborated on the need to protect workers: “Workers and employers can’t wait for us to come up with all the answers before they unleash this technology. It’s unleashed already” (Qtd. in Schneider 2010b, para. 41).

However, because NIOSH lacks regulatory capacity (it can only make recommendations to OSHA), its ability to intervene directly on behalf of workers is severely limited. At best, NIOSH can study the risks associated with nanotechnology, it does not have the authority to adopt binding regulations. Nonetheless, the agency has pursued a fairly aggressive research agenda, considerably expanding the nanotechnology risk portfolio. It has published more than 170 peer-reviewed studies of the health effects of nano-exposure and actually established exposure limits for nano-titanium dioxide (Schneider 2010b). In fact, in December of 2010 the Agency issued the first formal federal recommendation for control of nanotechnology in the workplace. The draft document established a number of standards and procedures, including, but not limited to, an occupational exposure limit of seven milligrams for nanotubes, greater exposure monitoring, the use of protective gear if environmental controls do not reduce exposure levels below the proposed limit, and clean-up procedures (National Institute for Occupational Safety and Health 2010).

In 2011, NIOSH issued an additional guidance document, this time focusing on nano-titanium dioxide. This document sent shockwaves through the scientific and occupational hazard communities as it constituted the first time the Agency had distinguished between the toxicological effects of inhaling very small, nanosized particles of titanium dioxide and larger particles. NIOSH held that size and surface area should constitute primary criteria for determining a substance’s toxicity—a critical methodological assumption given the debate over nanotechnology. Specifically,
the document concluded that the ultrafine, smaller particles are more worrisome and deserving of an exposure limit of .3 milligrams per cubic meter—100 nanometers in size. Richard Denison, a senior scientist at the Environmental Defense Fund, judged that NIOSH’s approach was “more clearly stated and defended and justified here than I’ve seen before” (Qtd. in Shaw 2011, para. 1). However, as of this writing, OSHA has not adopted any of NIOSH’s recommendations in drafting concrete regulations.

Food and Drug Administration (FDA)

Of all the would-be regulators of nanotechnology, few seem to have drawn as much ire as the FDA. The FDA has the authority to regulate cosmetics, medical devices, food, drugs, biological products, and combination products. Products in these areas are anticipated to readily incorporate nanotechnology and many already do so. Thus, FDA anticipates having to regulate a variety of “combination products,” such as drug-devices and device-biological products, which integrate nanotechnology into current products and systems (Sargent 2011b).

Those concerned that nanotechnology’s risks were being ignored argued that because FDA does not provide regulatory consideration of products until after development, it is is unlikely to take a proactive stance with nanoproducts. In particular, public health advocates scoff at this reactive approach, calling it inadequate and a threat to public safety. “FDA is like ostriches with their heads in the ground, not looking for a problem so they do not see one. If they don’t see one, they don’t have to respond to a problem,” said Jaydee Hanson, senior policy analyst for the Center for Food Safety (Qtd. in Schneider 2010b, para. 21).

In a PEN-sponsored review of the FDA’s ability to regulate nanotechnology, Michael Taylor concluded that the FDA has absolutely no capacity for “pre-market review” of nanoproducts (meaning it cannot review the safety of nanoproducts until after they have been commercialized or
otherwise released onto the marketplace). For Taylor, this fact is especially worrisome given the enormous uncertainty surrounding the potential health implications of nanoproducts:

Because there is no requirement for FDA pre-market review and no other incentive or requirement for companies to disclose their research or product development activity, FDA has no legal basis for obtaining this information from them. This is an important issue in the nanotechnology cosmetic arena because of genuine uncertainty about the actual composition and properties of ingredients that are claimed on cosmetic product labels to be produced through or otherwise incorporate the benefits of nanotechnology (Taylor 2006, p. 29).

Taylor stated that insufficient resources and funding might stifle FDA capacity to adjust to the demands of nanotechnology.

The FDA has yet to enact any substantive regulations for nanoproducts, although it is legally precluded from regulating some substances (e.g. cosmetics). Yet, in the Agency’s defense, it has recently taken steps toward upgrading its access to information and is at least considering regulations and guidelines for the new technology. In 2006, the FDA created a Nanotechnology Task Force to help assess the adequacy of existing regulatory guidelines for nanotechnology. In 2007, the Nanotechnology Task Force released a report acknowledging that the characteristics relevant to product safety may change at the nanoscale, but more testing was required to understand these implications. The Nanotechnology Task Force also called for agency guidelines to specify a number of information disclosure and reporting requirements for private companies, and suggested that the FDA improve its data assessment program (Food and Drug Administration 2007).

After several years of eliciting public commentary and general inaction, FDA announced in summer 2011 that it would “open dialogue” about nanotechnology regulation. In May 2011, the Agency published a series of draft guidelines in the federal register that, according to FDA Commissioner Margaret A. Hamburg, M.D., served as a “starting point” for nanotechnology discussion. Hamburg went on: “Our goal is to regulate these products using the best possible science. Understanding nanotechnology remains a top priority within the agency’s regulatory science
initiative and, in doing so, we will be prepared to usher science, public health, and FDA into a new, more innovative era” (Qtd. in Food and Drug Administration 2011, p. 5). The guidelines specify matters that might be considered by the Agency when nanotechnology is intended in a product, such as the size and properties of the nanoproducts used. While public health advocates concede the document is a welcome step in the right direction, the draft leaves confusion as to how the FDA—in practice—will regulate nanoproducts. Nonetheless, most observers agree this vagueness is likely derived from the fact that this is only a draft document, and it is far too early to determine what approach the agency will take.

**Conclusion**

The nanotechnology case represents an example of anticipatory policymaking under conditions of *extreme* uncertainty. To be sure, all three cases examined in this thesis will feature highly uncertain problems. However, the nanotechnology case is distinctive because, in many ways, policymakers, scientists, and the general public alike have no real idea what its associated “problems” are in the first place. The nanotechnology case is also made distinctive by the fact that it likely represents the purest example of anticipatory policymaking, not only in this study, but maybe—just maybe—of the last decade or so. Policymakers made a calculated attempt to construct an anticipatory governance scheme, although the jury is still out as to how successful they were. Anticipation was, without question, a hallmark of the 21st Century Nanotechnology Research and Development Act.

The uncertainty associated with nanotechnology, coupled with policymakers’ desire to act with prescience, impacted the policymaking process considerably. Even if we ignore the simple fact that the 21st Century Nanotechnology Research and Development Act included provisions directly aimed at encouraging anticipation, there remain a number of important findings relating to anticipatory policymaking revealed in this study. For example, the nanotechnology debate illustrated the
importance of analogy as a strategic rhetorical device for limiting uncertainty—or at least the perception of uncertainty. Policymaking was a noticeably incremental process, requiring regular readjustments to existing statutes. Policy design itself sought to encourage the production of information, which was seen as critical to reducing confusion about the problem’s risks. Indicators and feedback, while absent from the first round of policymaking became critical drivers over time. Anticipation was readily integrated into statutes, but proved to be much more elusive ends during the implementation stage.

This case also exposes the fundamental difficulty involved with striking a balance between benefit maximization and risk minimization. Returning to the question posed at the beginning of this case, policymakers did, in fact, make a calculated effort to address both ends. In many ways, they saw them as mutually dependent. Nanotechnology could not be successful if it was not safely regulated. However, their perception ran up against a harsh implementation environment, which was hamstrung by the practical divergence of these policy goals.

The findings revealed in this chapter are preliminary in so far as the nanotechnology debate continues to unfold as of this writing. While it is impossible to predict how unresolved conflicts will unfold, one thing is certain, and that is that time will vastly improve understandings of nanotechnology. How will better information—improved knowledge and greater clarity—impact the current policymaking and governance regime? How will policymakers respond if the risks they so highly anticipate do in fact arrive? What if they never emerge? The answers to these questions will prove most fruitful to our understanding of the nanotechnology debate and anticipatory policymaking in general. For now, however, the best we can do is wait and see.
H5N1 avian influenza, commonly known as “avian flu” or “bird flu,” is a strain of influenza virus originating in birds that can be transmitted to humans through close proximity. H5N1 was first detected in bird populations in China’s Guangdong Province in 1996. The following year, the virus reemerged in Hong Kong, resulting in the deaths of thousands of birds and infecting 18 humans, six of whom died. The virus lay dormant for roughly a dozen years, before re-merging in 2003. Since then, the virus is known to have infected 564 individuals, killing 330 of them, all in Asia, the Middle East, and Eastern Europe. No case has been reported in the U.S. (World Health Organization 2012).

Concerns about H5N1 influenza are twofold. First, unlike the seasonal flu, which cycles through human populations annually and typically has a near identical genetic composition regardless of yearly strain, H5N1 influenza is foreign to the human immune system. This biological novelty—humankind’s lack of natural immunity—makes H5N1 an alarmingly lethal virus, killing more than 57% of those infected. Second, and perhaps more important, scientists fear H5N1 will mutate into an airborne strain, capable of rapid human-to-human transmission. As of this writing, H5N1 can only be contracted through direct contact with an infected host, such as a sick animal or human, or through direct contact with an infected host’s excrement. However, scientists believe it is very probable H5N1 will develop the capacity to transmit itself from one host to another through a simple cough or sneeze. Such a mutation would almost certainly spark a global H5N1 pandemic, or an infectious disease epidemic rapidly spreading through human populations across the globe. What is more, the longer H5N1 circulates—the more humans, birds, and/or animals infected—the greater the probability the virus will undergo the critical genetic shift.

Enormous uncertainty surrounds H5N1. Scientists simply do not know—cannot know—if, when, or to what extent an outbreak might occur. Yet, harkening back to our discussion of
nanotechnology in Chapter 3, a pandemic influence is a known—albeit unpredictable—threat. Based on knowledge acquired from recent cases and past pandemics scientists can estimate, with varying degrees of probability, what an H5N1 pandemic might look like. The symptoms and health effects of the virus, its pathology, even the number of people who would likely be sickened and killed can all be approximated, although such approximations vary widely.

H5N1 thus constitutes a classic example of preparedness policymaking. Despite the fact that not a single case has occurred on American soil, the President and Congress have allocated billions of dollars toward readying the nation for the possibility of pandemic. What factors catalyzed this dangerous but highly unpredictable—and by no means certain—threat onto the national agenda? Moreover, as described later, a different influenza strain known as the H1N1 influenza or “swine influenza” did, in fact, lead to a pandemic in 2009. How did the policymaking dynamics associated with the swine flu differ from those associated with bird flu? These questions, as well as the overarching questions relating to anticipatory policymaking that guide this thesis project as a whole, are explored below.

**Dimensions of the Problem**

Avian influenza viruses (or influenza “A viruses”) typically develop in the intestines of wild birds. In most cases, the infections are innocuous and infected birds will show no symptoms of sickness. However, influenza A viruses are highly contagious and can readily spread from wild to domestic bird species, including chickens, ducks, and turkeys, through direct contact with an infected wild bird or through contaminated materials and surfaces, such as cages, feed, or water. The domesticated birds typically have no natural immunity to the virus, with consequently high incidence of sickness. Such outbreaks range in lethality and transmissibility from a “low pathogenic” variant, which is only accompanied by mild symptoms, to a “highly pathogenic” variant that rapidly spreads
through bird populations and causes severe organ damage. Highly pathogenic strains can have a mortality rate of 90-100% (Center for Disease Control and Prevention 2010).

The vast majority of human influenza A infections are contracted through direct contact with a sickened bird or animal, or their secretions. Human-to-human infections are exceedingly rare and usually necessitate direct contact. Depending on the subtype and strain of the virus, influenza A viruses can cause a wide array of health complications in humans. Avian-born viruses have been shown to cause “typical” flu-like symptoms, such as fever, cough, sore throat, muscle aches, and eye infections. In certain instances, avian influenza viruses can cause serious and even life threatening conditions, such a pneumonia and severe acute respiratory disease (World Health Organization 2011). H5N1 avian influenza is widely considered one of the deadliest influenza strains in fifty years. The virus tends to settle in the lungs of its victims, often triggering a flood of immune cells to the lung tissue. As a result of this barrage of cells, or “cytokine storm,” victims can suffocate to death, as their lungs reduce to a sodden mass of dead tissue (Osterholm 2005; DeLeo 2010).

While sporadic infection with avian-born influenza virus is no doubt disconcerting, the major concern surrounding influenza A viruses, like H5N1, largely stems from their ability to trigger a global pandemic. A pandemic is an epidemic—a substantial number of human cases of a disease that exceeds normal expectations or experience—spreading through human populations across a large geographic area, often across various continents. Pandemic viruses are infectious, meaning they afford rapid and direct human-to-human transmission. A disease is not considered a pandemic simply because it kills or infects many people. Because it cannot spread from one human to another, cancer, despite its enormous human toll, is not considered a pandemic (World Health Organization 2011; Doshi 2011).

Airborne transmissibility is usually a necessary precursor for pandemic influenza. Airborne viruses can be spread via a cough or sneeze, accommodating easy transmission. Many viruses acquire
these traits over time and can evolve through a variety of evolutionary processes. One of the most common scenarios sees a single host (e.g., a bird, pig, or even a human) simultaneously infected with a non-airborne strain of avian influenza and an airborne strain of seasonal influenza. Within the infected host, the two viruses could swap genetic characteristics, creating a new airborne strain (Davis 2006). Most experts agree the longer a virus circulates—the greater the number of instances and infections—the more likely this or some other evolutionary process will occur (Webster and Govorkova 2006). As a result, prolonged cases of avian influenza infection—even in animal populations—tend to raise concerns within global public health communities.

Avian influenza viruses are essentially novel to human beings. Whereas the seasonal flu infects human populations on at least a yearly basis, humans are very rarely exposed to avian-born influenza viruses. For this reason, humans lack the antibodies necessary to combat these types of viruses. As a result, pandemic influenza strains are often highly lethal. For example, the 1918 Spanish Flu Pandemic, widely believed to be the deadliest pandemic in human history, is estimated to have had a mortality rate as high as 20%, and is judged to have killed 50-100 million people worldwide (Strikas et al. 2002).

While uncommon, influenza A viruses have infected humans before. For example, the H2N2 virus or “Asian Flu,” which originated in China and circulated among human populations from 1957 to 1968, resulted in upward of two million deaths worldwide, 69,800 in the U.S. Likewise, H1N1 influenza subtypes are responsible for some of the most notorious influenza outbreaks in modern history. H1N1, which can originate in and infect both birds and pigs, was responsible for the 1918 Spanish Flu Pandemic, which killed 50 to 100 million people worldwide (Barry 2004; Davis 2006). H1N1 also caused the most recent pandemic that occurred in the summer and fall of 2009. This 2009 pandemic was deemed the “swine flu” pandemic because it originated in pigs in Mexico. The virus spread to 214 countries, including the U.S., and resulted in close to 18,138 deaths. As
described later, the swine flu pandemic captured widespread public and policymaker attention and, in October of 2009, U.S. President Barack Obama declared the swine flu pandemic a national emergency (Elliot 2009).

Fighting the types of rare influenza viruses that typically spawn pandemics is difficult. Antiviral drugs, which are administered as a prophylactic to mitigate the symptoms of seasonal influenza, have yielded mixed results combating H5N1. To most experts, the development of a safe and effective vaccine is the most effective response to any influenza virus. In a New England Journal of Medicine editorial, “Vaccine against Avian Influenza—A Race against Time,” Dr. Gregory Poland (2006) writes: “Safe and effective vaccines are likely to be the single most important public health tool for decreasing the morbidity, mortality, and economic effects of pandemic influenza — particularly in view of the reported resistance of influenza A (H5N1) to antiviral agents” (p. 1411). The utility of vaccines is largely derived from their proactive approach to fighting a virus. Because patients are inoculated in advance, they are spared both the suffering associated with contracting the disease and the risk of becoming potential transmitters to others. Unfortunately, because they are in a seemingly constant state of flux, influenza A viruses often defy a single vaccine serum. As the virus evolves, previous vaccines tend to lose their efficacy, requiring scientists to develop new solutions. Seasonal influenza, by contrast, is more consistent in genetic composition and circulates more readily, allowing scientists to quickly draw on a plethora of virus samples. As a result, seasonal viruses pose far fewer impediments to vaccine development (DeLeo 2010).

The first known case of H5N1 avian influenza was reported in the Guangdong Province of China in 1996. The Guangdong case was relatively insignificant and isolated to a single farm goose. One year later, in 1997, the virus reappeared and ravaged poultry populations on farms and live poultry markets in Hong Kong, resulting in the deaths of thousands of birds. (Many of these birds were killed via mandatory culling practices, which attempted to halt the virus’s spread.) More
concerning, the 1997 outbreak hospitalized 18 people, the vast majority of whom had direct contact with birds in the open-air poultry markets of Hong Kong. Six of the 18 hospitalizations ended in death. Thus, the virus took a critical first step toward evolving into a pandemic strain—it infected humans. The 1997 outbreak also marked the first time an influenza A virus transmitted from birds caused acute respiratory distress syndrome (ARDS) in humans, a condition characterized by extreme difficulty breathing and blue discoloration of the lips and nose. Victims literally suffocated to death. Authorities in Hong Kong responded by systematically culling more than 1.5 million chickens (CDC 2008; WHO 2011b).

According to most accounts, international and American public health agencies, such as the World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC), saw the Hong Kong outbreak as a dark foreshadowing of things to come. The CDC dispatched teams of scientists to Hong Kong to draw samples of the virus, which were later subjected to rigorous scientific testing at their headquarters in Atlanta, Georgia (Davis 2006). Dr. Lo Wing-lok, a specialist in infectious diseases working in Hong Kong, called the virus “cause for grave concern” (Gargan 1997, para. 8).

Despite the immediate alarm caused by the Hong Kong outbreak, H5N1 did not become the global health crisis predicted by many—at least not initially. From 1998 through 2002, H5N1 disappeared. Not a single case of H5N1 avian influenza was reported in birds, animals, or humans. However, this dormancy did not last and H5N1 reemerged in February 2003, once again infecting humans in Hong Kong. On this occasion, the virus was detected in two family members, who allegedly had traveled to China days prior to displaying symptoms. One of the individuals recovered from the virus while the other died. A third family member died of an undiagnosed respiratory illness. No formal testing was conducted, so the deaths could not be conclusively linked to H5N1.
By the end of 2003, H5N1 represented a significant danger to global public health, resulting in severe and often fatal human infections in China, Thailand, and Vietnam. In 2004, 46 avian influenza cases were reported, of which 32 resulted in death, making the virus a highly potent killer. Although the 2003 and 2004 infections were contracted through direct contact with infected poultry, public health authorities suspected one instance of human-to-human transmission occurred in Thailand when an individual contracted the disease after caring for an ailing family member. In the eyes of many, human-to-human transmission represented yet another step toward pandemic. Public health specialists feared the longer H5N1 circulated, the more likely it was to undergo the critical mutation needed to spark a global pandemic (DeNoon 2005; Webster and Govorkova 2006). In 2005, Daniel DeNoon of Fox News reported: “[I]t’s becoming clear that there are many small steps—rather than alarming leaps—that lead to a flu pandemic” (Qtd. in DeNoon 2005, para. 10). Guénaël Rodier, director of the WHO Department of Communicable Disease Surveillance and Response stated: “There is no evidence of a big crisis. But there are enough elements to say there may be something going on…We have enough data to be concerned. At the same time we don't have enough data to be sure” (para. 11). Influenza experts Robert Webster and Elena Govorkova summarized concerns that a growing number of cases implied a growing threat of pandemic:

There is no question that there will be another influenza pandemic someday. We simply don't know when it will occur or whether the H5N1 avian influenza virus will cause it. But given the number of cases of H5N1 influenza that have occurred in humans to date (251 as of late September 2006) and the rate of death of more than 50%, it would be prudent to develop robust plans for dealing with such a pandemic. (2006, p. 2174)

Many saw this prolonged evolutionary period as a rare, but somewhat welcome, opportunity to act with anticipation. Dr. Anthony Fauci, Director of the National Institute of Allergy and Infectious Disease, argued: “Previous influenza pandemics have arrived with little or no warning, but the current widespread circulation of H5N1 viruses among avian populations and their potential for increased transmission to humans and other mammalian species may afford us an unprecedented
opportunity to prepare for the next pandemic threat” (2006, p. 73). He added: “Rather than react in panic, however, we need to determine what can be done now with the knowledge and resources currently available to prevent or minimize the impact of a potential pandemic” (p. 73). Fauci, like many others in the public health community, felt H5N1 demanded an anticipatory policy approach.

The growing number of cases and deaths abroad, coupled with a heightened sense of alarm within the scientific community, crystallized a coherent policy conflict. On the one hand, scores of global and domestic public health specialists advocated for sweeping preparedness policies, capable of readying the U.S.—and in fact the rest of the world—for an H5N1 pandemic. Yet, on the other hand, a number of observers warned against overreaction. These individuals and groups held it was far too early to determine if H5N1 in fact constituted a viable pandemic threat and, therefore, policymakers should restrain from enacting costly and invasive public health interventions. The following section explores the discursive strategies associated with these two camps in greater detail.

**Discourse of Conflict**

H5N1 continued to spread in 2005, infecting individuals in Cambodia, China, Indonesia, Thailand, and Vietnam. The number of H5N1 cases and deaths increased that year, as 98 individuals were sickened with the virus (43 of whom died). The next year would prove to be the virus’s most lethal to date, infecting 115 individuals in nine countries (Azerbaijan, Cambodia, China, Djibouti, Egypt, Indonesia, Iraq, Thailand, and Turkey) and causing 70 deaths (World Health Organization 2012).

H5N1’s spread served to expand the political conflict surrounding the pandemic influenza issue. Initially, the avian influenza was perceived solely in scientific or public health terms. When the avian influenza first appeared in 1997 in Hong Kong, it represented one of many global emerging viruses. Indeed, global public health institutions, most notably the WHO, frequently identify and
track new or emerging diseases, many of which fail to infect beyond the initial site of outbreak. Of course, the global public health authorities responsible for monitoring disease outbreaks grant new viruses of all varieties, especially influenza strains, almost immediate attention. Viruses, like H5N1, behave in wildly unpredictable ways, making it next to impossible to predict which of these various strains will become the next great pandemic. According to Ab Osterhaus, professor of virology at the Erasmus Medical Center in Rotterdam, the only constant that exists within the viral world is to “Expect the unexpected” at all times (Harmon 2011, para. 3).

Public health infrastructures are anticipatory by nature. To limit the uncertainty associated with viral threats, public health specialists construct epidemiological accounts or descriptions of the disease, tracking their scope within the population and assessing the factors that correlate with patterns of health and illness (Arkansas Department of Health 2011). Obviously, such accounts require information and data—better yet, indicators—relating to the features or dimensions of the public health concern. Such information might include counts of the numbers of cases and deaths, accounts of how the disease spread, and descriptions of the genetic composition of the disease.

More than any other U.S. public health institution, it is the CDC that is explicitly charged with identifying, tracking, and responding to emerging health threats. Historian Elizabeth Etheridge (1992) describes the CDC as a sentinel for health, a designation that nicely sums up the agency’s central role in scanning the globe for new and potential public health risks. Early identification and anticipation of diseases is critical to the agency’s mission. The CDC strives to provide forewarning and time to ready for any looming public health dilemma, such as pandemic influenza. Anecdotal accounts indicate that the CDC took an active role in surveying the outbreak of H5N1 in Hong Kong in 1997. Representatives from the CDC travelled to Hong Kong, gathered samples of the virus, and then shipped those samples back to headquarters in Atlanta for screening and assessment (Davis 2006; Gargan 1997). At least initially, the avian influenza was seen largely as a bureaucratic
issue, falling directly within the purview of the CDC’s jurisdictional responsibility over international health threats and emerging diseases. Indeed, the 1997 Hong Kong incident barely caused a stir outside of the public health policy community, let alone in the halls of Congress or the Office of President. The CDC’s dominance over this potential problem was made apparent in a 1998 *Time* article, which was one of the earliest articles published by the magazine directly referencing H5N1, that referred to the CDC as the “Ghostbusters” of the epidemic, adding that the agency “grabbed most of the headlines” (Larson 1998, p. 56).

Still, the Hong Kong incident and the H5N1 virus cannot—should not—be reduced to a mere exercise in public health precaution. Even as early as 1997-1998, when the flu had only actually infected fewer than 20 individuals, members of the scientific community were extremely concerned with H5N1. In January 1998, months after the Hong Kong incident, *The New York Times* reported that scientists at the CDC’s laboratory in Atlanta were hurriedly working to understand the molecular composition of the virus in order develop tests to allow doctors to screen for future cases of H5N1 and eventually develop vaccines. The article reported that the CDC expressed “deep concern that the genes of A(H5N1) could yet mix with those of human influenza viruses to create a new strain that could cause widespread outbreaks, if not a pandemic rivaling the one that killed 21 million people in 1918 and 1919” (Altman 1998). Thus, while avian flu had yet to enter the mass public consciousness, it was well on its way onto the agendas of bureaucratic agencies by the late-1990s.

The defining feature of the H5N1 policy debate was uncertainty. Public health agencies across the country warned that, while H5N1 constituted a viable and very dangerous threat, the likelihood of pandemic could only be viewed as tremendously uncertain. This uncertainty remains ever-present to this day. As one public service announcement by the Minnesota Department of Health explained:
Public health experts are concerned that the H5N1 virus could change (mutate) into a form that is easily spread from one person to another. We don’t know for sure whether that will happen – or when it might happen. But if it does, the result could be a global influenza pandemic. Since few, if any, people would have any immunity to the new influenza virus, it could spread around the world very rapidly, causing serious illness in many people. (Minnesota Department of Health 2012, para. 5)

A similar announcement by the City of Long Beach, California’s Department of Health and Human Services asked: “Will H5N1 cause the next flu pandemic? It is unknown at this time” (2012, para. 10). This uncertainty was central to virtually all narratives relating to the avian influenza, making it an extraordinarily complex problem to define. Indeed, any and all projections as to the nature of this particular threat were tenuous at best. Even those within the public health community, who hoped to convince members of Congress to enact sweeping preparedness policy, conceded that H5N1 may in fact never come to fruition, despite the enormous threat it posed.

In communicating the threat of avian influenza to the general public and policymakers alike, many scientists attempted to sidestep the problem’s inherent uncertainty by arguing it was not a question of “if” the next pandemic would occur, but “when.” In this vein, Richard Webby and Robert Webster noted: “Influenza experts agree that another influenza pandemic is inevitable and may be imminent” (2003, p. 1522). And while scientists could not predict whether H5N1 would in fact evolve into a pandemic strain, the Hong Kong outbreak demonstrated the enormous danger associated with this particular virus. Six out of the eighteen individuals infected with H5N1 died, giving the new virus a lethality rate of over 33%. In years to come, the virus’s lethality rate would be estimated at around 59%, a measure serving to fuel concerns about the potential severity of the disease (Butler 2012). In reframing pandemic influenza as a seemingly cyclical process, these individuals thus minimized the perception that policy action might be in vain. Indeed, even if this incredibly threatening disease did not evolve into a pandemic strain, another virus surely would—in due time—because an influenza pandemic was long overdue. Thus, according to this narrative uncertainty did not negate the need for preparedness policy.
Discourse surrounding the avian influenza also underscored the virus’s novelty. Humankind has no immunities to H5N1, heightening the virus’s distinctiveness and lethality. Commenting on the special character of the virus and its impact on policy discourse surrounding the topic, Lawrence Altman, a columnist for The New York Times, wrote “Why should so few cases cause such drastic measures locally and apprehension globally? The main reason is [H5N1’s] novelty to humans” (1997, para. 2-3). Even so, another observer commented, somewhat cynically, “novelty alone doesn’t make for a pandemic… And, so far, novelty is all the ‘bird virus’ has going for it” (Crowley 1998, p. 41).

Such skepticism aside, novelty matters. As scholars of problem definition have shown, novel problems are particularly prone to capturing public and policymaker attention (Rochefort and Cobb 1994). In the case of the avian influenza, the “newness” of this particular strain served to heighten media—and likely public—interest at this time. Interestingly, however, the virus’s novelty was not socially constructed. It was quite literal—indeed, biological—as H5N1 was totally foreign to the human immune system. Thus, claims of novelty were no doubt legitimized by the virus’s distinctive genetic composition.

Analogy constituted arguably the most important rhetorical device of this period. Extrapolations regarding what a pandemic might look like, at least in terms of the number of individuals sickened and killed, economic impact, and social implications, largely relied on the use of historical comparisons between H5N1 and previous pandemics. Proponents of immediate government intervention compared the avian influenza to the 1918 Spanish flu pandemic. Mike Davis, author of The Monster at Our Door: The Global Threat of Avian Influenza, called the Spanish flu “a template for the public-health community’s worst fears about the imminent threat of avian influenza” (2005, p. 24). Dr. Michael Osterholm, director of the University of Minnesota Center for Infectious Disease and Policy, felt a virus similar to the 1918 flu could kill at least 70 million people worldwide (Enserink 2004). Even the Congressional Budgeting Office (CBO) used the analogy to
offer a slightly less extreme estimate of H5N1’s human toll. They predicted a pandemic resembling the 1918 flu could infect 90 million Americans, killing 2 million of them (CBO 2006).

Still other comparisons were drawn between the 1918 Spanish flu and the H5N1 strain of avian influenza. Dr. William Schaffner, chairman of preventive medicine at Vanderbilt University Medical Center in Nashville, Tennessee, argued the two strains were not only similar in terms of their novelty, but also with regard to their victims. Schaffner noted that, like H5N1, Spanish flu “was a new influenza strain at the time. The population of people on the whole planet had no experience with it” (Qtd. in Lallanilla 2005, para. 8). Moreover, he added, the Spanish flu “had a high fatality rate among young, healthy people” (Qtd. in Lallanilla 2005, para. 11). ABC News writer Marc Lallanilla, author of the article in which Schaffner was interviewed, summarized: “While most flu viruses strike the very young and very old, the Spanish flu affected many between the ages of 20 and 35. The avian flu has followed a similar pattern” (2005, para. 10).

Because young people normally have a stronger immune system, they are more susceptible to a cytokine storm (Osterholm 2005). U.S. News & World Report’s Bernadine Healy painted a horrific picture of the avian influenza’s potentially devastating impact on the young in her article “The Young People’s Plague.” Wrote Healy: “The victims tend to overreact to the alien virus, triggering a massive immune response called a cytokine storm, turning healthy lungs into a sodden mass of dying tissues congested with blood, toxic fluid, and rampaging inflammatory cells” (2006, p. 63). She further described hospital corridors lined with dead young people. The genetic similarities were presumed to be so great that scientists went so far as to use samples of the 1918 flu to draw inferences as to why exactly the H5N1 is drawn to the lungs. In fact, on one occasion, a team of scientists unearthed a victim of the 1918 epidemic in Alaska to extract samples of their lung tissue. The excessive body weight of this particular victim coupled with extreme cold in this region apparently ensured tissue preservation (Larson 1998).
Other experts argued that such analogies to the 1918 flu were misconstrued. In the aptly entitled “Asian ‘Bird Flu’ Isn’t Similar to 1918,” Dr. Fred Levit wrote, “If appropriate measures were instituted, an epidemic would be more limited and much less dangerous than that of 1918” (1998, para. 3). Some critics of the 1918 analogy argued that avian influenza was more analogous to the 1976 swine flu outbreak. Following the outbreak of a rare strain of influenza—swine influenza—among U.S. army recruits in Fort Dix, New Jersey, public health experts fearing that the outbreak was a precursor to a global pandemic convinced President Gerald Ford to order a nationwide immunization program that eventually cost $135 million. Yet the feared swine flu pandemic never materialized. The swine flu case went on to be seen by some as one of the greatest public health miscalculations of the 20th century, both because of its cost and because the vaccine administered itself resulted in the deaths of at least 25 Americans (Neustadt and Fineberg 1978).

To Altman, among others, the “specter” of the swine flu debacle “haunts federal health officials” as they tried to cope with uncertainty surrounding H5N1 (1997, para. 8). Indeed, just as proponents of action leveraged the 1918 Spanish flu analogy to garner support for government preparedness programs, opponents—or at least skeptics—held that H5N1 was tantamount to the swine flu incident. Marc Siegel, an associate professor at the New York University School of Medicine, called the H5N1 a “pandemic of fear,” noting: “The swine flu fiasco of 1976 is an example of the damage that can be done by fear of a mutated virus that never quite lives up to expectations. About 1,000 cases of ascending paralysis occurred from a rushed vaccine given to more than 40 million people in response to a feared pandemic that never arrived” (2006, para. 9).

The discourse surrounding the avian influenza was fueled by uncertainty. Neither proponents nor opponents of government intervention could conclusively determine if, when, and to what extent an avian influenza pandemic would occur. This uncertainty no doubt contributed to the rampant use of analogy, which ultimately served to minimize the perception of avian flu as an
unclear threat by grounding predictions in concrete—albeit speculative and retrospective—examples. Those demanding government intervention eventually won the day, however, and by 2005 the avian flu had risen to the status of an important agenda item before both the U.S. Congress and the President.

**Agenda Setting, Policy Formulation, and Enactment**

The pandemic problem has become a Presidential and Congressional concern on two distinct but noticeably interrelated occasions. The first flurry of activity saw H5N1 gradually develop into an agenda item over roughly a three-year period. It was President George W. Bush who had requested preparedness funds from Congress as early as February 2003. In 2003, Congressional policymakers slowly began to pay greater attention to H5N1, fashioning legislation and holding hearings to address the possibility of a global pandemic. In the nearly four years to follow, Congressional policymakers continued to see H5N1 as a worthy agenda item, and evidence indicates avian influenza remained a priority in both the 109th and the 110th Congresses. Agenda activity slowly built from 2003 to the end of 2004, before peaking and leveling-off in 2005 and 2006.

This incremental pattern of agenda access may be a defining characteristic of anticipatory policy problems. Specifically, the agenda setting pattern observed in this first round of policymaking closely reflects what Birkland (2006) describes as problem identification and policy change in response to indicators—measures or metrics of a problem. Such a pattern is typical in what Birkland (2006) calls “domains not prone to disaster” or policy domains wherein policy change can precede the onset of an actual problem event. In the case of H5N1 those indicators were incidences of human infections and deaths. As indicators build and accumulate—implying the possibility or existence of a problem—policymakers can gradually fashion and adopt policy to prepare for an impending problem. Policy change in response to indicators thus epitomizes anticipatory
policymaking in that policymakers create policy and allocate resources proactively in order to stave off, or at least mitigate, a potential, but neither certain nor existing, problem. With regard to H5N1, the “problem” was not sporadic cases in Asia and Europe but an anticipated global pandemic.

Birkland (2006) further contrasts policy change in response to indicators with policy change in response to focusing events. Birkland sees focusing events as disasters, or large-scale catastrophes, that simultaneously capture the attention of policymakers, the media, and the general public. The hallmark of these problems is their rapid—indeed catalytic—rise to the top of the institutional agenda. They appear as agenda priorities literally overnight, displacing any other items that might stand in the way. In these instances, policy change is acute, marked by a sudden spike in activity in the wake of the pivotal event. Unfortunately, of course, such problems tend not to capture policymakers’ attention until after the event occurs.

The first phase of avian flu policymaking mirrored Birkland’s (2006) depiction of policy change in response to indicators. Specifically, as the number of avian influenza cases and deaths gradually accumulated over a period of several years, policymakers gradually developed preparedness policy in anticipation of a potential pandemic. Policy change thus preceded the emergence of an actual problem event. Conversely, the second phase was very similar to Birkland’s depiction of policymaking in response to focusing events. After a lull in policymaking activity in 2007 and 2008, pandemic influenza burst back onto the agenda in 2009. Unlike the previous round of policymaking, however, this process was far from incremental. In fact, virtually all policymaking activity occurred in less than twelve months. The actions taken were decisive and sweeping. Billions of dollars were allocated almost immediately toward pandemic preparedness.

However, this time the concern was not H5N1 influenza, but a new strain of flu, H1N1, or swine influenza. Nor was the problem anticipatory in nature. In the summer of 2009, H1N1 quickly spread through populations in Mexico and the Southwestern U.S. Within weeks, the virus became a
global pandemic, infecting and killing thousands of people worldwide and offering little time to act with prescience.

The H1N1 case *on its own* tells us very little about anticipatory policymaking. In many ways, it is a classic example of the reactive policymaking process typically initiated in response to an existing problem. Policy change was rapid, and developed in response to—during—the virus’s outbreak. However, when considered alongside the H5N1 case, H1N1 represents a critical test of the distinctive policymaking dynamics associated with anticipatory policymaking. Indeed, these two cases *demand* comparison given the relatively close proximity within which they occurred and given that both can be grouped within the same policy area—pandemic policymaking. This section therefore will compare and contrast the two cases, with an eye toward illustrating the anticipatory policymaking dynamics associated with H5N1 influenza. To some extent, the pandemic influenza domain affords a rare occasion to study what happens when an anticipatory problem—or at least a variant of anticipatory problem—does, in fact, occur. Beyond these methodological considerations, and beyond my investigation of the agenda setting process specifically, the H1N1 outbreak is important to our overall discussion of H5N1 avian influenza policymaking. First, many of the policies implemented in response to the swine influenza were developed during the avian flu policy process. Second, although avian influenza has yet to mutate into a pandemic strain, the virus continues to circulate among populations in Asia. Many fear an H5N1 outbreak remains a viable public health threat and warn against complacency. Should this event occur, it is likely the swine influenza experience will influence the renewed avian influenza policy debate. Simply put, the H1N1 swine flu pandemic cannot be divorced from H5N1 policymaking process, as both constitute watershed events in contemporary pandemic planning. The interplay between these two distinct but interrelated viruses is introduced in this section and will continue to guide our investigation of the implementation and evaluation stages of the policy process.
Avian flu’s ascent to the institutional agenda was relatively slow. In early 2005, Klaus Stöhr, project leader for the WHO Global Influenza Program, observed: “In the last 18 months, we have seen an incremental increase in our concern. We do not know if a pandemic can occur next week or next year” (Qtd. in DeNoon 2005, para. 12). The Bush Administration initially drove the agenda setting process, requesting $100 million in February of 2003 from Congress to help prepare a pandemic influenza vaccine. This appropriation was to be made directly to the Department of Health and Human Services (HHS), a logical source given its jurisdiction over emerging diseases in general and vaccine development more specifically. Congress granted half of the Administration’s request, allocating $50 million to HHS (Lister 2007).

Roughly one year later, avian influenza policymaking began to pick up pace in the legislative branch, a trend that would continue through the remainder of 108th (2003-2004) Congressional term and into the 109th (2005-2006) and 110th (2007-2008) Congresses. In February of 2004, the Bush Administration again requested $100 million to fund vaccine development. This time, Congress accommodated the entire request, awarding $100 million to HHS. This particular appropriation was made in the face of a nationwide vaccine shortage for seasonal influenza, which was said to have revealed overall inadequacies in the nation’s vaccine production capacity (Lister 2007).

In many ways, 2004 marked the beginning of what would be a slow and protracted rise in avian influenza policy activity in the U.S. Congress. Figure 4-1 depicts the number of times H5N1 was mentioned in the Congressional Record, an official recording of the proceedings of the U.S. Congress. In 2003, the number of mentions stood at 11. The following year, in 2004, the number rose to 13 before dropping slightly in 2005 to 8 mentions. However, a sharp uptick was reported in 2006 when avian influenza again was mentioned 76 times. While not as high as the 2006 peak, 2007 saw the avian influenza receive considerable attention with 57 mentions. This indicates avian
influenza occupied at least two years of sustained congressional attention. Equally telling, although these numbers declined dramatically in 2008 (15 mentions) they still remained higher than the 2004 uptick and imply, despite a decline in attention, policymakers remained at least cognizant of H5N1.

Figure 4-2 provides an even bolder illustration of this trend towards incremental and sustained policy activity. Figure 2 depicts the number of committee hearings that mentioned avian influenza. The number of hearing mentions gradually increased over the years 2002 (10 hearings), 2003 (12), 2004 (25), and 2005 (59) before peaking in 2006 (74). Perhaps most striking, even after the uptick in hearing activity in 2005 avian flu continued to garner hearing attention in subsequent years. In fact, both 2006 and 2007 saw a greater number of hearings than 2005. Moreover, there were 55 hearings in 2008 alone—only four fewer than in 2005. Figure 4-2 thus portrays both an incremental rise to prominence and sustained agenda attention, as avian influenza was mentioned in no fewer than 44 hearings in any single year between 2005 and 2009.
Figure 4-3 shows the number of bills containing the words “avian influenza” introduced in the 108th, 109th, 110th, and 111th Congresses, excluding appropriation measures. Figure 4-3 once again indicates an incremental policy process. To be sure, the number of avian influenza policies introduced jumped dramatically from the 108th Congress to the 109th Congress, increasing from 2 bills to 13 bills. However, this surge in policymaking was largely sustained into the 110th Congress, as 10 bills were introduced during that session. Not demonstrated on this graph is the number of bills containing the word “pandemic” introduced over these various legislative sessions. According to this measure, the 109th Congress was extraordinarily active in drafting legislation, as nearly 55 bills containing the word “pandemic” were introduced during this period. The 110th Congress, by contrast, only introduced 17 bills containing the word pandemic. The 110th Congress’s activity is still significant relative to other legislative sessions, which never saw more than 18 bills. In fact, even in the midst of an actual pandemic, Congress never introduced more than 18 bills in any given session containing the word “pandemic.” Thus, Congress was very active in the avian influenza policy arena, mounting a sustained legislative effort over the course of nearly four years.
Policy activity regarding avian influenza slowly increased over the course of a number of years, then, before leveling off and, eventually, declining. The avian influenza was clearly an important agenda item in at least two sessions of Congress spanning nearly four years. As described later, this pattern stands in stark contrast to the pattern observed in the wake of focusing events and, more specifically, in the H1N1 case. One could argue the sustained attention awarded to H5N1 is, in part, a testament to the very nature of anticipatory problems. Because the avian influenza never morphed into a pandemic strain, concern with H5N1 was prolonged, extending over a number of years. Policymakers were essentially legislating under the threat of pandemic. Indeed, had a pandemic actually emerged in 2004 or even 2005, it would have effectively foreclosed the possibility of an anticipatory policy debate.

Avian influenza was primarily framed as a public health issue. Logic dictated that the institutions charged with combating diseases would dominate this policy domain. From FY 2004 to FY 2009, Congress appropriated roughly $7 billion to avian influenza-related programs, ranging from disease surveillance to vaccine production, state and local readiness grants to aid to foreign nations. Of this, 86% (or $6 billion) was allocated to programs administered by HHS, which includes

![Figure 4-3: Number of Bills Containing the Term "Avian Influenza"](http://thomas.loc.gov/home/thomas.php)
important public health agencies like the CDC and National Institutes of Health (NIH).

Congressional committees with broad jurisdiction over health issues also dominated the policy debate. The vast majority of laws introduced during the 108th, 109th, and 110th Congresses were referred to the House Committee on Commerce and Energy’s Subcommittee on Health (Subcommittee on Health hereafter) or the Senate Committee on Health, Education, Labor, and Pensions (Senate HELP committee hereafter).

Both of these legislative venues projected an image of avian influenza as a public health problem necessitating a proactive public health approach to readying the nation for pandemic. For example, on May 26, 2005, the Subcommittee on Health held a hearing entitled *The Threat of and Planning for Pandemic Flu*, which solicited advice from a barrage of public health experts on how best to prepare and plan. Notable participants included Dr. Julie Gerberding, Director of the Centers for Disease Control and Prevention, Dr. Bruce Gellin, Director of the National Vaccine Program Office, and Dr. Anthony Fauci, Director of the National Institute of Allergy and Infectious Diseases. The policies considered in these venues blended a variety of public health interventions, including the development of vaccines, stockpiling of antiviral drugs, and developing of state and local preparedness measures. (These same interventions represented staples of the President’s plan as well.) Of these various provisions, vaccine development was seen as the most promising. The Influenza Preparedness and Prevention Act of 2005 (H.R. 4245), which was referred to the Subcommittee on Health, called for a greater stockpiling of antiviral drugs and regulatory measures to entice private companies to increase vaccine production. Similarly, The Influenza Vaccine Security Act of 2005, which was sponsored by then Senator Hillary Clinton (D-NY) and referred to the HELP Committee, set out to stimulate influenza vaccine production by relieving drug manufacturers of liability for personal harms in the face of a pandemic. The Seasonal Influenza and Pandemic Preparation Act of 2005 (S.2112) provided for a free pandemic and seasonal influenza
vaccine program. A slew of other statutes similarly sought to strengthen the nation’s capacity to produce an effective and readily available pandemic influenza vaccine.

From 2005 to the end of 2009, Congress played an important role in fashioning avian influenza legislation. Yet much of the policy activity during this period was initiated and coordinated by the Executive branch. Executive branch agencies and departments released a series of pandemic influenza “plans,” including the National Strategy for Pandemic Influenza, HHS pandemic plan, the Department of Defense’s (DoD) Pandemic Influenza Preparation and Response Planning Guidance, and an informal—unpublished—plan by the Department of Veterans Affairs (DVA) (Lister 2005).

While all of these plans presented both short and long-term planning goals, a serious and severe pandemic would trigger the National Response Plan (NRP). Enacted by the Department of Homeland Security (DHS) in 2004, the NRP, which was eventually superseded by the National Response Framework in 2008, specified coordination among local, state, and national agencies, although considerable planning input and involvement would also be solicited from private, non-governmental, and even tribal actors. The NRP placed considerable responsibility in the hands of state and local governments for initiating most planning and response activity. However, it also specified that the response to “large scale” emergencies would be coordinated through HHS and DHS (Lister 2005).

While the NRP plan could play an important role in pandemic response, it was not a direct attempt to ready or prepare the nation for pandemic influenza specifically, but rather a broader emergency management framework, or an “all hazards” plan (Lister 2005). HHS made the first attempt to plan for the avian influenza in August of 2004. The HHS document was technically a “draft plan,” as the agency intended to solicit input and alter its strategy in the coming months. It established a number of specific priorities including, but in no way limited to: (1) developing and testing antiviral drugs; (2) increasing the speed at which new pandemic influenza vaccines could be
created; (3) developing new technologies that could detect newly emerging influenza subtypes and
detect antiviral resistance; and (4) developing research protocols to determine the relative
effectiveness of influenza vaccines during a pandemic (United States Department of Health and
Human Services 2005; Lister 2005). HHS Secretary Tommy G. Thompson called the draft plan a
“road map on how we as a nation, and as a member of the global health community, respond to the
next pandemic influenza outbreak, whenever that might be” (“HHS Unveils Plan…” 2004, para. 4).
Some critics charged the plan was too vague and it delegated too many critical activities to the states
(Lister 2005). The American Biological Safety Association (ABSA), an organization of biological
safety practitioners, underscored the importance of strengthening risk communication, something
they felt was overlooked in the HHS plan. ABSA noted: “There will be a critical need to provide
accurate technical information to health care professionals in the medical community. There will also
be a need to provide accurate information that can be readily understood by the public at large
during a pandemic” (Duane 2004, p. 231).

The most important plan offered during this period was the President’s National Strategy for
Pandemic Influenza (National Strategy hereafter), released in November 2005. The National Strategy
established three “pillars” of implementation activities—(1) Preparedness and Communication; (2)
Surveillance and Detection; and (3) Response and Containment. Preparedness refers to all activities
taken to ensure the U.S. is “ready,” whereas communication is intended to underscore the roles of
all levels of government, as well as private actors and citizens. Surveillance and detection refer to the
continuous monitoring of the disease in order to provide the earliest possible warning. Finally,
response and containment refer to attempts to mitigate the flu’s health impact and limit its spread

In conjunction with the release of the National Strategy, the Bush Administration requested
$7.1 billion in emergency spending, which would be dispersed among the HHS, DHS, Department
of Agriculture (DoA), Department of Defense (DoD), Department of Interior (DoI), Department of State (DoS), and Department of Veterans Affairs (DVA). The lion’s share of this funding ($6.24 billion) would be devoted to HHS. The centerpiece of the Bush proposal was vaccine development, and the vast majority ($4.7 billion) of HHS’s appropriation was to be allocated to this end. The Bush Administration sought to produce 300 million courses of the vaccine within six months of the pandemic’s onset (White House Homeland Security Council 2005; Lister 2005).

Vaccine production was projected to occur in two phases. In the first phase, 20 million doses (enough to cover only first responders) would be produced by 2009. These courses would be developed via the “egg-based” vaccine production method. The egg-based method, the most common means of vaccine development, grows variants of the virus in eggs before extracting it for a vaccine serum. An additional 60 million courses would be developed in six months using this same approach (Craig and Hecht 2005). However, President Bush, like many public health professionals, saw the egg-based approach as an “antiquated process [that] would take many, many months to produce a vaccine and…would not allow us to produce enough vaccine for every American in time” (“Bush Unveils $7.1 billion…” 2005, para. 12). Egg-based vaccine development is widely considered an inefficient means of developing vaccines because it relies on many eggs and has a high rate of vaccine contamination, a problem that, in turn, requires courses to be discarded (Matthews 2006). The remaining vaccine doses would therefore have to come from “cell based” vaccine production, an alternative method that grows the virus in cells. While the cell method has enormous promise, potentially cutting production time by several weeks, it was largely in its nascent stage of development. The Bush Administration promised to invest in R&D, although some estimated it would take as many as five years before cell-based technology was viable (Craig and Hecht 2005).

Beyond supporting development of an avian influenza vaccine, the President identified the need to “detect outbreaks that occur anywhere in the world…[And] we must be ready to respond at
the federal, state and local levels in the event that a pandemic reaches our shores” (“Bush Pandemic Flu Strategy…” 2005). Working in conjunction with international health institutions, like the WHO, HHS—more specifically CDC—would spearhead global surveillance efforts, such as sample gathering, developing information-sharing technologies, and disease monitoring. President Bush requested $259 million to strengthen these areas (Lister 2005).

Finally, an additional $644 million was requested to support federal, state, and local preparedness efforts. Although the stockpiling of antiviral drugs and vaccines no doubt constituted an integral part of preparedness, this particular request was intended to strike at the organizational difficulties involved in managing a significant public health event. For example, many feared a pandemic event would overtax local hospitals and health centers, which would be unable to process the scores of sick patients streaming through their doors. (These concerns were magnified by the fact that many health professional staff would likely grow ill themselves.) Moreover, state and local disaster preparedness and health departments were required to develop preparedness plans, outlining emergency practices ranging from information sharing, to basic jurisdictional issues, to quarantine measures, to vaccine and antiviral distribution (Lister 2005).

The policy interventions proposed by the President underscore the policy dynamics associated with anticipatory problems. For one, the notion of preparedness is, in and of itself, a noticeably anticipatory policy intervention. Achieving a state of preparedness represented a plan or strategy, “a roadmap” for coping with the threat of avian influenza. Because they have yet to occur, anticipatory problems lend themselves to strategy—to planning and preparing. The President himself relied on the rhetoric of anticipation, comparing an H5N1 pandemic to a forest fire—a problem that, while potentially devastating, can be mitigated through proactive measures. “A pandemic is a lot like a forest fire,” President Bush proclaimed. “If caught early, it might be extinguished with limited damage; if allowed to smolder undetected, it can grow to an inferno that
spreads quickly beyond our ability to control it” (“Bush Unveils $7.1 billion…” 2005). In another public statement, President Bush evoked similar sentiments: “There is no pandemic flu in our country, or in the world, at this time. But if we wait for a pandemic to appear, it will be too late to prepare” (Alonso-Zaldivar 2005). Anticipatory problems thus necessitate a proactive approach to policymaking.

Preparedness also represents a politically advantageous approach for coping with uncertainty. The President’s rhetoric implied that policymakers no longer viewed avian influenza as the policy problem in question. Instead, the problem was an overall lack of preparedness. Government, it seemed, could not stop a pandemic, but it could certainly prepare for one. Focusing on preparedness shifted attention away from uncertainty and toward more concrete goals. Developing a vaccine, stockpiling antiviral drugs, and readying state and local governments are all potentially meaningful policy interventions. They are tried and true public health measures that have been shown to greatly reduce the negative impacts of any disease outbreak. From a problem-definition perspective, they also represent an obtainable solution. Whereas pandemics cannot be predicted or prevented, vaccines can, at least in theory, be developed, antiviral drugs can be evaluated, and state infrastructures can be graded. This is not to say that these ends are easy to achieve, but that they represent viable policy goals. Thus, the President identified solutions possessing benchmarks of success, even if the problem he set out to address never occurred.

Nor is it surprising that vaccine production came to represent a proverbial “silver bullet” solution. Sarah Lister, a Specialist in Public Health and Epidemiology at the Congressional Research Service, called a vaccine the “cornerstone” of the Bush plan…the “primary measure for influenza prevention” (2005, p. 16). To inoculate someone in advance of a pandemic is to avert illness through anticipation, nothing more, nothing less. (Of course, as evidenced in the 1976 swine flu example, inoculating the country too far in advance can also entail considerable political risks.) Antiviral
drugs, which are administered after someone has already been sickened, as well as state preparedness plans, cannot prevent an individual from contracting a virus, making them less appetizing policy options. From a medical standpoint, vaccines are without question the most effective way to combat an influenza virus, thus further legitimizing the policymakers focus on this particular policy intervention. And, of course, vaccine development represented a viable anticipatory measure. By developing a vaccine prior to the onset of a full-blown pandemic, public health practitioners could prevent large segments of the population from being infected, which would effectively nullify the problem altogether—at least for those individuals lucky enough to be inoculated.

Surveillance represents an equally proactive policymaking approach. As evidenced in the nanotechnology study, identifying and interpreting indicators of anticipatory problems are critical to helping policymakers and bureaucrats determine a policy response. Indeed, while we can rarely say with certainty when an anticipatory problem will manifest, indicators at the very least provide an approximation of problem change. Surveillance of H5N1, most notably surveying the number of cases and deaths, was essential to forecasting the likelihood of a pandemic.

In December, a month after the President introduced the National Strategy for Pandemic Influenza, Congress appropriated $3.8 billion of the requested $7.1 billion. The appropriation was said to represent a “first installment,” and an additional $1.8 billion was allocated before the end of FY 2006. This appropriation represents far and away the largest investment in pandemic planning to date (Lister 2005).

Reaction to the President’s plan was mixed. Jim Greenwood, president and CEO of the Biotechnology Industry Organization (BIO), applauded “the President for his leadership. Today’s legislation provides critical resources to stockpile existing therapies and to accelerate the development of new, innovative countermeasures—the vaccines and antiviral medications that are likely to be more effective against a pandemic flu strain” (Qtd. in Coghill 2005, para. 2). Still, not
everyone was pleased. Ruth Berkelman, Professor of Public Health at Emory University, praised the Bush plan for being “well reasoned” but indicated that the U.S. public health system still has a “long way to go” before it is fully prepared for pandemic influenza (Qtd. in Bristol 2005, p. 1683).

Others, particularly House and Senate Democrats, offered more pointed criticisms. Nancy Pelosi, then House Democratic Leader, called Bush’s strategy “several years too late” and complained that the country remains woefully “unprepared” (Qtd. in Allen 2005, para. 4). Senate Minority Leader Harry Reid indicated he was “pleased to see that the President has finally followed our lead” but noted the President’s request was nearly $1 billion less than the $8 billion passed by the Senate a week earlier (Qtd. in Craig and Hecht 2005, p. 55). Senator Edward Kennedy echoed Representative Pelosi’s concern, calling the plan a “long awaited first step” (Bristol 2005, p. 1683). Kennedy also took aim at the President’s seeming overreliance on a flu vaccine: “We need to strengthen the capacity of hospitals and health care facilities to respond and react to a pandemic. Stockpiles alone aren’t enough without the capacity to make use of them” (Bristol 2005, p. 1683). Many within the public health community who shared Kennedy’s concerns argued that an overall investment in the global public health infrastructure would be just as important as creating a vaccine. Jane Parry, a journalist who writes for the World Health Organization (WHO) Bulletin, indicated: “Influenza vaccines are no magic bullet. Work on a pandemic vaccine continues in several countries, but the true efficacy of a vaccine would become apparent only when used” (2007, para. 18).

Despite these objections, the National Strategy represented the dominant policy action of this period. And although avian influenza is overwhelmingly depicted as a classic public health problem, H5N1 was not necessarily pigeonholed into a single policy domain. Consider, for example, the other appropriations during this period. While the vast majority of appropriations made between FY 2004 and FY2009 were allocated to HHS, nearly $10 billion went to other executive branch departments and agencies including the DHS, DVA, DoI, DoA, Farm Credit Administration (FCA), and the U.S.
Agency for International Development (USAID). Nor were HELP and the Subcommittee on Health the only venues to hold hearings on avian influenza. The House Committee on Homeland Security, House Committee on Government Reform, Senate Committee on Agriculture, as well as a host of others, all held hearings explicitly dedicated to investigating the policy implications of avian influenza.

Avian flu’s capacity to cut across various policy venues was fueled by at least two competing sub-narratives. The first cast avian flu as the latest in a long line of global health problems. This narrative was forwarded by a host of very active policy entrepreneurs, many of whom hoped to convince American policymakers to reconfigure the national public health infrastructure in order to more aggressively combat health threats on an international stage, as opposed to waiting for them to reach our shores. Proponents of this “global health” perspective, many of whom not only worked in the public health sector but also in academia, the media, and “think-tanks,” argued that an increased interconnection spawned by rapid global travel and trade greatly magnified the possibility of disease transmission from foreign countries—most notably, developing countries with poor health infrastructures—to the United States. U.S. policymakers were urged to identify and, ideally, combat these threats before they made their way to the U.S. (Garrett 2005).

In summer of 2005, Foreign Affairs, a widely distributed journal on diplomacy and international relations, published a special edition dedicated to the avian influenza. Included were articles by Michael Osterholm of the University of Minnesota School of Public Health and Laurie Garrett, a Senior Fellow for Global Health at the Council of Foreign Relations. Both individuals were outspoken proponents of a global public health perspective. Garrett, who represented one of the most important policy entrepreneurs throughout this period, was especially active, appearing before Congress on several occasions. Garrett vehemently advocated for an anticipatory approach to public health, writing that “[p]ublic health needs to be—must be—global prevention” (2000, p. 13).
In the first of her two *Foreign Affairs* articles, Garrett (2005) held that, with regard to avian influenza, “doom may loom” (p. 3). Her piece embodied a noticeably global flavor:

In a world where most of the wealth is concentrated in less than a dozen nations representing a distinct minority of the total population, the capacity to respond to global threats is, to put it politely, severely imbalanced. The majority of the world’s governments not only lack sufficient funds to respond to a superflu; they also have no health infrastructure to handle the burdens of disease, social disruption, and panic. The international community would look to the United States, Canada, Japan, and Europe for answers, vaccines, cures, cash, and hope. How these wealthy governments responded, and how radically death rates differed along worldwide fault lines of poverty, would resonate for years thereafter. (p. 5)

A number of members of Congress offered legislation integrating these concerns. Senator Barack Obama (D-IL) and Representative Nita Lowey (D-NY) offered the Attacking Viral Influenza Across Nations Act of 2005. Among its various provisions, the Act sought to explicitly expand and centralize U.S. disease surveillance capabilities by requiring the Secretary of the Department of HHS to coordinate all public and private surveillance efforts. As indicated in its name, this particular Act offered a global approach to public health. It mandated that the Secretary of HHS submit a proposal to the Director of WHO regarding the development of a Pandemic Fund for countries impacted by the avian influenza. The Global Network for Avian Influenza Act (S. 1912/H.R. 4476), which was sponsored in the Senate by Joseph Lieberman (I-CT) and in the House by Representative Rosa DeLauro (D-CT), also included global health provisions. For example, it sought to establish a global network for monitoring and surveying H5N1 in migratory birds.

The second sub-narrative, which seemed to have even greater traction within the U.S. Congress, portrayed avian influenza as tantamount to bioterrorism. In the wake of 9/11 and the subsequent anthrax attacks, bioterrorism emerged as a prominent national agenda item. Organized interests, many of whom worked in academic research institutions and the private sector, set out to capitalize on the wealth of public funding suddenly available to study biological agents and diseases that could be weaponized (Greenberg 2002; “The Rise and Fall…” 2012). Advancing this stance, *The
Washington Times wrote: “[T]he avian flu is just one of many potential biological problems—whether natural or man-made—that we must grapple with” (“Avian Flu, Bioterror…” 2005, para. 2). No law better exemplified this trend than the Project BioShield Act of 2004 (H.R. 2122/S.15). Signed by President Bush in July 2004, Project BioShield amended the Public Health Service Act to launch a ten-year program aimed at allowing the U.S. to develop countermeasures to bioterrorist attacks, including the use of biological, chemical, radiological, and nuclear agents. The Act appropriated nearly $6 billion to this program over a ten-year span. Project BioShield lowered the threshold required for vaccine testing, allowing manufacturers to release vaccines that have not been demonstrated safe for human consumption.

The legacy of Project BioShield loomed large in subsequent legislative sessions as Congress attempted to grapple with avian influenza. Soon after the bill’s enactment, observers speculated whether the same rules of expedited review for bioterror-related vaccines might also be applied to pandemic or even seasonal influenza. In an editorial published in October 28, 2004, entitled “Struggling with the flu,” Nature magazine noted: “In July, Bush signed the Project BioShield Act, which is supposed to lift obstacles that prevent drug companies from developing the medicines needed to defend against biological attack. But it isn’t clear the Department of Homeland Security, which sets the priorities for Project BioShield, regards flu as falling under its domain” (2004, para. 8). Madeline Drexler, author of “Secret Agents: The Menace of Emerging Infections,” echoed these sentiments: “Give pharmaceutical firms financial incentives to make flu vaccines, which fetch paltry sums compared to blockbuster drugs such as Viagra or Zoloft. Because vaccine profits are low and liability costs high, companies have left the field in droves. Project BioShield, launched in 2003 to strengthen America’s defense against bioterrorism, showed that governments could fund vaccine R&D and make a market for the product at the end—as it did with its lightning-fast acquisition of smallpox and anthrax vaccines” (2004, para. 9).
In the years to follow, Congress would take heed of the implicit advice offered by the editors of *Nature* and by Drexler. The Project BioShield II Act, introduced by Senator Joseph Lieberman in the 109th Congress (2005-2006) took a proverbial page out of its predecessor law (Project BioShield) by shortening the development process for vaccines and drugs in the case of public health emergencies. Project BioShield Act II, as well as two related policy proposals (the National Biodefense and Pandemic Preparedness Act, and the Biodefense and Pandemic Preparedness Act), sought to situate avian influenza within the bioterror policy domain, a domain that was ever-expanding in the wake of 9/11 and enactment of the original Project BioShield. Washington policymakers grouped avian influenza with bioterrorism.

The multitude of agencies receiving avian influenza funding coupled with the divergent “sub-narratives”—most notably the global health and bioterrorism narratives—reflect a noticeably decentralized policymaking process, which accommodated a diversity of policy venues and stakeholders. Avian influenza’s considerable uncertainty allowed groups and participants falling outside of the immediate purview of the public health domain to stake claims of legitimacy. Because an actual pandemic had yet to occur, these actors could construct their own portrayal or depiction as to what an actual global influenza pandemic would look like, should it occur sometime in the future. In his analysis of the nuclear policy domain, Birkland (1997) describes a “conjectural” policymaking process. In the absence of an actual nuclear meltdown on U.S. soil, policymakers and interest groups were forced to conjecture as to the likely implications of a future disaster. Avian influenza’s decentralized policymaking process was marked by the same conjecture, although political actors sought not only to contribute to present knowledge about a future event but to strategically link their “pet” solutions to a salient political problem. Rochefort and Cobb (1994) refer to this narrative technique as a situation wherein a solution “begets” or “finds” a problem.
The decentralized process described above further distinguishes anticipatory problems from the types of problems “typically” associated with disaster domains. Political scientists have long established that policymaking and decision-making tend to become highly centralized in the wake of crisis or disaster (Hart et al. 1993). A global pandemic would, without question, constitute a disaster. Considerable losses of human life and economy were anticipated. Policymaking institutions with jurisdiction over disaster response were engaged. Legislation and problem narratives even depicted the problem as being tantamount to terrorism, arguably the greatest disaster “area” of the 21st Century. Yet because a pandemic had not occurred, avian influenza policymaking was not marked by centralization. This likely reflects a tempered degree of urgency. In the absence of immediate human and economic suffering, policymakers could entertain divergent claims of legitimacy and, in the process, satisfy a plethora of interests. As evidenced below, they were far less receptive to the claims in the face of an actual flu pandemic—the H5N1 outbreak.

However, of all the bills targeting avian influenza introduced in the 109th Congress, few reached final decision. One notable exception is the Pandemic and All-Hazards Preparedness Act (S. 3678), which was enacted in winter 2006. The Pandemic and All-Hazards Preparedness Act offered a seeming middle-ground between those seeking to lump avian influenza within the broader bioterrorism domain and those hoping for a more robust public health preparedness infrastructure, the likes of which would build and expand upon the strategy offered by the Bush Administration. It created a new position within HHS, Assistant Secretary for Preparedness and Response, which was broadly responsible for coordinating preparedness activities and coordinating a response to public health emergencies. More importantly, the Act provided powers and financial support to the Secretary of HHS to promote biodefense and pandemic vaccine research and development. It also required the Secretary of HHS to oversee measures to review and strengthen the public health infrastructure’s surge capacity.
The controversial Public Readiness and Emergency Preparedness Act (PREPA) was also enacted in 2005. PREPA shields vaccine manufacturers from tort liability for clinical trials of avian influenza vaccine at the discretion of the Executive branch of government. Drug industry representatives, who lobbied heavily for PREPA, as well as congressional supporters, argued the Act was critical for encouraging manufacturers to produce vaccines in the face of a pandemic. A number of Democrats countered by characterizing PREPA as a handout to vaccine manufacturers that ultimately compromised public safety. In a joint press release, Senators Edward Kennedy (D-MA), Tom Harkin (D-IA), and Chris Dodd (D-CT) stated: “Without a real compensation program, the liability protection in the defense bill provides a Christmas present to the drug industry and bag of coal to everyday Americans” (Qtd. in Copper 2006, pp. 2-3).

No longer willing to stand by and wait for impending disaster, the 109th and 110th Congresses demonstrated an overt concern with the H5N1 influenza. Indeed, both sessions not only afforded avian influenza space on the crowded institutional agenda, but enacted substantive policy actions in anticipation of a pandemic event. These actions ranged from budgetary allocations to legislative acts. The following section examines the various factors that converged to promote avian influenza’s ascent to the top of the policy agenda.

Agenda Catalysts

What drove the avian influenza onto the institutional agenda? Avian influenza’s ascent to the institutional agenda closely reflects the incremental pattern described by Birkland (2006). Unlike in domains prone to disaster, policymakers could engage a measured and protracted response to those problems that slowly reveal themselves through indicators. The policymaking patterns described above closely reflect this trend. What is more, avian influenza was able to maintain
salience for a number of years, a far cry from the radical spike and decline pattern of attention observed in the wake of most focusing events.

In the case of domains not prone to disaster, Birkland (2006) stated that indicators—metrics or measures of a problem—would drive problem identification and, in part, agenda setting. Figure 4 shows the number of H5N1 influenza cases and deaths by year. Incidences of human infection and deaths represent the most visible indicators of pandemic influenza. In fact, beyond discovering evolutionary changes in the virus’s composition, cases and deaths likely represent the only measurable indicator of pandemic. The longer a virus circulates, the more likely it is to undergo a genetic transformation (Mills et al. 2006).

Figure 4-4 strongly suggests Birkland’s (2006) argument is correct. Congressional agenda attention, which began in 2003 before reaching an apex and plateau in 2006 and 2007, nearly mirrors the H5N1’s spread among human populations. Specifically, after a period of dormancy between 1998 and 2002, the virus reemerged in 2003. The number of cases and deaths incrementally increased from 2003-2005, before spiking in 2006 (115 cases, 79 deaths)—the same exact year most Congressional agenda activity was observed. Indeed, the pattern shown seems to imply Congressional activity was largely a response to the virus’s spread and circulation, precisely as would be predicted by Birkland.
Qualitative evidence from this period indicates noticeable sensitivity to the growing number of H5N1 incidences. For example, in 2005 a reporter for CNN News wrote: “Amid a growing number of cases of bird flu around the world, there is increasing global concern that the virus may mutate to a human-to-human strain and eventually lead to a pandemic” (“CNN takes in-depth…” 2005, para. 1). Experts readily cited the virus’s evolution as cause for concern in their appeals to policymakers. At a 2005 hearing, Andrew Pavia of the Infectious Diseases Society of America, a medical association of doctors and scientists who specialize in infectious diseases, invoked these concerns:

We are very concerned that the H5N1 avian virus has shown the ability to mutate and has become capable of infecting mammals, including pigs, tigers, cats, and humans as well as birds. At least 97 confirmed the World Health Organization (WHO) has documented human cases of H5N1 infections since January 2004 with 53 deaths. A recent WHO consultants meeting found evidence of further mutation and a suggestion that person-to-person transmission might be occurring in Northern Vietnam. Should the virus become readily transmissible from human to human, the disease could easily spread beyond Asia’s borders and initiate a global pandemic. (Committee on Energy and Commerce 2005, p.65)
Public health researchers Christina E. Mills, James M. Robins, Carl T. Bergstrom, and Marc Lipsitch wrote in their 2006 article in *Nature* that “the virus has spread over an area ranging from Romania to Indonesia, possibly carried over this distance by migratory waterfowl. Over 160 human cases, about half of them fatal, have occurred, from Indonesia to Turkey. These trends suggest an increasing risk that the virus may acquire the ability to transmit efficiently from human to human, equipping it to cause a new pandemic” (p. 769). Thus, a growing number of cases clearly factored prominently in experts’ minds when considering the avian influenza threat.

The contention that avian influenza cracked the policy agenda as a result of changes in the number of cases and deaths is further substantiated by Figure 4-5, which shows the number of *New York Times* stories published on avian influenza. Media coverage dovetails with the unveiling of new cases and deaths, growing from 2004 through 2005, and spiking in 2006. *The New York Times* coverage is also demonstrative of the pattern of sustained attention exhibited in our various measures of Congressional activity. Indeed, *The New York Times* published 266 and 276 stories in 2005 and 2006 respectively. The level of attention paid in 2004 was also considerable. In 2004, 138 stories were published, more than triple the number of stories published in 2003 (33 stories) and double the number of stories published in 2007 (66 stories). Policy scholars have long acknowledged the relationship between upticks in media attention and policy change (Baumgartner and Jones 1993). The observed rise in *The New York Times* coverage was likely especially critical to avian influenza, as very few Americans had any direct experience with this problem. Avian flu was literally a foreign problem, meaning it never actually reached American shores. Therefore Americans’ understanding or opinion of the pandemic would obviously rely on media depictions of the problem. While this phenomenon is by no means unique to anticipatory problems, their extreme level of uncertainty likely heightens the importance of the media.
There was also an uptick in public concern between October of 2005 and March of 2006. Ho et al. (2007) found that 60% of the public was “very or somewhat concerned” about an avian flu pandemic. Similarly, 60% of the public surveyed between October of 2005 and April of 2005 said they “felt it was very or somewhat likely that a variant of the avian flu virus would strike the United States” (p. 678). Like media attention, public opinion can play an important role in stimulating and supporting policy change (Kingdon 2003). And while it is unlikely that public opinion made policymakers feel more compelled to act on avian influenza than they would on an existing problem, high levels of public concern no doubt justified the sweeping preparedness measures enacted during this period. Indeed, given the inherent fiscal constraints associated with public budgeting, allocating millions of dollars toward a problem that may or may not happen is difficult sell in the absence of some level of public concern.

Problem definition was also an important part of the agenda setting process. The 1918 Spanish Flu analogy coupled with claims of novelty, severity, and the identification of a sympathetic problem population all served to heighten concern with avian influenza. But beyond these important rhetorical devices, avian flu was also cast as an inevitable problem—a question of “when” as
opposed to “if.” Put differently, by the time the avian influenza reached the policy agenda, policymakers had seemingly resigned themselves to the proposition that a pandemic would occur, although they could not predict when this event would happen. Indeed, by 2005 H5N1 was no longer seen as yet another Asian health crisis, but as a threat with immediate proximity to the American public. Secretary of HHS Michael Leavitt expressed precisely this thinking in a 2006 Department of Health and Human Services Pandemic Planning Update when he wrote:

> We are in a race, a race against time and complacency. There is a role for everyone and we must count on everyone to fulfill his or her role. 
> By definition a pandemic is defined as a global event. In reality, a pandemic is a local crisis worldwide. It can happen in every state and every city and every town at almost the same time.  
> A pandemic is not like a hurricane or an earthquake, where resources and help can be shifted from one area to another. Should it occur, every community will need to rely on its own planning and its own resources as it fights the outbreak. 
> Preparation is a continuum. Each day we prepare brings us closer to being ready. We are better prepared today than we were yesterday. And we must be better prepared tomorrow than we are today. (U.S. Department of Health and Human Services 2006, p. 2)

The perceived inevitability of a pandemic was an important driver of H5N1’s agenda setting process. Dr. Alonzo Plough, director and health officer for Seattle and King County Public Health, implicitly identified this critical shift at a 2006 Committee on Government Reform hearing on avian influenza. Plough testified: “Recently, the public is catching up with the concern we have had in the public health community around pandemic influenza. It’s something that we have warned about for years, but I think recent events and certainly the visibility of these hearings and the visibility of the recently released report, not to mention heightened media coverage and made-for-TV movies, has raised these concerns to new levels” (Committee on Government Reform 2006, p. 108)

There is, however, an intervening agenda setting influence that muddies the argument that the agenda setting process was purely indicator driven. A number of reports from this period suggest that concern with avian influenza was heightened, in part, by a focusing event that occurred in a totally separate policy domain—Hurricane Katrina. Hurricane Katrina battered the Gulf Coast
on August 29, 2005, months before the 2005-2006 booms in avian influenza activity. Christine Gorman of *Time* noted: “For the past two years, scientists, public-health officials and even a high ranking government official or two have warned about the potential danger of a deadly worldwide outbreak, or pandemic, of avian flu. But it took a couple of furies named Katrina and Rita to really bring home how much can go wrong if you don’t plan for major emergencies” (2005, p. 30). Katrina drove home the enormous dangers of being unprepared for disaster, resulting in widespread skepticism of government’s ability to protect citizens from harm. A *Washington Post-ABC News* Poll conducted in the aftermath of the hurricane indicated that President Bush’s public approval rating had dipped to 42 percent, the lowest of his presidency up to that point in time (Morin 2005).

Even HHS Secretary Leavitt called Hurricane Katrina a “wake-up call” for government officials hesitant to act on the avian flu (Shute 2005, para. 4). Members of Congress seized on the fallout from Katrina as an opportunity to criticize the Bush Administration and promote a preparedness agenda for H5N1. Senator Ted Kennedy indicated: “We need to act, because the administration has failed to prepare adequately for pandemic flu. The danger of a major hurricane hitting the Gulf Coast was ignored until it was too late. We must not make the same mistake with pandemic flu. Other nations have taken effective steps to prepare, and America cannot afford to continue to lag behind” (Qtd. in “United States Unprepared…” 2006, para. 17). Senate Minority Leader Harry Reid seconded Kennedy’s concern: “It is time to finally learn the lessons of September 11th and Hurricane Katrina and do everything we can before a national tragedy strikes in order to protect Americans. Waiting any longer would itself be a national tragedy” (para. 4).

So it was that Hurricane Katrina likely helped crystallize avian influenza as an agenda item. Birkland (2006) recognized the capacity of extraordinarily large-scale disasters to open up multiple policy domains for agenda action. For example, he shows the terrorist attacks of September 11, 2001, opened up at least two domains, the homeland security domain and the public safety domains.
It is possible that Hurricane Katrina was a significant enough event that it served to open up a broad policy domain for “preparedness” in general, in turn helping to facility avian influenza’s rise to prominence. Even so, this discovery does not negate the prominence of indicators as a problem identification tool. In fact, the agenda pattern associated with avian influenza does not conform to the pattern of radical policy change typically associated with focusing events. Indeed, problems that reach the agenda vis-à-vis focusing events tend to rapidly rise and fall from attention (Birkland 1996). Avian influenza not only reached the governmental agenda through a relatively incremental process, but also remained on the agenda for a considerable amount of time. A better illustration of the agenda-setting dynamic associated with focusing events is investigated in the next section, which examines the H1N1 swine influenza.

2009: Agenda Setting and H1N1 Swine Influenza

The H1N1 virus, or swine flu, first appeared in Veracruz, Mexico, in April of 2009 (Tuckman and Booth 2009). As implied by its name, swine flu is believed to have originated in pigs, although the H1N1 is technically a combination of human, swine, and bird influenza viruses. The symptoms associated with the swine flu virus are milder than those associated with avian flu, as only a small percentage of victims suffer respiratory distress. Otherwise, symptoms generally include sore throat, cough, fatigue, diarrhea, head and muscle aches, as well as a variety of other typical flu-like symptoms. Unlike seasonal influenza, H1N1 does not disproportionately impact elderly and immune compromised people.

Swine influenza did not constitute a focusing event in the most literal sense of the concept. There was no singular event—no sudden disaster—that thrust H1N1 into the public limelight. There was no plane crash, no nuclear meltdown, and no hurricane. And yet, Figure 4-6 demonstrates this pandemic strain evolved in a far different manner than avian influenza. It shows the number of
new H1N1 cases by month from April of 2009 through November of 2009. As evidenced in Figure 4-6, this was an exceptionally fast-spreading influenza strain. In only the first month of the outbreak, there were 256 cases. There were nearly 75,000 H1N1 cases in August alone. November saw 180,821, bringing the cumulative total to 622,482 cases worldwide. Nor did H1N1 stop in November, 2009. Instead, the cases became so great the WHO determined it was futile to continue counting.

Figure 4-6: Number of New Swine Influenza Cases By Month in 2009


Figure 4-7, which shows the number of H1N1 deaths by month, is again demonstrative of swine flu’s rapid development and spread. In April of 2009, H1N1 caused seven deaths. In August of 2009, H1N1 resulted in 2,185 deaths worldwide. In December of 2009, H1N1’s deadliest month, there were 4,394 deaths worldwide. Figure 4-7 also demonstrates swine flu disappeared just as quickly as it emerged. In July 2010, just a little over a year after the disease first appeared, only 95 cases were reported worldwide.
Taken together, Figure 4-6 and Figure 4-7 portray a policy problem that differed considerably from the avian influenza. Indeed, the window between the initial outbreak and the actual declaration of pandemic was incredibly short. On June 11, 2009, less than two months after the initial outbreak, WHO declared H1N1 a global pandemic (Centers for Disease Control and Prevention 2009b). This is not to say preparedness and anticipation were absent. Even after this declaration, the Obama Administration indicated planning and preparedness were needed for the fall flu season, as seasonal influenza cases typically spike during this time of year. In July of 2009, HHS Secretary Kathleen Sebelius declared: “[W]e will move aggressively to prepare the nation for the possibility of a more severe outbreak of the H1N1 virus. We ask the American people to become actively engaged with their own preparation and prevention. It’s a responsibility we all share” (United States Department of Health and Human Services 2009, para. 4).

Yet despite these calls for preparation—anticipation—the so-called ramp-up time for H1N1 influenza was far more constrained than in the H5N1 case. Indeed, upon its emergence in summer of 2009, H1N1 had already demonstrated an acute capability to spread directly between humans—a key precursor to pandemic. Cases were reported and confirmed in California in April 2009, weeks
after the initial outbreak in Mexico (Centers for Disease Control and Prevention 2009). By July, thousands of cases were reported worldwide. Thus, while H1N1 may not have constituted a focusing event in the most literal sense of the concept, its evolution is demonstrative of a very fast-moving problem that gave policymakers little time to undertake a measured and anticipatory policymaking approach.

Review of the agenda setting patterns associated with H1N1 indicate that this particular influenza strain breached the policy agenda very quickly, a far cry from the slow and incremental entrance demonstrated in the H5N1 case. Figure 4-8 shows the number of times the swine flu was mentioned in the Congressional Record. The number of H1N1 mentions exploded from zero mentions in 2008 to 150 mentions in 2009. Similar to the virus’s own evolution, H1N1’s descent was as rapid as its ascent, falling to 29 mentions in 2010 and only 14 mentions in 2011.

Figure 4-8: Number of Swine Influenza Mentions in the Congressional Record

![Figure 4-8: Number of Swine Influenza Mentions in the Congressional Record](image)


Figure 4-9, which shows the number of hearings mentioning H1N1 swine influenza, again demonstrates rapid agenda entrance and exit. The number of hearings mentioning H1N1 influenza jumped from four in 2008 to 128 in 2009. Equally precipitous was the dip in hearing activity between 2010 and 2011, as 63 and 23 hearings were registered in these years respectively.
Figure 4-8 and Figure 4-9 portray an agenda setting process similar to the pattern typically associated with focusing events (Birkland 1996). Other important distinctions can be identified. Consider, for example, the actual fashioning of policies and appropriation measures. In FY 2010, Congress appropriated more than $8 billion in response to the H1N1 outbreak. As early as July, the Obama administration earmarked $1.8 billion to develop an H1N1 vaccine. However, whereas the H5N1 policy process saw money go to a variety of federal agencies other than HHS, all appropriations during this period were centralized in HHS, with the vast majority of the funding dedicated to tried-and-true public health interventions, like vaccine development. One could argue this centralized funding scheme is a product of disaster policymaking. Whereas a lack of an immediate problem might accommodate widespread claims of jurisdiction and relevance during an anticipatory policy debate, emergencies or disaster necessitate decisive action and offer little room for experimentation.

Differences between avian influenza and swine influenza can also be observed in terms of the extent of congressional involvement. Figure 4-10 compares the number of policies containing the words “avian influenza” or “pandemic” in the 109th and 110th Congresses to the number of

![Figure 4-9: Number of Swine Influenza Mentions in Congressional Hearings](image-url)
policies containing the words “swine influenza” or “pandemic” in the 110th and 112th Congresses. The 109th and 110th Congresses constituted the most significant policymaking years for avian influenza; the 111th and 112th Congresses constituted the only legislative sessions wherein H1N1 policies could be fashioned because the outbreak did not occur until summer 2009. Hence, Figure 4-10 focuses on peak policymaking years—the two legislative sessions that saw the greatest number of laws introduced. Congress was far less active devising legislation to deal with swine influenza than it was with regard to avian influenza. Only 33 bills contained language indicating a concern with swine influenza, compared to 95 bills relating to avian influenza. In other words, Congress was far less involved in responding to the swine influenza than it was anticipating avian influenza. What is more, 26 of the 33 bills drafted in response to the avian influenza were introduced in the 111th Congress, further evidence of the acute agenda setting process described above.

This policymaking process was marked by a number of important qualitative distinctions as well. For example, very little emphasis was placed on fashioning legislation to prepare for, survey, or ready for pandemic, themes that were ever-present in avian influenza policy proposals. Anticipation,
it seems, was far less important during the swine influenza debate. In fact, save the reauthorization of the Pandemic and All-Hazards Preparedness Act, the Pandemic Protection for Workers, Families, and Businesses Act, and the Emergency Influenza Containment Act, none of the laws introduced during this period even included the terms pandemic or influenza in their title. Many policies implied an outright reactive policymaking approach. The Emergency Influenza Containment Act (H.R. 3991) set out to ensure that workers sickened with a contagious virus would receive paid sick leave. The Pandemic Protection for Workers, Families, and Businesses Act (H.R. 4092) also set out to establish a paid protection medical leave program. The Public Health Emergency Response Act of 2009 (H.R. 2231) is also activated by onset of a pandemic event. H.R. 2231 delegated greater authority to the Secretary of HHS to streamline the provision of nationwide healthcare services during a public health emergency. The School Protection Act of 2009 (H.R. 3798) amended the Public Health Service Act, providing to train elementary and secondary school nurses on how to respond to a pandemic influenza, as well as a biological or chemical attack. In all instances, key provisions were triggered in the face of a pandemic—not in anticipation of one. One can assume this is, in part, testament to the reality that by 2009 pandemic influenza was well underway, undermining the utility of proactive and anticipatory policy measures.

Reactive policymaking was also present in the Congressional Hearings held throughout this period. Congress began holding investigatory hearings on swine flu as early as April 2009. Lauren Sher of ABC News mocked the institution’s sudden concern with H1N1 in “LOOK OUT! Congress Has Discovered Swine Flu” (2009). After noting that more than three congressional hearings were announced in a 24-hour period, Sher ridiculed: “Remember deadly peanuts? Congress held a bunch of hearings but still no comprehensive food safety legislation has landed on the president’s desk for his signature. Now it’s on to the Swine Flu” (para. 4-5).
Contrary to Sher’s punch line, however, the hearings actually reflected sincere concern with swine influenza and the fact that, as early as summer of 2009, many believed a pandemic was inevitable. “There’s a lot of anxiety right now across the country,” declared Senator Tom Harkin (D-IA) at an April, 2009, Senate Appropriations health subcommittee meeting (Qtd. in Robbins and McNeil 2009, para. 8). The Senate Committee on Homeland Security and Government Affairs held a hearing on April 29, 2009, entitled *Swine Flu: Coordinating the Federal Response*, which set out to investigate the severity of the Mexico outbreak. Less than a month into the initial outbreak, policymakers demanded an aggressive federal response to H1N1. Senator Susan Collins indicated:

> The American people have the right to expect that the Federal Government is doing everything possible to combat this potential pandemic, and to date, I would agree with the Chairman that it appears that our Federal officials have taken this threat very seriously and responded very effectively. (Homeland Security and Government Affairs 2009, n.p.)

As the number of H1N1 cases exploded across the country into fall of 2009, Congressional hearing activity was primarily devoted to monitoring and investigating the ongoing response to H1N1. As discussed in greater detail in the implementation section, Congress was especially concerned with the Obama Administration’s vaccine development program. By September of 2009, there was growing concern of the possibility of a vaccine shortage. For example, at a September 29, 2009, hearing held by the House Committee on Oversight and Government Reform, Chairman Edolphus Towns (D-NY) asked:

> With the swine flu virus spreading rapidly, hundreds of thousands of health-care workers, many in my State of New York, are now being required to get flu shots. Concerns have been raised about mandatory immunizations. In fact, there is a protest underway right now in Albany, NY, which highlights the concerns that some have regarding mandatory vaccinations. I want to carefully examine these concerns today with our witnesses. (Committee on Oversight and Government Reform 2009, p. 2)
The vaccine production controversy represents yet another difference between the avian influenza and swine influenza agenda-setting stages. The ensuing hearing, as well as a number of others, devoted a considerable amount of attention to evaluating and analyzing existing implementation efforts, in this case vaccine development. Various presenters, including Dr. Anthony Fauci, provided updates on ongoing efforts, even offering timelines as to when vaccines would be prepared for distribution. This type of discourse was largely absent from the avian influenza debate. The stakes of successful implementation, it seems, were heightened in the swine flu case, reasonably enough in view of the fact that many Americans were already sickened by the swine flu by this time.

This is not to say anticipatory policymaking was totally absent from the H1N1 policy process. For example, the Strategies to Address Microbial Resistance Act established programs to monitor microbial changes in emerging diseases in order to determine if a virus was on the cusp of developing resistance to existing drugs. The Borders Health Security Act of 2011 offered a series of grants to border states to help with the detection of, and to survey, emerging infectious diseases.

President Obama attempted to adopt an anticipatory policymaking approach. Days after the initial H1N1 outbreak in Mexico, he requested that a full report on swine flu be added to his daily intelligence briefing (Pear and Harris 2009). In July of 2009, members of the Obama Administration’s leadership team, including White House Security Advisor John Brennan, Secretary of Health and Human Services Kathleen Sebelius, Secretary of Homeland Security Janet Napolitano, and Secretary of Education Arne Duncan, convened an H1N1 Influenza Preparedness Flu Summit at NIH Headquarters in Bethesda, Maryland. The event was attended by delegations from more than 54 states, tribes, and territories, who were asked to discuss and consider their planning and preparedness efforts in anticipation of the fall flu season. HHS Secretary Sebelius commented: “Over the course of coming weeks and months, we will move aggressively to prepare the nation for the possibility of a more severe outbreak of the H1N1 virus. We ask the American people to
become actively engaged in their own preparation and prevention. It’s a responsibility we all share” (Qtd. in United States Department of Health and Human Services 2009, para. 4). Thus, although the H1N1 virus was already well underway by the summer of 2009, policymakers were concerned the pandemic would worsen in the fall.

Despite these planning efforts, the Obama Administration’s policy approach must be described as largely reactive. Unlike the Bush Administration, the Obama Administration did not present a series of influenza strategies or plans, although the President strongly encouraged states and localities to begin their own planning preparations as early as summer of 2009 (United States Department of Health and Human Services 2009). Instead, one of the most significant actions taken by the Obama Administration was a declaration, on October 24, 2009, that swine influenza constituted a national emergency. The Administration empowered the Secretary of HHS to voluntarily waive federal laws protecting patient privacy. The Secretary was also empowered to allow hospitals to create “satellite facilities” to accommodate a potential surge in swine flu patients. Satellite facilities might include a local armory, tent, another hospital, or other suitable location (Calmes and McNeil 2009).

Interestingly, the Obama Administration sought to frame the emergency declaration as a proactive—indeed anticipatory—policy measure. “This is not a response to any new developments. It is an important tool in our kit going forward,” stated White House spokesman Reid Cherlin (Qtd. in Calmes and McNeil 2009, para. 5). Another official indicated: “It’s important to note that this is a proactive measure—not a response to a new development” (Qtd. in Zengerle 2009, para. 6). Despite these claims, the emergency declaration cannot—should not—be construed as an anticipatory policy. For by the time the Obama administration made its emergency declaration, thousands of Americans were infected with virus and nearly 46 states reported widespread influenza activity. Some officials estimated the virus killed at least 1,000 Americans and hospitalized more than 20,000
(Calmes and McNeil 2009). Most importantly, by declaring swine influenza a national emergency—as opposed to simply a public health emergency—the President explicitly grouped pandemic alongside other classic disasters, such as natural disasters and terrorist attacks. Hurricane Katrina and the September 11, 2001, terrorist attacks were declared national emergencies, for example. Indeed, it is exceedingly rare for illnesses to be declared national emergencies.

Declaration of a national emergency for swine influenza reflected a reactive policy response associated with focusing events. The label of “emergency” implies that an event poses an immediate and pressing threat to health. To declare an event an emergency is not only to acknowledge its existence, but also a heightened and present state of danger or crisis, not something that can be prepared for. Pragmatically speaking, an emergency declaration allowed the Obama Administration to centralize a tremendous amount of power in the executive branch. For example, it allowed the President to restrict various civil liberties in the face of a pandemic, an action typically reserved for national emergencies—not problems that may or may not occur. Theoretically, the Obama Administration could have invoked martial law (Reilly 2009). James Hodge, Jr., a professor of health law and ethics at Arizona State University, indicated the emergency declaration meant that “Broader powers of the federal government are now authorized to respond to the emerging outbreak. In short, the stakes just got raised with this proclamation” (Qtd. in Shear and Stein 2009, para. 9).

**Agenda Catalysts**

What factors can we associate with swine flu’s rise to the institutional agenda? Similar to avian flu, no singular event suffices. Indeed, the number of cases and deaths were dominant agenda-setting catalysts in the swine flu case. However, unlike the avian flu case these indicators did not reveal themselves slowly and over an extended period of time. Instead they multiplied and aggregated very rapidly, bringing the number of swine flu cases and deaths well into the thousands
less than four months after the initial outbreak in August of 2009. In the case of swine influenza, one could argue the cascading accumulation of indicators ultimately had the force of a focusing event, or at least created a policy ripe for emergency or crisis politics. In other words, while indicators served to illuminate both problems, their rate of accumulation in the swine flu case amounted to a focusing event-type of policy process. This, of course, muddies contemporary scholars’ understanding of indicators and focusing events. Abrupt policymaking processes are widely associated with focusing events, not indicators (Birkland 2007; Kingdon 2003). Indeed, Birkland (2007) indicated that a slow indicator accumulation process are inducing policy change in advance of the onset of an event, would mark the pandemic domain. This depiction holds for the avian influenza, but not the swine influenza. To summarize, this study shows the rate at which indicators amass can prompt radically divergent policy processes, ranging from a measured and protracted anticipatory response to a rapid and “crisis-type”—reactive—response.

That rapid indicator aggregation generated a discernible policymaking process in the H1N1 case is well substantiated in the various policymaking actions of this period. Most notably, the declaration of a national “emergency” inherently denotes a large-scale disaster. Obama’s declaration spoke to the very essence of cascading indicator accumulation: “The rates of illness continue to rise rapidly within many communities across the nation, and the potential exists for the pandemic to overburden health care resources in some localities” (Reilly 2009, para. 3 [emphasis added]). Whereas H5N1 slowly appeared over a number of years, thus accommodating an anticipatory policymaking process, H1N1 was suddenly sprung onto the American public and policymakers alike.

Rapidly aggregating indicators accommodated a narrative defining swine influenza as a crisis or disaster. In “Managing the H1N1 Crisis,” Joanna Krotz advised businesses on how to deal with likely employee shortages in the face of H1N1. Krotz argued that dealing with a pandemic was “categorically different” from other disaster planning efforts because, according to Nick Cavalancia,
vice president of Windows Management for ScriptLogic, a Microsoft Gold Certified Partner based in Boca Raton, Fla., “most disaster planning takes account of all the things that are essentially unlikely, like fire or a hurricane or a chemical spill. But the pandemic is not only possible, it's very probable” (2009, para. 3). As early as April 2009, the media had dubbed swine flu a crisis. One article entitled “The Little Boy Behind the Swine Flu Crisis,” went so far as to trace the roots of the disaster to a four-year-old Mexican child named Edgar Hernandez (O’Neill 2009). An online slideshow by MSN News (2009) dubbed H1N1 one of the top-ten “Natural Disasters That Shook 2009,” presenting it alongside the Sumatra Earthquake, South Indian floods, Hurricane Bill, and Australia’s Black Saturday brushfire.

The Obama Administration offered a far more tempered definition of H1N1. Administration officials no doubt profited from the perception of H1N1 as a crisis, as this depiction legitimized not only the emergency declaration but also considerable appropriation requests. Yet, for the President, handling the swine flu emergency constituted a critical test of his crisis management skills. “It can be very dangerous to overreact. And it can be very dangerous to underreact,” stated Eric Toner, a senior associate at the Center for Biosecurity at the University of Pittsburgh Medical Center (Qtd. in Pear and Harris 2009, para. 10). To this end, President Obama attempted to strike a balance between concern and calm. For example, at a speech at the NIH he indicated: “This is, obviously, cause for concern and requires a heightened state of alert. But it’s not cause for alarm” (Qtd. in Pear and Harris 2009, para. 5). This sort of crisis management via rhetoric provides another critical distinction between the H5N1 and H1N1 cases. Because swine influenza did, in fact, constitute a tangible crisis, President Obama had to be especially conscious of how he framed the problem, taking heed not to drum up too much fear. Indeed, there was far less need for President Obama to “sell” the problem to the public, as the number of domestic cases and deaths coupled with alarmist media reports spoke for themselves. The President had to downplay the severity of the
event in an attempt to assuage public hysteria. While difficult to fully conceptualize, this type of applied crisis management behavior is absent from anticipatory problems, which really only exist in the minds of policymakers and the public—at least at the moment of early policy debate.

To some degree, the swine flu discourse paralleled the avian flu discourse. For example, analogy was also present in the H1N1 debate, albeit to a much lesser extent than in the H5N1 case. In spring of 2009, public health experts and the media contemplated whether the swine flu was similar to the 1918 Spanish influenza. For example, Fox News reported that researchers at the University of Wisconsin found “The new H1N1 influenza virus bears a disturbing resemblance to the virus strain that caused the 1918 flu pandemic, with greater ability to infect the lungs than common seasonal flu viruses” (“Study: Swine Flu…” 2009, para. 1). In both cases—H5N1 and H1N1—the Spanish flu analogy was employed as a device for reducing uncertainty.

However, unlike the bird flu case, the Spanish flu analogy was not the most common analogy employed. Instead, a wide variety of policymakers and pundits held that swine flu, and in particular the significant vaccine shortages reported throughout the fall, constituted President Obama’s “Hurricane Katrina.” Conservative political pundit Rush Limbaugh argued: “This ought to be Obama's Katrina. [The vaccine shortage] is no different than FEMA supposedly screwing up and not getting down there in time to New Orleans” (2009, para. 10). The Washington Times published an editorial entitled “Will swine flu be Obama’s Katrina?”

This week, as America marked the fourth anniversary of the natural disaster that devastated the city of New Orleans and the unresponsive presidency of George W. Bush, Washington’s new team barely had time to notice.

They are racing against the uncertainties of nature and science — desperately hoping the autumn return of the H1N1 virus, known as swine flu, will not become the Obama presidency’s Katrina. (Schram 2009, para. 1-2)
In the H1N1 case, analogies were thus employed more as a tool of political strategy and debate than as a mechanism for limiting uncertainty and extrapolating estimates of the number of cases and deaths.

Finally, swine influenza’s ascent to the agenda was accompanied by a surge in media attention. Figure 4-11 shows the number of stories containing the word “swine influenza” published in The New York Times. The New York Times’ coverage mirrors the acute burst in policymaking activity observed among federal policymakers. The amount of attention given to the swine influenza in 2009 was considerable, as 565 stories were published that year alone. This number dwarfs the amount of attention given to H5N1 in its peak year, 2006, when 276 stories were published. However, coverage of the swine influenza was not sustained and, in fact, fell to a mere 46 stories in 2010. The surge in media attention followed by an equally noticeable decline is again indicative of disaster-type policymaking.

Thus, the pandemic influenza domain was marked by two distinct agenda setting stages. More importantly, the contrast between the agenda setting and policy formulation process associated with the avian influenza and the agenda setting and policy formulation process associated with swine
influenza boldly illustrates the distinctive dynamics associated with anticipatory problems. The following section investigates the implementation process associated with avian influenza, again using the swine flu case as a critical contrast.

**Implementation and Evaluation**

Implementation efforts were grounded in the *National Strategy for Pandemic Influenza* Implementation Plan (Implementation Plan hereafter) a 234-page document outlining “300 critical actions…to address the threat of pandemic influenza” (Homeland Security Council 2006, p.4). The Implementation Plan outlined scores of activities needed to achieve preparedness. Surveillance of both humans and animals at both the domestic and international level was obviously an important theme. However, with regard to protecting American lives, the Implementation Plan stated: “The cardinal determinants of the public health response to a pandemic will be its severity, the prompt implementation of local public health interventions, and the availability and efficacy of vaccine and antiviral medications” (2006, p. 8). Implementing a preparedness plan is an inherently anticipatory process. Absence of a clearly identifiable problem greatly undermines bureaucrats’ ability to examine the effectiveness of various policy interventions. The success of a preparedness program, it seems, can only be determined in hindsight or after the problem prepared for has emerged. Bush Administration officials appeared to be acutely aware of this reality. They took great pains to “construct” measures or benchmarks of implementation success. One could argue these benchmarks represented surrogates for an actual problem, meaning they provided a mechanism for gauging implementation efforts in the absence of a tangible social ill.

In March of 2006, HHS offered the Pandemic Planning Update, which provided a detailed report from Secretary Leavitt on the progress of the Implementation Plan. In years to come, HHS would publish six editions of the Pandemic Planning Update—the last coming in January, 2009. The
information provided in the latter largely mirrored the structure provided in the *Implementation Plan*, offering updates on everything from the status of surveillance efforts to vaccine development. From an anticipatory policymaking perspective, the documenting and publicizing of implementation successes fit well the Bush Administration’s recasting of the influenza problem as a question of preparedness. By presenting implementation as a proverbial laundry list of distinct but interrelated actions, bureaucrats were able to achieve measurable success in the face of a most uncertain problem (United States Department of Health and Human Services 2009b). For example, the government website “FLU.gov” presented a “Summary of Progress” in December of 2006 that listed each of the various actions associated with the *Implementation Plan*. Next to each, a designation of “complete” or “in progress” was provided, indicating whether or not the goal was obtained. While it is not uncommon for Congress to oversee and investigate federal implementation activities, HHS’s seeming preoccupation with offering such regular and visible updates is by no means the norm.

The four critical implementation areas were surveillance, the procurement of antiviral drugs, vaccine development, and state and local preparedness. Disease surveillance required both domestic and international efforts. Despite the *Implementation Plan*’s presentation of international surveillance as a “stand-alone” pandemic planning activity, it is not entirely possible to separate H5N1 surveillance from diseases surveillance in general. Nor did the Bush plan, or any policy activity from that period, create many new surveillance schemes. Instead, the global surveillance network for emerging diseases consists of a “bewildering mix” of agencies, programs, institutions, projects, and initiatives (Scoones and Forster 2010, p. 45). Together, these entities constitute a complex global health infrastructure. At best, it seems, the *National Strategy* infused more money into this system, perhaps incentivizing these institutions and programs to pay more attention to H5N1—at least until funds were depleted (Scoones and Forster 2010). At worst, this funding may have made little
difference at all, as many believe our global surveillance system remains woefully incapable of monitoring outbreaks (Butler 2012b).

Disease surveillance is influenced by both the complexities of international politics and the realities of economic inequality. For one, disease surveillance militates against basic notions of national sovereignty. Successful global surveillance requires countries both to report disease outbreaks and, in the event an outbreak occurs, to give international experts access to affected sites in order to investigate the threat. Suffice it to say, neither of these ends is a given. For example, in June of 2008, Indonesia announced it would no longer report avian influenza deaths as they occurred. Indonesian officials worried that reporting the deaths would undermine their international standing—the death rate in the Asian country stood at around 2008. “How does it help us to announce these deaths?” asked the Indonesian Health Minister (Qtd. in “WHO upset over…” 2008, para. 7). Realistically speaking, no “plan”—no strategy—can fully ensure cooperation on these matters. Yet anecdotal evidence indicates that the CDC may have benefited from a number of important surveillance initiatives. For example, in 2006, the Global Initiative on Sharing All Influenza Data (GISAID) was formed. GISAID is a global consortium of scientists committed to participating in a publicly accessible information-sharing database (Bogner et al. 2006).

The difficulties associated with global surveillance are also a product of basic income inequalities. Many Asian and African countries, which have high incidences of avian influenza infection, simply cannot afford to develop strong public health infrastructure and are thus unable to discern—let alone contain—avian influenza outbreaks (Breiman et al. 2007). In response, a number of U.S. government agencies have set out to strengthen the surveillance capacities of underprivileged countries, where high rates of avian influenza contamination were reported or suspected. Among other measures, USAID implemented more than $55 million worth of surveillance programs abroad, including disease monitoring, laboratory diagnoses, and disease containment programs in Laos,
Cambodia, China, Vietnam, and Indonesia; distributed more than 30,000 personal protective-equipment sets (decontaminating sprayers, protective boots, protective coveralls, masks); and deployed infectious disease and animal experts across Asia, Africa, and Eastern Europe. CDC spearheaded most of HHS’s surveillance activities. According to estimates, more than $100 million was spent on international surveillance initiatives through FY 2006 (Salaam-Blyther 2011). Much of this activity was initiated through the CDC’s Global Disease Detection (GDD) Initiative, which aims to rapidly mobilize resources to identify and contain outbreaks. The GDD led an array of implementation activities, including, but by no means limited to, testing vaccines developed by Vietnam and other countries suffering from persistent outbreaks; developing clinical trials and a research infrastructure in southeast Asia; surveying outbreaks in animals in the Asian region. Other agencies responsible for international surveillance included the USDA, DoD, and DoS (Salaam-Blyther 2011).

Domestic surveillance efforts were far more straightforward. For example, the USDA, working in conjunction with the Interior and other agencies, launched a multi-pronged program aimed at detecting H5N1 in wild migratory birds. Not only did the agencies report testing more than 35,000 wild migratory birds by 2006, but they also created a GPS-monitoring system capable of tracking flocks across the globe (United States Department of Health and Human Services 2006b).

Of all the goals of the National Strategy, antiviral drug stockpiling was perhaps the most quantifiable. The federal government hoped to stockpile 80 million doses of antiviral drugs, or enough to treat roughly 25 percent of the American population. Antiviral drug stockpiling was a “shared responsibility,” meaning 60 percent of the stockpile would be accumulated by the national government while the remaining 40 percent would be acquired by the states. States could purchase the drugs at a reduced rate of about three-quarters the original cost (United States Department of Health and Human Services; Harris 2006). Implementing the antiviral drug stockpile plan was largely
a matter of purchasing. Two companies, Roche and GlaxoSmithKline, produced the vast majority of these drugs, as generics were not readily available. Countries and even private companies interested in building their own vaccine cache were advised to place an order and assume their place in line relative to others. Thus, governments seeking to purchase the drugs were virtually at the mercy of the private sector (Harris 2006).

Given the broad international concern with avian influenza, implementing agencies encountered a delay in their stockpiling efforts in spring of 2006. In March, the Bush Administration announced it was buying 14 million doses of antiviral drugs, which would bring the total number of purchased antiviral drugs to about 19.5 million. Democrats scoffed at the announcement, questioning why the stockpiling process was taking so long. “We appropriated this money in December, and now it's March. Why are they waiting so long, and where are the rest of the orders?” asked Allison Dobson, a spokeswoman for Senator Tom Harkin (D-IA) (Qtd. in Harris 2006, para. 7). The cause of the delay was multifaceted. For one thing, the drug manufacturers themselves were overwhelmed. For example, Roche reported more than 65 countries placed orders to fill their stockpiles. At the same time, the Bush Administration consciously delayed spending $101 million of the original appropriation because it was trying to determine “how much of the remaining medicines should be delivered as liquids, which are easier for children and the elderly to take” (para. 15).

Exacerbating these concerns, there were reports of wildly different purchasing habits on the part of states. In 2008, The Washington Post reported: “Fifteen states purchased less than 50 percent of the amount recommended by the federal government” (“Antiviral Stockpiles” 2009, para. 1). Commenting on the situation, Senator Charles Schumer (D-NY) stated: “Despite the urgency and the need in the event of an avian flu pandemic, the administration is slow-walking the much-needed dollars because of their overall budget problems. That is wrong” (Qtd. in Harris 2006, para. 17).
Fortunately for the Bush Administration, the antiviral controversy appeared to subside, owing in part to H5N1’s failure to mutate into a pandemic strain. By March of 2008, the Administration stockpiled nearly 50 million courses of the drug, approximately 31 million shy of its goal (United States Department of Health and Human Services 2008). It wasn’t until January of 2009 that the Administration declared it had reached the target of stockpiling 81 million courses. The Administration also reported states had purchased more than 22 million treatment courses, although it is unclear whether this number was as high as intended (United States Department of Health and Human Services 2009b). Ironically, the Bush Administration appears to have profited—at least politically—from the inherent uncertainty associated with anticipatory problems. Because the virus did not emerge, the Administration was afforded an extended window of time within which to achieve its antiviral purchasing goal. Had the virus emerged during the more than three-year period between the initial appropriation and the Administration’s actual completion of the stockpiling goal, it is reasonable to assume widespread criticism would have resulted.

Vaccine stockpiling and development, the centerpiece of the Bush Administration’s preparedness plans, encompassed a number of important elements. The Administration sought to purchase and stockpile enough “pre-pandemic” vaccine to inoculate at least 20 million Americans (Hellerman 2006). A pre-pandemic vaccine was a vaccine based on circulating avian influenza viruses. Implementing this goal went relatively smoothly. In September, HHS signed a contract for more than $160 million with pharmaceutical companies Sanofi Pasteur and Chiron to create a pre-pandemic vaccine (Hellerman 2006). As of January, 2009, the U.S. government stockpiled 2.2 million pre-pandemic vaccine courses, just enough to cover first responders and healthcare workers at the onset of a pandemic (Infectious Disease Society of America 2011).

But influenza viruses are moving targets. Most experts agree a pre-pandemic vaccine would offer minimal protection against a pandemic avian influenza strain. Influenza viruses are in a
perpetual state of flux. Vaccines need to be updated year after year relative to specific seasonal strains. Stockpiling large amounts of pre-pandemic vaccine is therefore counterproductive. With this reality in mind, the Bush Administration set a target of being able to generate 600 million doses of a pandemic influenza vaccine within six months of a pandemic. (The 600 million doses figure is approximately enough to inoculate every American twice.) (United States Department of Health and Human Services 2009b).

To achieve this end, HHS invested in expanding domestic manufacturing capacity, largely through contracts with private drug manufacturers. The contracts encouraged expansion of both egg-based and cell-based vaccine production methods as well as research and development in “next generation” vaccine development techniques. Gauging the success of these measures was obviously difficult if not impossible, at least prior to the H1N1 outbreak in 2009. In the January, 2009, edition of Pandemic Planning Update VI—the last update to be submitted prior to the swine flu pandemic—HHS reported making great strides in the area of vaccine development. More than $120 million was filtered into domestic facilities, which retrofitted their existing egg-based production capacities to allow them to more efficiently develop vaccines for novel viruses, like the avian and swine influenza strains, as opposed to only seasonal influenza strains. The improvements reportedly led to record production of seasonal influenza vaccine, a promising sign for those hoping for a quick pandemic ramp-up time. Similarly, more than $1 billion was allocated into contracts with private companies to develop advanced cell-based technology, which were projected to produce approximately 240 million doses of vaccine within six months of the pandemic (United States Department of Health and Human Services 2009). HHS reported that “five manufacturers are on target for reaching the milestones required in their contracts, and all are moving toward FDA approval of cell-based influenza vaccines” (United States Department of Health and Human Services 2009, p. 9). The implementation process associated with vaccine development again reveals the distinctive qualities
of anticipatory problems, in general, and pandemic preparedness, more specifically. Determining the relative success of many of these measures was virtually impossible in the absence of a pandemic strain.

Finally, the Implementation Plan requested state governments to take steps to ready themselves for a pandemic. State planning would, presumably, include everything from determining school closures and travel restrictions, to communications procedures, to drug distribution. Broadly speaking, the thrust of this activity would come through a series of plans, which each state was expected to complete pursuant to HHS guidelines. Of all implementation activities, the development of state plans proved to be one of the easiest. By fall of 2006, the Bush Administration reported every state had at least a draft plan. Additional funding was provided for state preparedness, including $225 million to support “tabletop” and “benchmarking” exercises. These exercises were essentially crisis management courses offered by representatives of HHS and CDC (United States Department of Health and Human Services 2006b).

How do you evaluate implementation efforts aimed at a problem that, in many respects, does not exist? Representatives from the Bush Administration claimed implementation success. As early as July 2007, Dr. Rajeev Venkayya, Special Assistant to the President for Biodefense, revealed the Administration was well on its way to achieving “preparedness”:

Of the actions that were due at 12 months, we assess that 86 percent of those actions have been completed. That's to be compared to a score of around 92 percent that we released at the six-month mark. There are about 14 percent of the actions that are not yet completed. We document those in the action-by-action detailed report. We anticipate those being completed in the 18-month time frame at the next six-month report. (Office of the Press Secretary 2007, para. 15)

Contradicting the Administration’s claims of success was, of course, extremely difficult, given the absence of a problem against which these measures could be evaluated. Moreover, outside of public health circles, something of a malaise settled over the policymaking community with regard to avian influenza. At a 2007 Council on Foreign Relations meeting on avian flu preparedness, Laurie
Garrett indicated that she was surprised by the waning interest: “Let me just start by saying that we had a meeting 17 months ago here. The turnout was about five times what we see in the room here today, and I think that it is indicative of the general public 17 months ago compared to what we see today, and in the amount of press coverage and the amount of attention” (Council on Foreign Relations 2007, para. 5). To be sure, by 2007, the number of H5N1 cases and deaths had begun to decline, although the virus maintained an exceptionally high lethality rate. That year, a string of outbreaks yielded 88 human cases and 59 deaths. The human and poultry infections and fatalities were reported in nine countries—Cambodia, China, Egypt, Indonesia, Laos, Myanmar, Nigeria, Pakistan, and Vietnam. The virus again tapered in 2008, as only 36 human and 28 deaths were reported. This decline in avian influenza activity certainly contributed to the overall decline in concern observed during this period.

However, this tide of indifference toward pandemic influenza would be relatively short lived. The 2009 outbreak of the swine influenza constituted a critical test of the Bush Administration’s National Strategy, although by this time the responsibility of implementing the plan fell squarely on President Obama’s shoulders. Scott Wilson and Spencer Hsu of The Washington Post reported: “The Obama administration has relied on a Bush-era public health strategy aimed at coordinating its response across an array of government agencies in the week since the first reports of a swine flu outbreak emerged” (2009, para. 1). President Obama praised the Bush model in saying that “I think the Bush administration did a good job of creating the infrastructure so that we can respond” (Qtd. in Naylor 2009, para. 3). As implied in the President’s statement, the National Strategy represented a framework setting general parameters based on public health best practices. However, it could not account for how these actions would “play out” under the strain of a pandemic. This is, of course, part-and-parcel of the enormous uncertainty associated with anticipatory policymaking.
While not perfect, implementation of the plan appeared to go relatively smoothly for the Obama Administration. “I would give them a B for performance so far,” indicated Dr. Eric Toner, a senior associate at the Center for Biosecurity at the University of Pittsburgh Medical Center (Stolberg 2009, para. 10). Yanzhong Huang, Senior Fellow for Global Health at the Council on Foreign Relations and Associated Professor at Seton Hall Disease, argued that the Obama Administration’s response was actually quite effective and, by and large, “informed by science and epidemiology” (2010, p. 11). As described above, the Obama Administration’s response to the swine influenza outbreak was swift and decisive. Important actions were initiated almost immediately. Within days, President Obama integrated influenza updates into his daily briefing. The President requested $1.5 billion to fund preparedness programs in summer of 2009. New guidelines for school closures were implemented. The President even navigated some tricky political waters, as a number of Republican politicians called on him to immediately close the borders. The President ultimately refused, instead opting to focus on mitigating the spread within the U.S. and arguing that the border closure policy would be “akin to closing the barn door after the horses are out” (Qtd. in Huang 2010, p. 8).

In the fall of 2009—amidst the swine flu pandemic—a glaring implementation failure was revealed, one that likely explains Dr. Toner’s decision to give the implementation process a passing but less than perfect grade. Severe swine influenza vaccine shortages were reported across the country. The CDC recommended 159 million vaccine courses be made available, enough to at least cover America’s “high risk” population (Schuchat 2009; Knox 2009). As late as November 2009, only 32.3 million doses were available. Concern and frustration abounded. Dr. Jonathan Fielding, Los Angeles County’s health commissioner, griped that “The vaccine situation is quite frustrating. The numbers we were asked to anticipate and plan for have turned out to be gross overestimates of what has been supplied to us” (Knox 2009, para. 9-10).
By most accounts, the vaccine shortage constituted a policy failure, and policymakers quickly jumped to the political task of assigning blame. As noted previously, Republican politicians and pundits alike laid the blame squarely on the Obama Administration, going so far as to call the debacle Obama’s “Katrina” moment (Limbaugh 2009). Republican Senator Susan Collins of Maine stated: “The fact that there are vaccine shortages is a huge problem. I believe the administration took the pandemic seriously, but I also believe administration officials were so determined to show that everything was under control that they sent the wrong signals about the adequacy of supplies of the vaccine” (Stolberg 2009, para. 13). Representative Roy Blount (R-MS) launched an even more pointed attack on the Administration, arguing that its “onerous regulatory and legal environment” was to blame (Cogan 2009, para. 1).

Administration officials countered that private companies contracted to make the vaccine had to be held accountable, not them. HHS Secretary Sebelius said the administration had been “relying on the manufacturers to give us their numbers, and as soon as we got numbers we put them out to the public. It does appear now that those numbers were overly rosy” (Shear and Stein 2009, para. 5). The Deputy HHS Secretary further criticized the drug manufacturers by stating that when they “hit some stumbling blocks, they sometimes thought the fix was around the corner and didn’t always feel the need to tell us, and then sometimes the fix wasn’t around the corner” (para. 6). According to representatives of the vaccine companies, however, the Obama Administration was well aware of the situation. Donna Cary of Sanofi Pasteur, one of the top vaccine producers, claimed their representatives were in touch with Administration officials “on a daily basis” (para. 8).

The task of investigating this misstep ultimately fell on Congress, which convened a number of hearings to determine the cause of the vaccine shortage. On October 21, 2009, the Senate Committee on Homeland Security held a hearing entitled “H1N1 Flu: Monitoring the Nation's Response” where HHS Secretary Sebelius was peppered with questions relating to the cause of the
shortage as well as what the Administration intended to do to remedy the situation. One particularly pointed exchange saw Senator McCain (R-AZ) repeatedly ask the Secretary when the Administration would be caught up in terms of vaccine supplies, to which Secretary Sebelius eventually replied: “Senator, I have no idea. I can get that information” (Starr 2009, para.13). Senator Joseph Lieberman (I-CT), chairman of the committee, echoed McCain’s inquiry: “My concern now is that the spread of the disease has gone beyond the government’s ability to take actions to prevent and respond to them” (Shear and Stein 2009, para. 18). The situation seemingly resolved itself and by December, 2009, ample swine flu vaccines were released onto the market. The President himself and the First Lady were vaccinated a week or so before Christmas (“Obamas Get Their…” 2009).

The contrast between the implementation stages associated with avian influenza versus swine influenza once again provides a vivid illustration of the distinctive policymaking features of anticipatory policies. The two sets of events cannot be entirely separated from one another. The Obama Administration relied heavily on the preparedness structure established by the Bush Administration. Even so, critical differences existed. Consider the difference between anticipation and action. While the implementation stage associated with avian influenza consisted of a number of very tangible preparedness actions, benchmarks of success were, more or less, constructed by the Bush Administration. Congressional policymakers and the President set the basic (but somewhat flexible) definition of what constituted an adequate level of preparedness. This is not to say these boundaries were not codified—they were clearly scripted in the Implementation Plan. Yet the uncertainty of the anticipatory problem likely allowed bureaucrats to skirt the evidentiary demands typically associated with measuring success relative to the mitigation of a real problem.

The Obama Administration, by contrast, could not dwell in the world of preparedness but was thrust—practically overnight—into a whirlwind of action. The fast-moving threat of swine influenza required the President to make strategic executive decisions throughout the outbreak and
into the pandemic, a responsibility that simply did not exist in the avian influenza case. The problem at hand was very immediate, manifest, and had a direct impact on the lives of Americans. Not surprisingly, then, concrete evidence—quantitative indicators—became a barometer of success, as opposed to abstract “report cards” or “planning updates.” This is precisely the dilemma encountered by the Obama Administration with regard to vaccines. The vaccine debate became based on quantifiable evidence of policy failure—there simply was not enough serum to vaccinate every American.

Of course, one could also see the vaccine shortcoming as an exercise in policy maintenance, similar to the process evidenced in the nanotechnology debate. Because it is constructed in the absence of an existing problem, anticipatory policymaking takes place through a process of informed foresight. The fact of enormous uncertainty logically demands that policymakers recalibrate policy in the face of new information and demands. The vaccine development program, which could be traced back to the National Strategy, reflected this reality. Indeed, prior to the H1N1 outbreak, the country had little experience overseeing a “ramp-up” program of this kind.

**Conclusion**

By the end of 2009, swine influenza had come and gone. The virus proved to be highly infectious, but—fortunately—nowhere near as lethal as expected. In the wake of the swine influenza pandemic, it seems concerns with avian influenza—and pandemic influenza in general—have diminished. As the number of avian influenza cases declined and leveled off in 2010 and 2011, so too did policymaker attention. The 112th Congress has barely acknowledged the virus’s presence. Gone are the days of H5N1 hearings and policy activity. However, in late summer of 2011, the United Nations Food and Agriculture Organisation (FAO) issued a warning of a mutant strain of H5N1 influenza virus, which is labeled H5N1 2.3.2.1. The new strain was discovered in bird
populations in China and Vietnam, and was particularly worrisome because of its ability to “sidestep the defenses provided by existing vaccines” (Qtd. in Cima 2011, para. 5). The virus quickly spread to bird populations in Cambodia, Egypt, and India. In an attempt to squelch the virus’s spread, the Indian government ordered a mandatory culling of chickens and other domesticated fowl within a several kilometer radius around the site of the virus’s discovery.

While the future of avian influenza is unknown, the H5N1 case provides a compelling illustration of tanticipatory policymaking. Unlike the swine influenza, the policy response to avian influenza was very incremental, which was in keeping with a “problem” that slowly revealed itself over a number of years. This prolonged and markedly uncertain process allowed for an equally protracted policy debate, spanning more than two sessions of Congress. Analogy was a hallmark of the problem definition process, and the implementation stage largely relied on self-imposed benchmarks as measures of success.

It is too soon to determine if the latest variant on the H5N1 influenza will amount to a viable global health threat. Either way, the concerns associated with H5N1 version 2.3.2.1 are the same as those with H5N1, which are that the highly pathogenic and lethal virus will mutate into an airborne strain. Assuming these fears are eventually confirmed, how might the prior policymaking conflict impact future avian influenza policymaking? Have policymakers become desensitized to the avian influenza threat? What lessons might be gleaned from the swine influenza case? Unfortunately, we likely will not be able to answer these questions until pandemic influenza rears its ugly head again.
Too Hot to Handle: Policy Failure and Global Warming

The concept of global warming refers to the rising temperature of the Earth’s atmosphere. It is primarily caused by an accumulation of certain gases, most notably carbon dioxide, in the Earth’s atmosphere that allows light to enter but not exit, in turn trapping heat. This phenomenon, commonly referred to as the “greenhouse effect,” has been magnified in the wake of the Industrial Revolution, as many of the technologies developed and utilized (factories, the automobile, large electricity grids) during this period emit enormous amounts of greenhouse gases. Most scientists believe the acceleration of global warming in recent decades is caused or, at the very least, exacerbated by human activities. The implications of global warming—anticipated and manifest—are manifold, including warming oceans, melting of polar glaciers, rising sea levels, wholesale destruction of entire ecological systems, diminished food security, and a proliferation of zoological and tropical diseases (Dessler and Parson 2006; Cass 2006; Hansen 2006; “What is Global Warming?” 2012).

Concerns with global warming center on the possibility that humankind is approaching a “tipping point,” which in climate terms is a threshold that, once crossed, will mark the onset of likely dire and irreversible changes in the Earth’s climate. Such changes may include permanent alterations in weather patterns, irregular ocean currents, and eradication of entire forests and species. And because these various ecological systems are interconnected, radical change in one system will likely alter others, further accelerating warming trends. For example, scientists note that melting glacial ice will alter ocean circulation, which plays a critical role in moderating extreme weather patterns and cooling Earth (“What is Global Warming?” 2012; Hansen 2006).

The precise temperature threshold likely to bring about this tipping point has not been definitely determined. This said, most agree that while humankind has yet to breach this point of no return, we are dangerously close. And while a menu of options exists for either preventing—or at
least adapting to—this event, change will ultimately require domestic and international policy interventions to curb greenhouse gas emissions, especially carbon dioxide (Cass 2006). With the U.S. as one of the world’s largest emitters of greenhouse gases, our government represents a critical actor in the fight against global warming.

This case chronicles efforts in the U.S. to anticipate, avoid, and mitigate a global warming tipping point. The global warming case differs from the other two cases examined here in at least three critical respects. First, one could argue that global warming is not a purely anticipatory problem. The dangers associated with nanotechnology and, to a slightly lesser extent, avian influenza have a longer time horizon, meaning they were not projected to occur until sometime in the future. To be sure, for many Americans, the dangers of global warming likely seem very far off. Yet, in the eyes of much of the scientific community, many of the dire effects of global warming are well underway, although they will likely be magnified if preventive action is not taken. Even so, few scientists are willing to concede the inevitability of a tipping point and continue to advocate for aggressive policy interventions, even if the dangers of global warming are already manifest.

Second, global warming is a far more entrenched and politicized problem than either of the two previous cases. Attempts to regulate climate change can be traced back to the Nixon Administration, and the subject has been addressed by planks in both major parties’ platforms. Global warming’s extended lifespan as a policy problem has also given rise to a fairly well-established interest group structure, marked by powerful participants as well as detailed rhetorical frames and narratives on both sides of the issue. Some contend the players surrounding this issue are so powerful, they’ve effectively gridlocked policymaking at the national level (Rabe 2004).

This chapter focuses on the global warming debate from 2001 to present, largely to mirror the time span examined in the other cases. Moreover, although a wide array of measures can be used to combat global warming (e.g., fuel efficient cars, public transportation, “green” building codes,
etc.), we focus here on efforts in at the U.S. federal government level to curb greenhouse gas emissions, specifically carbon dioxide. To many, such standards represent the proverbial “holy grail” of climate change policy, the single most effective mechanism for reducing carbon emissions.

Finally, the global warming case is, in many respects, a story of policy failure. While the legitimacy and effectiveness of the 21st Century Nanotechnology Research and Development Act and the various measures enacted to prepare for avian influenza may be disputable, these actions ultimately amounted to substantive policy change. While the U.S. has taken steps to improve fuel efficiency in automobiles, which are a key contributor to greenhouse gas emissions, most observers agree the global warming domain has yet to produce a truly viable policy solution. Specifically, the federal government has been unable to pass legislation or commit to an international treaty requiring emissions reductions. Most environmentalists agree that specified emissions caps are the only way to curb current warming trends.

Global warming constitutes a classic example of anticipatory policymaking, albeit within a much more highly charged political context than the previous cases. Fueling global warming fears is an underlying concern that humankind will experience catastrophic ecological events in the future if steps are not taken in the present to reverse warming trends. What factors drove global warming’s rise to prominence as an agenda item? Why have policymakers failed to enact significant anticipatory legislation, despite widespread concern and an abundance of warning signs pointing to the dangers of climate change? In the absence of federal law, what steps have national bureaucracies taken to combat climate change? These questions, as well as a host of others, will be considered in the pages ahead.
Dimensions of the Problem

Increases in the global surface and air temperature are indisputable. The Intergovernmental Panel on Climate Change (IPCC) estimates temperatures have warmed roughly 0.74 degrees Celsius over the last century. More than half of this warming has occurred since 1979 (University Corporation for Atmospheric Research 2012). The United States National Oceanic and Atmospheric Administration’s (NOAA) National Climate Data Center (NCDC) reports that more than half (11 years) of the top-twenty warmest years on record occurred in the 21st Century. Six of the top-25 warmest years occurred in the 1990s, while the remaining two occurred in the late 1980s (“The Hottest Years…” 2010).

Most climate scientists attribute such increases in average temperatures to human activity (IPCC 2008). Such warming trends are the result of the successive accumulation of infrared heat-trapping gases, a phenomenon commonly referred to as the “greenhouse effect” (IPCC 2008; Dessler and Parson 2006; Cass 2006). Carbon dioxide is the greatest single contributor to global warming, responsible for upwards of 60% of greenhouse emissions, with methane contributing another 15-20%, and the remaining 20% composed of nitrogen oxide, chlorofluorocarbons, and ozone (Cass 2006). The U.S. today is the second largest emitter of greenhouse gases, after China, which became the world’s greatest emitter in 2006. Together, these two account for more than 40% of all greenhouse gas emissions worldwide (Cass 2006). Burning of fossil fuels is the primary source of carbon dioxide emissions. The U.S. Environmental Protection Agency (EPA) estimates that electricity generation accounts for nearly 41% of all carbon dioxide emissions in the U.S. Other important sources are the manufacturing, construction, and mining industries; residential and commercial practices (e.g., home heating, lighting, cooling, and appliance use); and transportation, most notably automobile use (EPA 2012). The major sources of methane gas emissions are rice
paddies, cattle, waste dumps, leaks from coalmines, and natural gas production (Cass 2006). Thus, many of America’s largest and most profitable industries are greatly contributing to warming trends.

Other environmental practices serve to heighten global warming, although their impact is not as great as carbon dioxide emissions. Most notably, agricultural deforestation, or the clearing of large segments of forest to make space for crops or cattle, contributes to global warming in a number of respects. Forests provide a canopy shielding the Earth from the sun’s rays. Deforested land quickly turns barren in the absence of tree shade, allowing further heating of the exposed Earth and, in turn, raising surface temperatures. Trees are also important ecological filtering devices, removing toxic impurities and gases from the air. Fewer forests therefore result in higher levels of greenhouse gases blanketing the atmosphere (“What is Global Warming?” 2012).

It is difficult, if not impossible, to account exhaustively for all implications of global warming. The Earth is a complex system whose various ecological and biological subsystems are interconnected. Changes to one “aspect” of the planet can trigger ripple effects across the entire globe, impacting life forms and natural systems of all types. Herein lies the greatest uncertainty associated with global warming. While scientists have conclusively determined the Earth’s temperature is, in fact, rising, and while most agree human activity is to blame, far less consensus exists as to the actual implications of global warming. How severe is global warming? What are the long-term implications? How long does humanity have before warming trends become permanent? Which species and ecosystems will react most sensitively to these trends?

One of the most dramatic and well-documented implications of global warming is rising sea levels, which some estimate have risen by roughly 17 centimeters since the start of the 20th century and are calculated to rise another 7 to 22 inches by 2100 (Strickland and Grabianowski 2012). Scientists have struggled to determine precisely how much of this melting is caused by global warming, but it is clear that higher atmospheric temperatures have warmed ocean waters, leading to
accelerated melting and erosion of much of the globe’s polar ice sheets and shelves. Whatever their precise causes, rising sea levels pose considerable threats to individuals living along the coast, putting these communities at risk of catastrophic flooding (Roberts 2012; Borenstein and Barnard 2012). One report estimates roughly 3.7 million Americans to be at risk from rising sea levels (Cameron 2012). Sea level increases also can be highly disruptive to ecological systems, destroying critical wetlands. Moreover, a vicious self-perpetuating cycle is possible. Because seawater acts as a lubricant on ice caps, higher ocean levels means quicker glacial melting (Hansen 2006).

Global warming, it seems, has the capacity to impact nearly every facet of human—and animal—existence. Settlement patterns will obviously be wildly interrupted simply because people living along coasts and on islands will have to retreat from rising tidewaters. Nearly every continent is projected to experience decreases in food production, with already struggling nations in Africa and parts of South America bearing the greatest burden (Stecker 2011). As much as one-third of all wildlife species could be extinct by 2050 if current warming trends continue (Leahy 2004). A rise in tropical diseases is anticipated because warmer weather and moister climates are conducive to the spread of vector organisms, such as insects, snails, and rodents. Vector organisms are the primary transmitters of malaria, dengue fever, yellow fever, viral encephalitis, and other deadly diseases (Union of Concerned Scientists 2003). Other researchers have already linked global warming to extreme weather events, such as hurricanes, tsunamis, wildfires, and floods (National Wildlife Federation 2010). And, of course, all of these occurrences would have extremely dire implications on the global economy. Some estimates hold that global warming could be responsible for economic damage on a scale not seen since the Great Depression or world wars, costing 5% to 20% of the world’s gross domestic product (Eilperin 2006).
The dangers associated with global warming are seemingly endless and, in the eyes of many, capable of fundamentally undermining the social order as we know it. They are not, however, inevitable. Scientists fear the possibility of an approaching tipping point—a temperature threshold that, once breached, will bring about irreversible changes. Should a tipping point occur, the Earth will enter a new and permanent state marked by extreme temperature changes (Moul 2012; Dell’Amore 2010; “What is Global Warming?” 2012; Hansen 2006). In actuality, the concept of a tipping point denotes a number of watershed events (a number of tipping points), each of which is expected to have enormously dire implications. The basic premise behind the multiple tipping points theory is rooted in the understanding that the Earth’s various systems are interconnected. Once one system is disrupted others will soon follow, creating a domino effect. Scientists often cite a disruption of the Atlantic “conveyor belt” as a critical tipping point. The Atlantic conveyor belt refers to the process through which warm water is sent northward and colder water is sent southward in the Atlantic Ocean. Drastic influxes of coldwater due to melting ice caps threatens to permanently disrupt this oceanic cycle by preventing warm water from moving north. Scientists worry that this particular occurrence will spawn exponentially stronger hurricanes, while severely hindering the Earth’s capacity to cool itself. Another tipping point would occur if Greenland become entirely ice free, an event not only likely to dramatically heighten the Earth’s temperature, but also cause a 20 to 23-foot rise in sea levels. Scientists have maintained that a warming of 4 degrees Celsius would bring about this tipping point. Additionally, the destruction of more than half the Amazon rain forest, which many project could occur by 2200, could prompt similarly devastating effects, eradicating entire species and depriving the Earth of one of its most important air purifying systems. In sum, multiple events are anticipated to occur if warming trends are not reversed. Most importantly, these events are simultaneously caused by global warming and will cause great warming (Moul 2012; Dell’Amore 2010; “What is Global Warming?” 2012; Hansen 2006).
Scientific recognition of global warming dates to 1896, when Swedish scientist Svante Arhenius argued that influxes in carbon dioxide in the atmosphere could alter the earth’s surface temperature. Systemic research throughout the 1950s confirmed Arhenius’s hypothesis, revealing a connection between carbon dioxide and rising temperatures. Global warming became a political issue in the U.S. in the 1980s, spurred by the convergence of a number of factors. It was during this period that the Environmental Protection Agency (EPA) formally recognized global warming as a real phenomenon that could have catastrophic implications for humans. These concerns were magnified in 1985 when a team of British scientists discovered a hole in the ozone layer. The ozone hole captured widespread media attention and was presented as tangible evidence of the connection between human activity and atmospheric destruction. But global warming did not truly solidify its place on the American policy agenda until 1988, a year when scorching heat waves blazed a trail of devastation across much of the U.S. Severe droughts resulted, stifling agriculture production across the country. Water levels in the Mississippi River fell so low that commerce was virtually stilled. Wildfires torched large swaths of Yellowstone National Park. In terms of an important concept from the problem-definition literature (Rochefort and Cobb 1994), the 1988 heat waves lent “proximity” to global warming, shifting the issue “from the realm of scientific abstraction to a real possibility that affected everyone from farmers and campers to the owners of beach houses” (“A History of Global…” 2010, p. 8).

Throughout this period, global warming made headway in policymaking circles. The 1978 National Climate Act (P.L. 95-367) was the first piece of climate change legislation. It established the Climate Program, an interagency research endeavor authorized to gather climate information and consider the policy implications of global warming. However, the Climate Program lacked any formal policymaking authority, a major flaw in the eyes of environmentalists and proponents of significant climate change legislation (Pielke 2000, 2000b).
By the end of the 1980s, global warming was highly politicized, with policy entrepreneurs and interest groups advocating both for and against substantive climate change legislation. One of the most outspoken advocates of stronger climate change policy was then-Representative Albert Gore (D-TN). Gore is credited with having convened the first congressional hearing on climate change in 1976 and sponsoring a number of additional hearings throughout the 1980s (Aldred 2007). In 1989, he wrote in *The Washington Post*:

> Humankind has suddenly entered into a brand new relationship with the planet Earth. The world's forests are being destroyed; an enormous hole is opening in the ozone layer. Living species are dying at an unprecedented rate. Chemical wastes, in growing volumes, are seeping downward to poison groundwater while huge quantities of carbon dioxide, methane and chlorofluo-rocarbons are trapping heat in the atmosphere and raising global temperatures.

> How much information is needed by the human mind to recognize a pattern? How much more is needed by the body politic to justify action in response? (para. 2-3).

Over the course of his almost 25 years in public service, Gore has established himself as one of the foremost advocates of climate change policy and, in 2007, he won a Nobel Peace Prize for his efforts in this area (Aldred 2007).

Yet Gore wasn’t the only policy entrepreneur on global warming to emerge during this period. Senator John Chafee (R-RI) also convened a number of hearings on the topic and was a steadfast supporter of international climate change treaties. Outside Congress, too, a number of important issue entrepreneurs set out to raise awareness about global climate change. Few of these individuals received more attention that James Hansen, Director of NASA’s Goddard Institute for Space Studies, who published a number of highly influential papers modeling the long-term implications of global warming and advocating for climate change legislation (“A History of Global Warming...” 2010) In what has come to be seen as a watershed moment in the history of climate change policymaking, Hansen testified at a 1988 U.S. Senate hearing that he was “99%” confident long-term warming trends were underway and they would likely bring frequent storms, flooding, and
more life-threatening heat waves (Qtd. in Parkinson 2010, p. 232). In addition, a wealth of environmental interest groups continue to call for domestic and international measures against global warming. Examples include Greenpeace, Earth First!, and National Wildlife Federation, as well as scores of others.

Counteracting these individuals and groups, however, is a bevy of industry groups that construe climate change legislation, and most notably fossil fuel emissions standards, as a threat to profits. For example, in 1989 the Global Climate Change Coalition (GCC) was formed to represent a diversity of corporate interests. Members included Chevron, Chrysler, Shell Oil, Texaco, Ford, General Motors, American Petroleum Institute, and the American Forest & Paper Association, to name a few (“A History of Global Warming” 2010). The GCC aggressively disputed the contention that global warming posed a threat to humanity and set out to influence policy at the domestic and international level (“A History of Global Warming” 2010). In years to follow, a variety of industry groups sought strategically to undermine the science of global warming by highlighting the inherent uncertainties surrounding the forecasting of future trends (Oreskes and Conway 2010).

In 1987, Congress passed The Global Climate Protection Act (P.L. 100-204), which tried to remedy perceived deficiencies of the Climate Program by authorizing the EPA and Department of State (DoS) to develop climate change policy. Even though President Ronald Reagan signed the Global Climate Protection Act, he objected to vesting policymaking authority in the EPA and DoS, arguing this would interfere with the White House Office of Science and Technology Policy’s jurisdiction over science issues (Pielke 2000, 2000b).

Concerns about global warming were heightened on the international level in the 1980s. In 1988, the United Nations established the Intergovernmental Panel on Climate Change (IPCC), a body responsible for providing comprehensive scientific and technical assessments of the risks associated with climate change as well as the human causes of climate change. In the years to follow,
IPCC reports were seen as arguably the most authoritative documents in climate change research. IPCC studies partially served as the evidentiary basis for a number of international treaty proposals that set out to encourage U.N. member states to commit to binding limits on greenhouse gas emissions (Cass 2006). Thus, creation of the IPCC was critical to the opening of international bodies, most notably the U.N., as legitimate policymaking venues. Climate change policy has since progressed along two parallel, but at times intersecting, tracks—the domestic and international arenas.

In 1990, the IPCC released its first report, which confirmed that global warming was, in fact, underway and would unquestionably continue in the absence of government intervention. The report piqued international interest, increasing the prospects for a broad international agreement. The so-called platform for contemporary international climate change discussions was established at the 1992 Earth Summit in Rio de Janeiro. The Earth Summit, otherwise known as the United Nations Conference on Environment and Development (UNCED), was a U.N.-led international conference arranged to discuss an array of environmental issues. The result was creation of the United Nations Framework Convention on Climate Change (UNFCCC), a global treaty aimed at stabilizing greenhouse gas in the atmosphere and reversing global warming trends. The UNFCCC, in-and-of-itself, lacked formal policy power. It set no legally binding limits on greenhouse gas emissions and did not impose any enforcement mechanisms. It did, however, call for a number of updates or “protocols” that would presumably result in mandatory emissions standards. The protocol requirement established a broad goal to stabilize greenhouse gases at 1990 levels by the year 2000. The mandatory update clause was significant in that it created an impetus for nations to continue to work towards establishing international emissions standards. Indeed, these protocol discussions would come to represent one of the most important policy venues in the global warming debate, as they constitute a formal setting wherein binding international emissions standards can be
set. The U.S. was one of the first nations to formally ratify the UNFCC, which was supported by the entire European Union and 167 other nations (Rabe 2004).

Domestically, President George H. W. Bush presided over what might have been the most active period in global warming policymaking to date (Rabe 2004). A notable example of this work is the 1992 Energy Policy Act (P.L. 102-486), which altered the rules guiding the delivery of electricity and attempted to reduce American dependence on foreign oil. Among its various provisions, the 1992 Energy Policy Act required utility companies to report—but not limit—their carbon dioxide emissions. It also provided tax incentives for the use of alternatives to fossil fuels. The Clean Air Act Amendments of 1990 (P.L. 101-549) utilized a novel market-based or “cap-and-trade” approach to reducing sulphur dioxide emissions. Specifically, the Clean Air Act Amendment of 1990 set a cap on the amount of sulfur dioxide that could be emitted by so-called “smokestack” industries or manufacturing industries, like the automobile, paper, steel, rubber, and chemicals industries. However, the Act recognized that retrofitting plants to reduce emissions would likely be costly and take a great deal of time. It therefore allowed for a transition period during which industries that exceeded their cap could compensate for excess emissions by purchasing credits from industries that were below the cap (Talbert 2012; Rabe 2004). The cap and trade system promoted by the Bush Administration would come to represent the centerpiece of later climate change debates and often attract the ire of Republican politicians.

While not directly aimed at addressing global warming, the Intermodal Surface Transportation Efficiency Act of 1991 (P.L. 102-240) “represented a revolutionary break from past highway bills with its greater emphasis on alternatives to the automobile, community involvement, environmental goals, and coordinated planning” (Burbank and Brinckerhoff 2009, p. 156). This legislation was intended to prod states into conducting long-range transportation planning efforts that considered, at least in part, different ways to reduce pollution and energy consumption. It also
provided support for alternative modes of transportation, most notably commuter railway systems. Finally, the Bush administration established the State and Local Climate Change Program in 1990. The Climate Change Program offered states grants and technical assistance in order to help them collect data, develop policy, and, eventually, establish individualized climate change plans (Rabe 2004).

With this basic policy infrastructure in place, Democratic President Bill Clinton assumed office in 1993. President Clinton, whose environmental credentials were no doubt bolstered by his selection of Al Gore as running mate, harshly criticized the Bush-era environmental policies and promised to impose much more stringent standards. Most importantly, the Clinton Administration sought to maintain 2000 emissions at 1990 level, the centerpiece of most international climate change treaties. However, the Administration quickly encountered roadblocks. Congress rejected one of President Clinton’s first initiatives, a proposed tax on fossil fuels, during his first months in office. Further undermining the Administration’s climate change agenda was the Republican takeover of Congress in 1994 (Rabe 2004). In fact, aside from a handful of funding increases for climate change research programs and incentives for clean technologies, most of the Clinton Administration’s initiatives were rejected by Congress. One of the only major exceptions was the Partnership for a New Generation of Vehicles Program, which called on America’s “Big Three” auto manufacturers to develop fuel-efficient “production prototype” automobiles by 2004 (Rabe 2004)

But, in many ways, the big story behind the Clinton Administration’s climate change agenda occurred not on the domestic front, but in the international arena. By the time Clinton assumed office, most Western powers were ready and willing to commit to binding emission standards. Calls for an international emission standard came to a head in the winter of 1997 at the Kyoto negotiation meetings in Kyoto, Japan. The Kyoto Protocol sets binding emissions targets for signatories, making
it the most significant climate change treaty to that date. The Clinton Administration signaled it
would support the Protocol, although a showdown with Congress loomed. Years earlier, in 1995, the
Clinton Administration accepted the “Berlin Mandates,” a precursor to Kyoto that called for legally
binding emissions targets but exempted developing nations from the requirements. The developing
country exemption was extremely controversial. Many observers argued it was unfair to require
some nations to invest in the environment but not others. Still, most signatories agreed the
emissions mandates would pose significant economic impediments on the developing nations by
stunting their growth and further perpetuating global inequality (Rabe 2004).

Congress was far less accepting of the developing nations exemption. In July of 1997,
months before the Kyoto Protocol debate, the U.S. Senate unanimously passed a resolution
preemptively rejecting any future climate change agreements without formal commitments from
developing countries. Yet, even in the face of this stark opposition, the Clinton Administration
proceeded with the Kyoto negotiations and formally signed the Protocol in November 1998.
President Clinton’s signing was met by extreme disdain from the U.S. Senate, as members berated
his wanton disregard of their previous resolution. Majority leader Trent Lott (R-MS) stated: “The
Senate will not ratify a flawed climate-change treaty” (Qtd. in Lantis 2005, para. 4). Senator Robert
Byrd promised to join in “stabbing [the treaty] in the heart” (para. 4). Even Senator John Kerry, a
proponent of binding climate change resolutions, concluded the treaty was “not ratifiable in the
Senate” (para. 4).

In the absence of Senatorial consent, the Kyoto Protocol was dead in the water. Only ten to
fifteen Senators indicated any willingness to consider supporting the policy (Rabe 2004). Wrangling
up enough votes to gain passage proved too great a hurdle to overcome. Clinton left office in 2001
without having submitted the treaty for senatorial confirmation. This responsibility would fall on
incoming President George W. Bush. Despite lofty promises and high expectations, Clinton and
Gore ultimately failed to secure substantive climate policy. Ironically, emissions rose in the U.S. during their tenure. Rabe (2004) reports that, by 2000, not only had emissions not stabilized to 1990 levels, they had actually increased by nearly 15 percent over the decade.

As the nation turned the corner into the 21st century, warning signs abounded as to the dangers of global warming. In 2001, the IPCC issued its third assessment, indicating: “Globally it is very likely that the 1990s was the warmest decade, and 1998 was the warmest year” (Intergovernmental Panel on Climate Change 2007b, para. 6). The report added that this warming would likely bring about more extreme weather events and that evidence strongly implied these changes were the product of human activities. What is more, the policy divisions evidenced in the 1990s crystallized into a clear ideological split between environmentalists and industry, Democrats and Republicans, on the issue of global warming. This divisiveness only served to heighten global warming’s status as a political issue. It is against this backdrop that the following section examines the global warming’s problem definition debate.

**Discourse of Conflict**

Uncertainty is without question the dominant feature of global warming’s definition as a policy problem. Global warming’s uncertainty is partially derived from very real gaps in existing scientific knowledge, although these gaps have been readily manipulated for political gain. The truth is that global warming science is not without important areas of consensus. Scientists “know” or are fairly certain, the Earth is warming, sea levels are rising, certain plants and animals are migrating or dying in response to temperature fluctuations, and the oceans are becoming more acidic. Most are also fairly certain that many of these changes are caused by human activity (Union of Concerned Scientists 2012; Quiggin 2008).
On the other hand, many aspects of global warming are simply unknown. Scientists cannot conclusively determine how much warming will occur in the future, and estimates range from 2.1 degrees and 11 degrees Fahrenheit by 2100. Nor can scientists predict how much carbon dioxide or other greenhouse gas emissions will be released in the future. Scientists cannot predict how different ecosystems and species will respond to warmer temperatures. Enormous uncertainty also surrounds the human, health, and economic implications of global warming. Indeed, by virtue of the fact that many of these events have yet to actually occur, global warming is marked by pervasive doubt. Even the most sophisticated scientific models can only provide an approximation of future change (Biello 2007; Quiggin 2008).

This type of uncertainty is, of course, a hallmark of all anticipatory problems. In a 2000 article appearing in *The Atlantic*, Daniel Sarewitz and Roger Pielke, Jr., described the seemingly amorphous nature of the global warming problem:

People can’t directly sense global warming, the way they can see a clear-cut forest or feel the sting of urban smog in their throats. It is not a discrete event, like an oil spill or a nuclear accident. Global warming is so abstract that scientists argue over how they would know if they actually observed it. (Sarewitz and Pielke 2000, para. 10)

The degree of abstraction described by Sarewitz and Pielke, coupled with the above noted sources of scientific uncertainty, created an intensely polarized discursive conflict in regard to global warming policy. The division breaks fairly neatly along partisan lines. For example, a 2011 poll by the Yale Project on Climate Change Communication and the George Mason Center for Climate Change Communication found that “A majority of Democrats (55%) say that most scientists think global warming is happening, while majorities of Republicans (56%) and Tea Party members (69%) say that there is a lot of disagreement among scientists about whether or not global warming is happening” (Leiserowitz et al. 2011, p. 4; see also Guber and Bosso 2012).
To limit this uncertainty, scientists and policymakers alike have employed analogies and other forms of implied comparison. As early as 1991, Michael Glantz of the Environmental and Social Impacts Group at the National Center for Atmospheric Research wrote:

The use of analogies and analogical reasoning has been at the center of attempts to understand what future climate change might be like and provides a glimpse of some aspects of physical and societal responses to climate change at the regional level. Proper use of analogies (even if only to educate or to create awareness) can take some degree of uncertainty out of the societal side of the climate change question. (p. i).

Indeed, public discourse regarding global warming relied heavily—was virtually dependent—on the use of implied comparison as a means of communicating this complex scientific phenomenon. The best example of this is, of course, the “greenhouse effect” metaphor, which constitutes the formative depiction and explanation of how emitted gases are heating the Earth. And while the greenhouse effect did not constitute a politically motivated narrative per se, its importance in communicating an easily understandable explanation of climate change was instrumental in making global warming a salient political issue.

Scores of other, often more colorful, analogies and comparisons have been employed by proponents on climate change legislation. For example, researchers at University Corporation for Atmospheric Research in Boulder produced a video analogizing the extreme weather caused by global warming to baseball players on steroids. Laura Snider (2012) of the Boulder, Colorado, newspaper The Daily Camera, explained this analogy as follows:

The [analogy] explains that it’s difficult to attribute any one single home run to a baseball player’s steroid use. But over a season, the number of home runs hit by a player using steroids is likely to be higher than the number of home runs hit by the same player during a season when he wasn’t used steroids.

Similarly, it’s difficult for a single heat wave, for example, to be attributed to an increase in greenhouse gases in the atmosphere, but over time, an atmosphere that contains more greenhouse gases likely will produce more heat waves than the atmosphere did before the increase.

And just like a baseball player who uses steroids can still strike out, record-setting
cold snaps can occur even when there are additional greenhouse gases in the atmosphere. (para. 8-10).

Perhaps the most pervasive analogy was the contention that global warming was tantamount to World War II. Specifically, this analogy held that global warming not only constituted a problem of epic proportions, but that “[a]ddressing the root causes of global warming will require a level of national and international cooperation not seen since the Allied nations’ response during World War II” (Mackey and Li 2007, p.10). This analogy was so pervasive, in fact, that *Time* magazine adorned the cover of its April 28, 2008 “Special Environment Issue” with a doctored image of the iconic WWII photograph depicting six American Marines raising the U.S. flag in Iwo Jima. However, in this instance the Marines are raising a tree, and the magazine cover bears the title “How to Win the War on Global Warming.” *Time* correspondent Bryan Walsh (2008) argued that a WWII-type effort on the part of the U.S. is not only our best—and perhaps only—hope for reversing climate change trends, but will likely pay considerable economic dividends in the long run. Writes Walsh:

> Forget precedents like the Manhattan Project, which developed the atom bomb, or the Apollo program that put men on the moon—single-focus programs both, however hard they were to pull off. Think instead of the overnight conversion of the World War II-era industrial sector into a vast machine capable of churning out 60,000 tanks and 300,000 planes, an effort that not only didn’t bankrupt the nation but instead made it rich and powerful beyond its imagining and—oh, yes—won the war in the process. (para. 4)

As noted by Stone (2002), analogies and metaphors to war, let alone those comparing a problem to the greatest military conflict of the modern era, are commonly marshaled by problem definers to legitimize long term and largescale policy commitments. In most instances, a nation at war will leverage all of its resources—including financial and human—to ensure victory, a testament to war’s magnitude as a policy problem. While global warming would not require human sacrifice, it would demand considerable government spending, real international cooperation, and, even, the restructuring of American and global economies. Environmentalists and other proponents of
substantive climate change legislation readily employed the analogy in conjunction with their calls for sweeping international agreements and domestic emissions curbs. For example, environmental analyst Lester Brown argued in Plan B 3.0 that rapid mobilization and economic restructuring were essential to combating global warming and that “the U.S. entry into World War II offers an inspiring case study in rapid mobilization” (Brown 2008, para.11). Former Vice President Gore evoked the WWII analogy on several occasions, including a speech before the Sierra Club in 2005:

Winston Churchill, when the storm was gathering on continental Europe, provided warnings of what was at stake. And he said this about the government then in power in England — which wasn’t sure that the threat was real — he said, “They go on in strange paradox, decided only to be undecided, resolved to be irresolute, adamant for drift, solid for fluidity, all powerful to be impotent.” He continued, “The era of procrastination, of half measures, of soothing and baffling expedience of delays, is coming to a close. In its place we are entering a period of consequences.”

Ladies and gentlemen, the warnings about global warming have been extremely clear for a long time. We are facing a global climate crisis. It is deepening. We are entering a period of consequences. (para. 24-25)

For their part, those expressing skepticism about causes of, or responses, to global warming have also relied on analogy to support their cause. One notable example is the argument that the current warming period is similar to previous warming periods in Earth’s history, which has seen extreme temperature increases in the absence of manmade emissions. These critics often cite the “Medieval Warm Period,” which occurred between roughly A.D. 950 and 1250, during which the Earth’s temperatures rose sharply, followed by the “Little Ice Age,” a stark downturn in global temperatures from 1400 to 1700. Michael Tennant (2012), writing in the conservative leaning The New American argued that this finding “would seem to present a problem for the theory of manmade global warming, which asserts that the Earth’s present alleged warming trend is primarily, if not solely, the result of human activity, specifically carbon dioxide emissions, and that it cannot be stopped absent a return to a pre-industrial world” (para. 2).
Advocates of policy measures curbing greenhouse gas emissions define global warming as a crisis. In a 2007 address before the United Nations General Assembly, Secretary-General Ban Ki-moon boldly evoked the rhetoric of crisis, stating:

Today, war continues to threaten countless men, women and children across the globe. It is the source of untold suffering and loss. And the majority of the UN's work still focuses on preventing and ending conflict. But, the danger posed by war to all of humanity—and to our planet—is at least matched by the climate crisis and global warming. (para. 8)

In framing global warming as a crisis, while analogizing it to the devastation of war, problem definers cast climate change as an issue too great to ignore. Indeed, the crisis definition intrinsically presents global warming as a problem necessitating immediate action, as opposed to a potential threat that can be dealt with at a later time. Accordingly, former Republican presidential nominee and Arizona Senator John McCain, one of the few proponents of emissions legislation in his party, argued: “A common misperception is that this is a crisis that is down the road. Climate change is real. It’s happening now” (Wyatt 2009, para. 7).

Although depiction of global warming as an immediate crisis may be less than persuasive to some political actors, proponents of emissions standards often supplement it with a related theme, namely, that of a moral obligation to future generations who will suffer the consequences if corrective steps are not taken soon. Environment America, a federation of state-based, environmental advocacy organizations, has claimed: “If we want to spare our children and grandchildren the worst consequences of global warming, we must dramatically reduce the carbon pollution that we pump into the atmosphere. And, as most scientists agree, we better do it soon” (Environment America 2012, para. 1). The State of the World Forum, an organization that helps world leaders find solutions to critical global challenges, echoed these sentiments: “Make no mistake: this will impact you and certainly all of our children” (State of the World Forum 2012, para 2). Such a narrative lends further proximity to the issue while identifying “our children” as a very sympathetic
problem population (Rochefort and Cobb 1994).

Those opposing stringent emissions standards, and industry groups in particular, typically frame climate change policies as a threat to the American economy. International treaties, as well as domestic policies, both are subjected to this attack. For example, at a 2003 House hearing on the Kyoto Protocol’s potential impact on the coal industry, Representative Robert Ney (R-OH) declared: “The Kyoto Protocol, beyond any question, will eliminate thousands of jobs across the country. Jobs will be lost throughout the industry in all coal producing states and many other regions in our country. In Ohio, almost all of the 3500 coal mining jobs will be threatened” (Committee on Resources 2003, p. 4). Similarly, Representative Richard Pombo (R-CA) stated: “At a time when people in this room have personally experienced the pain and trauma of massive plant closings in recent years, the Kyoto Treaty would add further insult to injury. In short, Kyoto means pink slips in French” (p. 3).

The jobs argument is multifaceted, integrating a variety of concerns relating to domestic employment and international competitiveness. As demonstrated above, emissions standards are seen as a threat to American workers. Updating factories to meet these standards promises to be a costly undertaking and, in order to cover the costs of these conversions, many fossil-fuel-dependent industries anticipate layoffs. This narrative also lends proximity to the debate while, again, identifying a sympathetic problem population, workers. In an Op-Ed appearing on the conservative website RedState.com, then-Republican Presidential hopeful Rick Santorum propounded these themes:

I have traveled across this great country many times. I have met countless Americans looking for jobs—real jobs, doing real work. These Americans have lives to lead, families to feed, rent to pay, and gas tanks to fill. Their dreams are our dreams; their hopes are our hopes; their search for a better America is our search.
And yet in Washington, blocking the American dream has become political sport. The Washington Establishment would rather fight global warming than fight for American jobs.

We are the collateral damage of the war against global warming. (Santorum 2012, para. 1-3)

The jobs argument closely dovetails with the argument that international emissions standards are unfair. Specifically, many opponents charged that proposed international agreements, which exempted developing countries, were inherently biased against American workers and businesses. Representative Joe Knollenberg (R-MI) summarized these concerns in 1998:

This fatally-flawed agreement [the Kyoto Protocol] is blatantly unfair because it exempts developing nations from making any commitment to reduce their emissions of greenhouse gases. As a result, nations like China, India, Mexico, and Brazil, [...] will be given a free pass while the United States is forced to struggle with the Kyoto treaty’s stringent mandates. (Qtd. in Müller 2001, p. 1)

In portraying emissions policies and jobs as mutually exclusive, opposition groups were able to exert an enormous amount of influence over the subsequent agenda setting and policy formulation process. To pass muster, proposed policies, at a minimum, had to demonstrate they would not undercut the American economy. In many instances, policymakers, including Presidents Bush and Obama, framed their proposals not as purely environmental actions, but also as strategic economic opportunities. The current climate-change discourse is saturated with claims of a new “green economy,” an idea that purports a profitable but environmentally sound class of jobs and products.

A more extreme narrative has argued that climate change policy is objectionable not necessarily because it threatened American jobs, but rather because global warming does not, in fact, constitute a “real” problem. These individuals and groups go so far as to present climate change as a scientific—and, in the eyes of many, liberal—conspiracy. No popular figure better exemplified this rhetorical trend than techno-thriller writer Michael Crichton. In 2004, Crichton published the best-selling book *State of Fear*, which describes a group of eco-terrorists attempting to create widespread fear as a result of a series of environmental catastrophes in order to forward their global warming
agenda. The book, which sold more than 1.5 million copies worldwide, represented a harsh critique of what Crichton sees as misleading climate science. In a 2005 speech delivered before the American Enterprise Institute for Public Policy Research, Crichton commented: “I spent the last several years exploring environmental issues, particularly global warming. I’ve been deeply disturbed by what I found, largely because the evidence for so many environmental issues is, from my point of view, shockingly flawed and unsubstantiated” (Mooney 2005, para. 2).

Some members of Congress adopted similar thinking. The biggest proponent of this “conspiracy theory” was Senator James Inhofe (R-OK). Inhofe, a member of the Senate Committee on Environment and Public Works, vehemently opposed almost any legislation aimed at imposing strong emissions standards, and he convened a number of hearings challenging EPA findings and climate change proposals (Brown 2011). Inhofe, who published a 2012 book entitled The Greatest Hoax: How the Global Warming Conspiracy Threatens Your Future, is quoted as saying: “With all the hysteria, all the fear, all the phony science, could it be that manmade global warming is the greatest hoax ever perpetrated on the American people? I believe it is” (Qtd. in “NY Times Understated…” 2008, para. 10).

Those taking aim at the science behind global warming sought to exploit areas of uncertainty by using them to encourage a general sense of skepticism on this issue. In fact, various points of evidence imply that, by the late 1990s, a concerted effort to highlight the uncertainties of global warming was afoot. A leaked 1998 memorandum from the American Petroleum Institute (API) read: “Victory will be achieved when [a]verage citizens ‘understand’ (recognize) uncertainties in climate science; [and] recognition of uncertainties becomes part of the ‘conventional wisdom’” (API 1998, para. 18). Republican politicians employed similar strategies. A controversial memorandum from Republican strategist Frank Luntz to President George W. Bush leaked in 2002 indicated how this strategy infiltrated the highest echelons of Republican leadership. Luntz wrote:
The scientific debate is closing [against us] but not yet closed. There is still a window of opportunity to challenge the science. Voters believe that there is no consensus about global warming within the scientific community. Should the public come to believe that the scientific issues are settled, their views about global warming will change accordingly. Therefore, you need to continue to make the lack of scientific certainty a primary issue in the debate. (Qtd. in Quiggin 2008, p. 207)

Luntz’s advice seems to have resonated within the Bush Administration. Subsequently, several critics, including the Union of Concerned Scientists, charged widespread political interference with federal climate scientists on the part of Administration officials (Union of Concerned Scientists 2012). Dr. Rosina Bierbaum, a Clinton administration appointee to the Office of Science and Technology Policy (OSTP) who also served during the first year of the Bush administration, complained: “The scientists [who] knew the most about climate change at OSTP were not allowed to participate in deliberations on the issue within the White House inner circle” (Qtd. in Union of Concerned Scientists 2012, para. 7).

Proponents of substantive climate change policy countered that this overt manipulation of uncertainty was flawed, shortsighted, and outright dangerous. Dr. James Hansen publicly took the Bush Administration to task by declaring that actions to reduce greenhouse gas emissions were “not only feasible but make sense for other reasons, including our economic well being and national security. Delay of another decade, I argue, is a colossal risk” (Qtd. in Revkin 2004, para. 8). In an attempt to demonstrate the flaws and dangers associated with fixating on global warming’s uncertainty, William Nordhaus (2012), Professor of Economics at Yale University, analogized global warming’s uncertainty to the uncertainty associated with gambling:

…[T]hink of the issues as if we are playing roulette in a Climate Casino. Each time the roulette wheel stops, we resolve one of the uncertainties. Our best guess is that CO2 doubling will increase temperatures by 3°C, but if the ball lands on black it will be 2°C while a ball on red will produce 4°C. Similarly, a ball in a black pocket will lead to minimal damages from a certain amount of warming, while a ball in a red pocket will lead to much larger warming than we anticipate. On the next spin, a ball in the black will produce low growth and slow growth in emissions, while a ball in the red will produce rapid growth in CO2 emissions. And so forth. (Nordhaus 2012, para. 19)
But, in the Climate Casino, the ball also might land on zero or double-zero. If it lands on zero, we find significant loss of species, ecosystems, and cultural landmarks like Venice. If it lands on double-zero, we find an unanticipated shift in the earth’s climate system, such as a rapid disintegration of the West Antarctic Ice Sheet. (para. 19-20)

All of these narrative and definitional claims came to represent staples of the climate-change debate by the time George W. Bush took office in 2001. Powerful interest had crystallized on both sides of the issue during President Clinton’s tenure in office, as important policy and political questions came to the fore. We now turn to the agenda setting and policy formulation process. This section will chronicle measures taken—or not taken—by the President and Congress from 2001 to present, a period spanning two presidential administration and six Congressional sessions.

**Agenda Setting, Policy Formulation, and Enactment**

The election of Republican President George W. Bush in 2001 ushered in a period of great uncertainty within the global-warming policy domain. President Clinton’s decision to refrain from sending the Kyoto treaty to the Senate meant the fate of the controversial agreement ultimately lay in the hands of the newly elected President. Although President Bush promised, if elected, to combat global warming and a host of other environmental issues during his bid for the presidency, widespread Congressional opposition to the treaty coupled with the Administration’s pro-business philosophy served to dampen the prospects of ratification.

President Bush emphatically affirmed these doubts in a June 11, 2001, speech when he called the Kyoto Protocol “fatally flawed” (Qtd. in Parker et al. 2011, p. 7). The President added:

Kyoto is, in many ways, unrealistic. Many countries cannot meet their Kyoto targets. The targets themselves are arbitrary and not based upon science. For America, complying with those mandates would have a negative economic impact with layoffs of workers and price increases for consumers. And when you evaluate all these flaws, most reasonable people will understand that it’s not sound public policy. (Qtd. in Parker et al. 2011, p. 7)
Months later, he clarified his statement regarding Kyoto, stating that he would “not do anything that harms our economy, because first things first are the people who live in America; that’s my priority” (Qtd. in Lobe 2001, para. 3). Days later, White House Spokesman Ari Fleischer permanently extinguished hopes of U.S. ratification of the treaty: “The president has been unequivocal. He does not support the Kyoto treaty. It is not in the United States’ economic best interests” (Qtd. in Lobe 2001, para. 6).

Reaction to the President’s announcement underscored the deepening partisan divide over global warming. Environmental groups chided Bush for his actions, stating it would exacerbate warming trends while fundamentally undermining the international standing of the United States. “Bush’s decision to abandon America's commitment to the Kyoto Protocol has created the most serious international environmental policy crisis in years,” stated to Christopher Flavin, president of the Worldwatch Institute, an organization advocating for sustainable development policies (Qtd. in Lobe 2001, para. 20). Similarly, Fred Krupp of the Environmental Defense Fund, a prominent environmental advocacy group, indicated: “As the world's last remaining superpower, and its largest producer of greenhouse gases, the United States has a special obligation to lead on this issue. It is bad for America's interests for the United States to be seen as the rogue nation of greenhouse gas pollution” (Qtd. in Lobe 2001, para. 22).

Conservative groups, by contrast, applauded President Bush, calling his decision a victory for American industry and a rational response to the enormous uncertainty still associated with climate-change science. The Heritage Foundation, a conservative think tank, heaped high praise on the new President: “President Bush is right to walk away from the Kyoto Protocol. It is a flawed agreement for addressing the issue of global temperature changes and their impact on the environment. Considerable uncertainty remains about the science of climate change and mankind’s contribution to it” (Coon 2001, para. 4).
However, outside of the most conservative political circles, “doing nothing” about climate change did not necessarily constitute a politically viable option. If President Bush was going to reject the Kyoto Protocol, he was going to have to present an alternative. To this end, President Bush announced his Clear Skies Initiative on February 14, 2002. The President’s proposal fundamentally recast the prevailing approach to curbing greenhouse gases by presenting a policy aimed at curbing greenhouse gas “intensity” as opposed to a cap-and-trade on overall emissions. Greenhouse gas intensity refers to the “intensity of emissions per every one unit of economic activity” (Parker et al. 2011, p. 8). In other words, industry would not be forced to slow growth or output in order to stay below a predetermined emission bar or threshold. They would, however, be required to ensure that, when they did emit, they did so in a more efficient way. The Bush Administration estimated that, if industries continued to grow and emit at current rates, greenhouse gas intensity would decline by nearly 18% by 2012 under the Clear Skies Initiative. Yet, because no formal caps were imposed, overall greenhouse gas emissions were expected to increase during this period (Parker et al. 2011).

In pitching the Clear Skies Initiative, President Bush argued that industry needs and sound environmental policy were not incompatible. “America and the world share this common goal: we must foster economic growth in ways that protect our environment. We must encourage growth that will provide a better life for citizens, while protecting the land, the water, and the air that sustain life,” stated President Bush (White House 2002, para. 7). But environmentalists and many Democrats rejected the President’s offering as insufficient. First, while the plan proposed a reduction in nitrogen oxides, sulfur dioxide, and mercury by upward of 70%, it did not identify carbon dioxide—the primary culprit behind warming trends—as a regulated greenhouse gas (Prather 2002). Incidentally, throughout his time in office, President Bush made absolutely no attempt to return carbon dioxide emissions to their 1990 level (Parker et al. 2011). Second, the “Clean Skies Initiative” was completely voluntary, meaning industries were not required to participate. Most
analysts agreed that reversing warming trends would require mandatory restrictions on emissions (Prather 2002).

Soon after the President unveiled his plan, Senator George Voinovich (R-OH), Senator James Inhofe (R-OK), Representative Billy Tauzin (R-LA), and Representative Joe Barton (R-TX) introduced a version of the Clear Skies Initiative in Congress. The bill provoked a number of competing proposals, including the Clean Air Planning Act of 2003 (S. 843), Clean Power Act of 2003 (S. 366), Climate Stewardship Act of 2003 (S.139), as well as a slew of others. This trend continued and, by the 109th Congress (2005-2006), no fewer than seven competing proposals were circulating within the legislative branch (Center for Climate and Energy Solutions 2012, 2012b).

These proposals varied in a number of respects. Many explicitly curbed carbon dioxide, a feature noticeably absent from Clear Skies. More important, however, all these policies were anticipatory in that they provided long-range plans to prevent future warming. Proposals were often compared relative to their ability to curb emissions 10, 25, even 50 years in the future. For example, the World Resources Institute reported a “2 billion ton difference in year 2020 emission caps between the least stringent (Bingaman) and the most stringent (Jefford-Boxer and Waxman) proposals” (Larsen 2006, para. 3). Other comparisons measured stringency not by tons of emissions, but by the extent to which future emissions could be kept in line with emissions from prior years. For example, a 2008 document by the PEW Center on Global Climate Change compared seven leading policy proposals based on a number of criteria, including their “2010-2019 Cap,” “2020-2029 Cap,” and “2030-2050 Cap.” Under each of the categories, the Center for Climate Change highlighted future levels based on past-to-present estimates. Thus, for example, the Climate Stewardship and Innovation Act (S. 280) was projected to bring emissions to a “1990 level in 2020,” whereas the Low Carbon Economy Act (S. 1766) would bring emissions to “2006 level in 2020” (PEW Center on Global Climate Change 2008).
Policy proposals to govern emissions set out courses of action aimed at achieving future policy goals. In other words, they constituted “plans” or “strategies.” Richard J. Lazarus, Professor of Law at Georgetown University, argues that this need to plan and project years into the future constitutes the greatest impediment to successful climate-change policy: “The inherent problem with such lawmaking moments, however, is just that: they are moments. What Congress and the President do with much fanfare can quickly and quietly slip away in the ensuing years. This is famously so in environmental law.” Adds Lazarus:

The critical lesson for climate change legislation is that the pending lawmaking moment must include the enactment of provisions specifically designed to maintain the legislation’s ability to achieve its long-term objectives. Climate change legislation is peculiarly vulnerable to being unraveled over time for a variety of reasons, but especially because of the extent to which it imposes costs on the short term for the realization of benefits many decades and sometimes centuries later. (2010, p. 10749)

Thus, according to Lazarus, global warming anticipation and planning are difficult because they militate against the politician’s desire to achieve immediate political gains. More than any other problem reviewed in this study, successful anticipation of global warming requires (or at least is perceived to require) short-term economic pain and job loss, a tough sell for any politician hoping to be reelected. This wrinkle creates a much more politically charged environment than observed in previous cases, as many politicians and members of the public are simply not willing to sacrifice immediate economic stability for long-term environmental safety—even if failure to do so might eventually bring about catastrophic consequences.

Long-range planning has played a key part throughout our country’s global warming debate. Consider the Bush Administration’s 244-page *Climate Change Technology Program Strategic Plan*, released in 2006. Secretary of Energy Samuel W. Bodman highlighted the anticipatory nature of climate change policy in stating:

This plan was inspired by the President’s vision to harness America’s strengths in innovation and technology to transform energy production and use in ways that significantly reduce greenhouse gas emissions over the long term. This strategic plan
is unprecedented in its scope and scale and breaks new ground with its visionary 100-year planning horizon, global perspective, multilateral research collaborations, and public-private partnerships. (Qtd. in Eilperin 2006b, para. 3)

Critics held that, while planning was important, the Bush Administration was using global warming’s extended time horizon—the fact that many of its dangers will not be fully recognized for many years—to effectively “punt” on a pressing issue. “It’s good to look ahead, but people expect something immediate, as well as futuristic,” stated Representative Sherwood Boehlert (R-NY) (Qtd. in Eilperin 2006b, para. 5). Still harsher criticism was levied by John Coequyt, an energy policy specialist for the environmental advocacy group Greenpeace, who indicated: “The big picture from the Bush administration is always the same: This is a long-term problem that will be solved by another administration. It's time to start talking about what are the things we can do tomorrow” (para. 16).

Given this preoccupation with the future, global warming policymaking, in many respects, reflected the pattern of “conjectural” policymaking observed by Birkland (1997) in his examination of the nuclear power policy domain. Because the future is always uncertain, policymakers can only conjecture or speculate as to what future emissions and warming trends might look like. Policymakers, interest groups, scientists, and think-tank organizations constructed various “scenarios” and “models” allowing them to project future emissions. The models served as baselines and reference points against which emissions proposals could be tested. Put differently, they provided a forecast of the extent to which emissions were likely to increase in 10, 50, even 100 years into the future. American policymakers tended to opt for a “business as usual” scenario, which generally assumes carbon dioxide emissions will continue to grow at current rates (Romm 2011). This was certainly not the only standard employed. The IPCC released its *IPCC Special Report on Emissions Scenarios* in 2000, which offered more than 40 different emissions scenarios. Each scenario was based on a variety of different assumptions, including, but by no means limited to, the rate of
economic growth, population increases, future technological developments, and projected land use (IPCC 2000). In addition to the business-as-usual approach and various IPCC scenarios, a multitude of alternative scenarios were presented by scientists, organized groups, and other interested parties.

Constructed measures of success are seemingly inherent to anticipatory policymaking because it is difficult, if not impossible, to evaluate policies that set out to address problems that do not exist in the present. The various scenarios developed by the IPCC and others offered a benchmark of success. They represent a standard for evaluating the long-term effectiveness of the various emission standard proposals. In turn, the selection of these scenarios was a highly contested process, as these models constituted the only viable device for distinguishing one policy proposal from another.

Of the various proposals offered in 2003, only the Climate Stewardship Act of 2003 (S. 139) received a floor vote. S. 139, which was co-sponsored by Senators John McCain (R-AZ) and Joseph Lieberman (I-CT), set mandatory caps on carbon dioxide emissions, requiring that they remain at 2000 levels by 2012. Among its many provisions, S. 139 rewarded companies for reducing emissions early or for bringing emissions below the required standard, provided carbon allowances to companies promoting new carbon reducing technologies to consumers, and allowed companies to pursue a myriad of emissions trading options (National Resources Defense Council 2005).

The Climate Stewardship Act was ultimately defeated in the Senate by a vote of 43 to 55. In the eyes of many, garnering 43 votes was a victory and represented a promising sign for future climate change legislation. Commenting on the vote, Kevin Curtis, vice president of National Environmental Trust, a non-profit advocacy organization dedicated to educating the public on environmental issues, said: “[I]t’s a great start. This may seem to be a defeat now, but in the end, it’s a victory” (Qtd. in Little 2003, para. 1). An anonymous staffer from the Environment and Public Works Committee suggested the Act was actually closer to passing than the final vote implied:
“We’ve heard that the opposition was surprised and intimidated by the results, especially given that in the days before the vote it looked awfully close to passing. There were about five or six more swing votes that we thought might go in our favor, but then, literally the day before the vote, the rural electric [lobbyists] got very busy. As did the car guys. And the National Mining Association was everywhere” (Qtd. in Little 2003, para. 5). Beyond signaling a sincere concern with the possibility of global warming, the vote demonstrated that climate-change legislation could include carbon dioxide as a regulated gas, an important victory for environmentalists. One could argue this provision was precisely what the Bush Administration and other conservatives hoped to avoid, and that the Clear Skies Initiative, in part, represented an attempt to preempt a carbon dioxide cap.

Global warming emerged as a top agenda item in the 110th Congress. The Center for Climate and Energy Solutions, a non-profit agency that seeks to advance policy action on climate change, reported by July of 2008 that “lawmakers had introduced more than 235 bills, resolutions, and amendments specifically addressing global climate change and greenhouse gas (GHG) emissions—compared with the 106 pieces of relevant legislation the previous Congress submitted during its entire two-year (2005-2006) term” (2008 para. 1). Figure 5-1, which shows the number of times the terms “climate change” or “global warming” were mentioned in the Congressional Record, confirms this wave of agenda attention during the 110th Congress. The number of mentions nearly tripled from 2006 (237 mentions) to 2007 (853 mentions). This level of concern was sustained, as 756 mentions were reported in 2008 (the second year of the 110th Congress). Congressional Record activity eventually peaked in 2009 (995 mentions), which was the first year of the 111th Congress. Together, the 110th and 111th Congressional sessions constitute the most active period in climate change policymaking of the 21st Century.
Figure 5-2, which shows the number of times the terms “global warming” or “climate change” were mentioned in congressional hearings, also indicates a noticeable uptick in concern during the 110th Congress. The number of hearing mentions exploded from 2006 to 2007, jumping from 170 to 407. Attention was once again sustained over a two-year period, as 316 and 485 mentions were recorded in 2008 and 2009 respectively.
The House Energy and Commerce Committee and the U.S. Senate Committee on Environment and Public Works, both of which have jurisdiction over environmental issues, were important venues, convening a number of investigatory hearings and stewarding legislation along the institutional pathways of Congress. Indeed, even before the 2007 policy boom, both committees heavily debated and considered responses to global warming. Stakeholders sought to use public hearings as an arena to forward narratives favorable to their policy aims. The stark polarization between these camps was vividly represented at a 2005 hearing on *The Need for Multi-Emissions Legislation*. James Jeffords (I-VT), who once called global warming his number one priority, called for stringent emissions standards: “[W]e cannot legislate responsibly and ignore manmade global warming completely. The U.S. power sector emits one-tenth of the world’s total carbon dioxide emission. To ignore this fact defies reason, logic and the peer review work of the National Academy of Sciences, the American Geophysical Union and the International Panel on Climate Change” (Committee on Environment and Public Works 2005, pp. 16-17). Conversely, at a 2009 hearing on Clean Energy Jobs and American Power Act (S. 1733), one of the various cap-and-trade bills circulating at this time, Brett A. Vassey, President & CEO of Virginia Manufacturers Association, testified that his group wanted “Congress to develop responsible policies that protect domestic jobs and the environment. We are concerned that these bills will ‘cap’ industrial competitiveness and ‘trade’ domestic manufacturing jobs abroad for an entirely undefined environmental benefit. We can do better and we must do better” (Vassey 2009, p. 6).

While global warming fell within the broader environmental policy domain, the perceived magnitude of the problem coupled with its relative uncertainty accommodated narratives linking this issue to other policy areas as well, a dynamic observed in both of my prior cases. Few examples better illustrate this dynamic than the contention that climate change was a foreign policy threat. Climate change and America’s dependence on foreign countries for oil were conveyed as two policy
problems that could be killed with one proverbial policy stone. In 2010, Rebecca Lefton and Daniel J. Weiss (2010) of the Center for American Progress wrote:

The United States is spending approximately $1 billion a day overseas on oil instead of investing the funds at home, where our economy sorely needs it. Burning oil that exacerbates global warming also poses serious threats to our national security and the world’s security. For these reasons we need to kick the oil addiction by investing in clean-energy reform to reduce oil demand, while taking steps to curb global warming. (p. 1)

Similarly, Paul Portney, President of Resources for the Future, a non-profit agency that conducts research on environmental issues, testified in 2006 that, beyond concerns about dependence on foreign nations, “Another reason we need to pay attention to oil consumption is that every gallon of gasoline burned releases carbon dioxide into the atmosphere. Again, I will emphasize that I do not consider myself a Chicken Little on environmental issues, but this climate change problem is something that I think we have to continue to pay attention to” (Subcommittee on Energy and Resources 2005, p. 89). Characterizing climate change as a foreign policy issue allowed proponents of policy change to link global warming to a problem of incredibly high political saliency. Indeed, the article sponsored by Center for American Progress goes on to list a number of terrorist-harboring states from which the U.S. exports oil (Lefton and Weiss 2010). Of course, these contentions did not go uncontested. For example, in response to the proposition that the Global Warming Pollution Reduction Act (S. 309) would make the U.S. “safer,” Retired Major General Robert Scales of the U.S. Army testified:

Advocates of [the Global Warming Pollution Reduction Act] believe passionately that it will reduce America's production of greenhouse gases. Some suggest that it will create jobs. They may or may not be correct. But nothing in this bill will either reduce the likelihood of American involvement in future wars nor will it improve America's war making capabilities. Indeed over the decades the consequences of the bill might well reduce American influence and retard our ability to deter and fight wars in the future. (Qtd. in Lungren 2009, para. 3)

By the 110th Congress, roughly seven proposals emerged as prospective emissions standards policies, including the following: (1) Lieberman-Warner Climate Security Act (S. 2191); (2) Low
Carbon Economy Act (S. 1766); Climate Stewardship and Innovation Act (S. 280); Global Warming Pollution Reduction Act (S. 309); Global Warming Reduction Act (S. 485); Climate Stewardship Act (H.R. 620); and Safe Climate Act of 2007 (H.R. 1590). The policies varied greatly in toughness. Some were introduced by Democrats; others by Republican; and still others were bipartisan. All seven proposals regulated greenhouse gases. All of these policies were noticeably anticipatory, prescribing long-range policy plans and setting emission standards upwards of 50 years out. All of these policies also opted for a required or optional cap-and-trade approach. The policies generally capped emissions but offered various offsets, cost controls, and rewards for taking early action. Indeed, by this time market-based emissions standards had become virtually the only policy instrument offered, which was testament to the widely perceived need to balance risk with jobs and economic growth (Center for Climate Change and Energy Solutions 2012, 2012b; Parker et al. 2011).

By the end of the 110th Congress, only one bill appeared poised for explicit consideration. Senator Joseph Lieberman was once again at the center of this policy activity, having co-sponsored this bill with Senator John Warner (R-VA). The America’s Climate Security Act of 2007 (S. 2191) drew from a number of prior emissions proposals, offering an incremental approach to reducing emissions over a more than 50-year period. S. 2191 promised to reduce greenhouse gas emissions 19% below 2005 levels by 2020, and 63% below 2005 levels by 2050. Once again, a complex trading scheme was concocted and the bill explicitly capped overall emissions in the electricity generation, industrial, transportation, and natural gas sectors. On December 5, 2007, the Committee on Environment and Public Works approved the bill by a narrow—11 to 8—margin. However, it was unable to attain the 60 votes needed to overcome a Republican filibuster and was defeated in the Senate by a vote of 48-3 (Parker et al. 2011).

Senate rejection of America’s Climate Security Act of 2007 (S. 2191) highlighted the enormous difficulties associated with passing climate change legislation. Even in the face of nearly
seven years of political momentum and bipartisan support, S. 2191 was unable to garner enough votes in the Senate. Overwhelmingly, opponents cited economic concerns as the reason for their vote. “The impact of this climate tax is too great to bear for Kentuckians and for the rest of the country,” stated Senator Mitch McConnell (R-KY) (Qtd. in “Global Warming Bill Faces…” 2008, para. 11). President Bush also criticized the measure: “There is a much better way to address the environment than imposing these costs on job creators” (para. 5). Reports further suggest that industry groups aggressively contested the measure, threatening to run advertisements targeting senators who represented districts that housed large numbers of emitting facilities—districts likely to suffer job loss (“Global Warming Bill Faces…” 2008).

Thus, the 110th Congress failed to enact emissions legislation, an outcome particularly disappointing to proponents because it had been the first time Democrats controlled both chambers of Congress since 1995. However, Democratic gains in 2008 House and Senate elections meant the 111th Congress was better positioned to break the policy deadlock. Equally important, the election of President Barack Obama gave Democrats control of the White House for the first time in eight years. During his election bid, President Obama promised to reinvigorate the climate change debate. Among his various proposals was an ambitious cap-and-trade initiative that would reduce emissions by 80% by 2050. The President-elect also promised to reengage the UNFCC, thus reviving the possibility of a post-Kyoto global emissions agreement (Parker et al. 2011).

Warning signs and problem indicators related to the phenomenon of global warming abounded during this period. With each passing year, scientific models became more sophisticated, allowing better explanation of the causes of global warming and more advanced forecasting techniques. In 2007, the IPCC released its long-awaited Fourth Assessment Report (AR4), which offered a dire prediction of global warming trends. The Report provided a wealth of evidence demonstrating with unequivocal certainty that the planet was, in fact, warming at an alarming rate
and that this trend was directly attributable to human activity. It concluded by offering a blunt warning to policymakers waffling over emissions legislation: “Delayed emission reductions significantly constrain the opportunities to achieve lower stabilisation levels and increase the risk of more severe climate change impacts” (IPCC 2007b, para. 12). In response to the report, UN Secretary Ban Ki-moon proclaimed: “Today, the time for doubt has passed. The IPCC has unequivocally affirmed the warming of our climate system, and linked it directly to human activity” (Ki-moon 2007b, para. 3).

Unlike President Bush, who sought to disregard if not outright undermine global warming science, President Obama believed global warming constituted a very real threat to the U.S. “There’s no longer a debate about whether carbon pollution is placing our planet in jeopardy; it’s happening,” stated President Obama in a 2009 address (Obama 2009, para. 10). Upon assuming office, he signaled global warming as one of his top legislative priorities and urged Congress to pursue strong climate change legislation (Lizza 2010).

Congress obliged, and months into the President’s first term the House of Representatives offered the American Clean Energy and Security Act of 2009 (H.R. 2454). H.R. 2454, which was co-sponsored by Representative Henry Waxman (D-CA) and Edward Markey (D-MA), used a cap-and-trade approach to reduce greenhouse gas emissions, promising a 3% reduction below 2005 levels by 2012 and an 83% reduction by 2050. Emissions standards were applied to “covered entities,” which included most of the highest emitting industries (e.g., electricity, oil, manufacturing, etc.). These entities were required to obtain “tradable emissions allowances” for every ton of carbon dioxide emitted in the prior year. Beyond the cap-and-trade program, the Act included a wealth of other provisions aimed at promoting energy efficiency, renewable electricity, “green” buildings and job training, and more efficient appliances and transportation. It also offered a myriad of grant
opportunities for states and promulgated a new series of federal requirements (U.S. Green Building Council 2009).

Par for the course on climate-change policy, opponents and proponents quickly lined up. The coal mining and livestock industries aggressively challenged the bill, targeting members from coal mining districts ("A History of Global Warming..." 2010, p. 311). Conservative groups opposed the bill on the grounds, again, that it threatened jobs and the economy. The Heritage Foundation blasted the policy: “Despite Washington policymakers’ best attempt to call cap-and-trade a market-oriented approach, the reality is that any carbon capping plan is a costly energy tax in disguise—raising energy prices and unemployment with little, if any, environmental benefit” (Loris and Lieberman 2009, p. 2).

On the other hand, proponents of the bill, which included an eclectic mix of environmental groups as well as—surprisingly—a handful of automotive and gas companies, argued the bill represented a long overdue opportunity to tackle climate change. (These groups, as well as a number of labor unions, were partially galvanized by President Obama’s ability to frame climate change legislation as being potentially advantageous to job growth.) Some proponents readily invoked the rhetoric of anticipation, noting that H.R. 2454 promised to pay huge dividends for future generations. “The American Clean Energy and Security Act moves the nation further toward a clean energy future,” wrote Environment America, a non-profit environmental advocacy firm (Dutzik and Figdor 2009, p. 5). President Obama urged legislative leaders to pass the bill in a speech delivered days before the final vote: “We all know why this is so important. The nation that leads in the creation of a clean energy economy will be the nation that leads the 21st century’s global economy. That’s what this legislation seeks to achieve. It’s a bill that will open the door to a better future for this nation and that's why I urge members of Congress to come together and pass it” (Obama 2009, para. 25).
With the blessing of House Speaker Nancy Pelosi (D-CA), the American Clean Energy and Security Act of 2009 passed by a vote of 219 to 212 (with three abstentions) on June 26, 2009. As expected, the vote largely broke down along partisan lines, as the vast majority of supporters (211 out of the 219) were Democrats (OpenCongress 2012). The passage was without question a victory for proponents of climate change. However, as Ryan Lizza of the New Yorker pointed out in his examination of U.S. climate policy, it was marred by what many saw as a dark foreshadowing of the looming policy debate in the Senate. Forty-three Democrats broke rank and voted against the bill. Nearly all these individuals represented states with strong ties to the agriculture or coal industry. Thus, the House vote, despite being a success, signified the extent to which emissions policy could transcend party affiliations and become a regional issue (Lizza 2010). In other words, Senators representing impacted regions were unlikely to support this proposal.

With legislation narrowly secured in the House, the Senate took to fashioning legislation. Almost in tandem with passage of the House measure, the Senate Energy on Natural Resources Committee passed the American Clean Energy Leadership Act of 2009 (S. 1462) in June 2009. Although the bill included a number of useful provisions regulating energy efficiency in residential and commercial buildings, it did not include any required caps on emissions (Matzner and Presswood 2010). The Practical Energy and Climate Plan (S. 3464), which was also introduced at this time, similarly attempted to combat global warming without imposing clear emissions standards (Center for Climate and Energy Solutions 2010).

For obvious reasons, emissions standards proposals captured the most attention in the Senate. A variety of cap-and-trade bills had been introduced into the chamber during this period. The Carbon Limits and Energy for America’s Renewal Act (S. 2877) offered standards for carbon dioxide with limited trading options. The Clean Energy Jobs and American Power Act of 2009 (S. 1733) closely reflected key provisions from the House’s American Clean Energy and Security Act of
2009. S. 1733 actually passed the Senate Environmental and Public Works Committee by an 11-1 margin, but never made it to the Senate floor (Center for Climate and Energy Solutions 2010b). The only real contender for enactment was the American Power Act. In many ways, the provisions incorporated in this bill differed little from other emissions standards. It employed a cap-and-trade system to reduce greenhouse gases, including carbon dioxide. The bill also levied a fee on transportation fuels (2010b). What made this particular bill exceptional was that its co-authors, Senators John Kerry (D-MA), Joseph Lieberman (I-CT), and Lindsey Graham (R-SC), explicitly designed the legislation to be flexible enough to accommodate provisions enticing to Senators who would normally oppose global warming legislation. In other words, this bill was born out of political pragmatism, not environmental idealism. Its supporters were driven by one overriding goal: secure the 60 votes needed to clear the U.S. Senate (Lizza 2010; Chaddock 2010). Commenting on the need to cobble together a politically saleable package, Kerry stated: “For climate, it’s the bottom of the ninth inning and the bases are loaded if we can just push these runs across the plate” (Qtd. in Daly and Frommer 2010, para. 8).

As negotiations evolved, it became clear that two grand concessions would need to be brokered in order to convince Senators, most notably Republicans, to support the American Power Act. First, the bill would need to expand subsidies for nuclear power plants, a provision that was especially important to Graham (R-SC), who grew up near a nuclear plant and was a huge proponent of the technology (Lizza 2010). More importantly, however, the bill also included a provision that would allow states to receive subsidies for offshore oil drilling, a provision meant to appeal to fence-sitting Republicans representing southern coastal states (Daly and Frommer 2010; Lizza 2010).

Most reports indicate the bill was well positioned to finally break the deadlock. The offshore drilling piece greatly bolstered the viability of the bill. Even President Obama, hoping to drum up support for an important part of his domestic agenda, was willing to support offshore drilling. In
fact, the President went so far as to declare: “It turns out, by the way, that oil rigs today generally don’t cause spills. They are technologically very advanced. Even during Katrina, the spills didn’t come from the oil rigs, they came from the refineries onshore” (Qtd. in Johnson 2010, para. 2).

Then disaster struck. On April 20, 2010, an explosion on a British Petroleum oil rig, which was operating in the Gulf of Mexico, sent oil streaming into the ocean, killing 11 workers and blanketing the water in a toxic plume. The spill, which was not capped until mid-July, released nearly 5 million barrels of oil into the water, devastating entire wildlife habitats and crippling the gulf coast economy (Dybas 2012; Hoch 2010).

The Gulf oil spill is widely seen as one of the greatest environmental catastrophes in American history. Almost overnight, the once enticing drilling concession inserted in the American Power Act had come to represent a proverbial “third-rail” provision. In the wake of the spill, few Senators were willing to support legislation subsidizing offshore drilling. Yet, in the absence of this provision, the Act’s sponsors would not be able to entice many of the Senators representing coastal states (or with strong ties to the oil industry) to support the bill, making it virtually impossible to cobble together a voting block. In a last-ditch effort to appease those concerned with the drilling issue, Senator Kerry inserted a provision allowing states to veto offshore drilling up to 75 miles off their coast (Daly and Frommer 2010). Kerry’s attempt was futile, and only days after the disaster even Senator Graham began distancing himself from the legislation. Graham further indicated that he felt partisan differences over offshore drilling were too great to overcome. President Obama, still reeling from a bruising but successful health care debate, also grew cool to the climate-change issue, perhaps sensing too great a depletion of his political capital (Lizza 2010). On July 22, 2010, Senate Majority Leader Harry Reid formally announced the Senate would not be pursuing comprehensive emissions legislation before the August break. Commenting on this decision to abandon climate change, Senator Kerry stated: “In order to pass comprehensive legislation, you have to have 60
votes. To get 60 votes, you’ve got to have Republicans. As of today, we don’t have one Republican” (Qtd. in Chaddock 2010, para. 7).

In the wake of a Republican takeover in the House and a greatly diminished Democratic majority in the Senate, the 112
th Congress has ignored emissions legislation altogether (Center for Climate and Energy Solutions 2012c). (As discussed below, most of the current policymaking activity is occurring in the bureaucratic arena, specifically through EPA regulation.) The only silver lining is that the Obama Administration has made incremental strides toward negotiating a viable international agreement. At the 2009 Copenhagen Conference, which essentially amounted to an attempt by the international community to reengage the U.S. and China, President Obama agreed to a global climate change accord that would keep global temperature below 2 degrees Celsius (Parker et al. 2011). Although the agreement reintroduces the possibility of American participation in international climate change negotiations, it did not impose binding standards. Moreover, critics charge the emissions targets offered by the Obama Administration are “embarrassingly low emissions targets compared to other countries” (Rafaty 2012, para. 10). A letter endorsed by more than a dozen environmental groups and 1,200 industry leaders and activists charged that President Obama’s approach to international climate change means “America risks being viewed not as a global leader on climate change, but as a major obstacle to progress” (Qtd. in Rafaty 2012, para. 10). Thus, as of this writing, the U.S. has yet to formally commit itself to any emissions standards, domestic or international.

**Agenda Catalysts**

Despite being an important policy issue since the 1980s, global warming experienced a renaissance, at least in terms of agenda attention, in 2007. This uptick in concern was not fleeting, but was sustained through 2009 before dipping in 2010. What factors explain global warming’s rise
to agenda prominence? Why was Congress unable to enact an emissions law despite this burst in agenda activity? In brief, for every factor that served to catalyze global warming’s entrance onto the agenda, there appeared a countervailing factor to prevent actual policy change.

Pralle (2009) points out that any discussion of global warming agenda setting must account for the role of problem indicators. Perhaps more than any other environmental policy domain, the global warming arena is littered with measures and metrics pointing to the possibility of future catastrophe. Measures indicating the amount of carbon dioxide in the atmosphere and projections of a looming tipping point all served to reinforce the notion that global warming constituted an agenda-worthy problem. Indeed, IPCC reports came to constitute ready-made and, to some extent, “pre-packaged” indicator assessments. These reports not only presented an abundance of data, but also explained and interpreted the meaning and implications of these measures. One could argue the IPCC reports defined at least certain parts of the global warming problem in quite definitive terms. Not surprisingly, the IPCC’s fourth report, which was released in 2007, coincides with the uptick observed in agenda attention. Of course, all the indicators associated with global warming were marred by one glaring shortcoming—uncertainty. Even the IPCC reports and the various climate models from this period conceded that their findings were not points of fact, but rather scientific—statistical—approximations of what the future might look like. Indeed, the exercise of science is inherently uncertain in a way nonscientists often fail to appreciate (Budescu et. al 2009). Opponents of emissions standards, however, seized on these uncertainties associated with global warming to build a case against acting in haste on a “problem” that we don’t fully understand.

These indicators also entered into the policy narrative depicting global warming as a crisis. Save a handful of ardent skeptics, few argued global warming did not exist. Most policymakers came to see it as a very severe situation, if not a potential disaster. This narrative certainly helped catalyze the issue onto the agenda. On the other hand, this depiction was not so entrenched that it justified
immediate action. Although global warming constituted a very serious future threat, curbing emissions was seen as an equally significant threat to the American economy. This countervailing narrative was so persuasive that, by the 21st century, even those policymakers who favored emissions legislation framed their proposals as equal parts jobs and environmental measures. Indeed, President Obama readily fell into line, situating the climate-change proposals being considered in the 111th Congress as part of a broader effort to bring to bear the fruits of a new “green” economy (Goldenberg 2009).

Similar to the avian flu case, the global warming case was also greatly influenced by a powerful focusing event, the Gulf Oil Spill (Birkland 1997, 2006). Much like Hurricane Katrina, the Gulf Oil Spill constitutes an example of a focusing event with “cross-domain” implications. While the oil spill did not constitute a global warming problem per se, it ultimately served to halt the progress of the American Power Act—arguably the most politically viable climate change policy in the legislature—in the Senate. Coupled with the finding that Hurricane Katrina constituted a focusing event in the pandemic influenza domain, this particular finding further substantiates that large disaster events can have implications beyond their immediate policy domain. Birkland (2006) documents a similar phenomenon in his examination of policy change in the wake of the September 11, 2001 terrorist attacks. According to Birkland, the 9/11 attacks “opened two overlapping domains to a wide range of ideas: the homeland security domain and the public safety domain” (2006, p. 163). The Gulf Oil Spill example is also distinctive in that it highlights the capacity of focusing events to halt—not promote—policy change. This finding enriches extant theories of the policy process, which tend to assume focusing events are solely catalysts of policy change (Kingdon 2003; Birkland 1997).

Throughout this controversy, there has been no shortage of policy entrepreneurs. Senators John Kerry and Joseph Lieberman, Representative Edward Markey, and a host of other
congresspersons demonstrated unwavering commitment to emissions legislation. After leaving office, Al Gore remained equally, if not more, committed to the cause. His 2006 documentary, *An Inconvenient Truth*, became the third highest grossing political documentary film in American history and undoubtedly helped fuel the 2007 policy surge (Garofoli 2006). Yet an equally committed gang of skeptics neutralized these entrepreneurs, the most notable being Senator James Inhofe. And just as Gore’s *An Inconvenient Truth* helped mobilize public concern, Michael Crichton’s *State of Fear* offered a skeptic’s take on the issue.

Figure 5-3, which shows the number of stories published on the topic of climate change in *The New York Times*, indicates media attention again closely mirrored the observed pattern of agenda attention. The number of stories on climate change jumped from 929 stories in 2006 to 1,629 in 2007, the first year of the 110th Congress. This focus was sustained throughout 2008 (1,292 stories) and 2009 (1,324 stories), both peak years for climate change policymaking. And just as global warming fell from the agenda in 2010, so too did it fade in the media, as only 877 stories were published that year. Interestingly, an uptick in concern was recorded in 2011 (1,351 stories), although there is little evidence of renewed agenda attention at the present. While this research did not go so far as to conduct a quantitative assessment or content analysis of media coverage, a cursory overview of this converge suggests that it is difficult to typecast *The New York Times*’ reporting as either advantageous or disadvantageous to promoting global warming policy change. On the one hand, a wealth of articles touted the dangers of global warming as well as the latest findings of climate change experts; on the other, the views of global warming skeptics and those concerned with the economic implications of greenhouse gas regulation were well represented in the newspaper. Thus, a general relationship between coverage and policymaker attention is evidenced, although the specific implications of this coverage on the discussion of policy change is largely unclear.
Yet while all of these factors unquestionably played an important role in catalyzing global warming onto the policy agenda, ideology and partisanship best explain climate change’s fate as an agenda item. Global warming, and more specifically emissions standards, did not flourish as an agenda item until the 110th Congress, a session which saw the Democrats secure a majority in both the House and the Senate for the first time since 1995. The Democratic leadership made global warming a priority, taking aggressive steps to ensure a policymaking environment conducive to policy change. For example, months into the 110th Congress, Speaker Pelosi created the United States House Select Committee on Energy Independence and Global Warming, a special group with the authority to conduct hearings and otherwise stimulate discussion relating to climate change issues (The Select Committee on Energy Independence and Global Warming 2012). The election of Barack Obama served to strengthen this momentum, as the newly elected President made it clear global warming represented a top item in his domestic agenda.

Ironically, however, just as politics helped elevate global warming to the institutional agenda, so too did it cause the demise of climate-change policy. The inability of the federal government to enact substantive emissions legislation can be boiled down to partisan and regional politics, as Republicans, in general, rejected emissions standards almost on principle, and certain individual
legislators of both parties representing districts with high-emitting industries rejected proposed bills out of electoral necessity. It is precisely this dynamic that makes the global warming case so intriguing. Such politically charged environments marked neither of the previous cases. As of this moment, policy change seems unlikely in the absence of some grand political compromise—no matter the increasing significance of the threat of global warming.

The global warming case, in short, represents an example of policy failure. As it stands, the climate change domain is devoid of any emissions standards, despite decades of policy discussion. And while a number of factors prompted this gridlock, partisan divisions best explain American policymakers’ inability to secure emissions legislation. It is within this context that we now turn to the final section, policy implementation. How have federal bureaucracies dealt with the threat of global warming in the absence of emissions legislation? The next section examines attempts by the EPA to fill the policy gap left by the legislative branch. Specifically, the EPA has made a concerted effort to expand the scope of one of its most important authorizing statutes, the Clean Air Act, to accommodate the regulation of greenhouse gases.

**Implementation and Evaluation**

Despite a lack of legislation, EPA has taken steps to address greenhouse gas emissions. Specifically, EPA has used the Clean Air Act to regulate greenhouse gases. Originally enacted in 1963, the Clean Air Act authorizes EPA to develop regulations for airborne contaminants that are shown to be hazardous to human health. The law has been amended several times, the most significant revisions coming in 1970 and 1990. It currently allows EPA to regulate stationary pollution sources, such as factories or manufacturing facilities, as well as mobile pollution sources, such as automobiles or trucks (Environmental Protection Agency 2012c). In part spurred on by
judicial requirements, EPA presently believes greenhouse gases constitute an air pollutant and have thus used the Clean Air Act to impose emissions caps.

EPA did not always recognize the Clean Air Act’s applicability to greenhouse gases. In fact, calls to use the Act for this purpose originated from outside stakeholders. In 1999, the International Center for Technology Assessment (ICTA), an advocacy groups focusing on science and technology issues, issued a petition for rulemaking that requested the EPA to regulate greenhouse gases emitted from new motor vehicles. ICTA and others argued that greenhouse gases fit the definition of “air pollutant” codified in the Clean Air Act. Pursuant to statutory requirements for regulation, they also argued greenhouse gases endangered public health and welfare, and that it was “technically feasible” to reduce emissions in vehicles (National Association of Clean Air Agencies 2012).

After collecting public commentary for nearly two years, EPA published a public notice formally denying the ICTA’s petition on September 8, 2003. The EPA notice outlined a number of reasons why the Clean Air Act should not be used to regulate greenhouse gases. EPA held Congress did not intend for the Clean Air Act to be used to combat global warming and emissions, and that such regulation would ultimately be inconsistent with the Bush Administration’s climate change policy. They raised a number of other policy arguments as well, including the contention that regulating emissions from passenger cars was tantamount to imposing stringent fuel economy standards (EPA 2010; Moreno and Zalzal 2010; National Association of Clean Air Agencies 2012). Most telling, EPA concluded that “[u]ntil more is understood about the causes, extent and significance of climate change and the potential options for addressing it, EPA believes it is inappropriate to regulate [greenhouse gas] emissions from motor vehicles” (Qtd. in Environmental Protection Agency 2009, para. 18). This particular statement closely reflected the Bush Administration’s philosophy regarding global warming. In fact, a letter, which was leaked to the media in 2011, between a top-EPA official and President Bush implies that the Agency was actually
inclined to develop regulations, but might have been discouraged by the President (Power 2011). Assuming this is, in fact, true, the denied petition further demonstrate the deep politicization of the global warming issue, even at the bureaucratic level.

In the wake of the ruling, the ICTA, 13 other environmental organizations, 12 states, three cities, and one U.S. territory chose to engage a different policymaking venue and filed a petition for review with the U.S. Court of Appeals for the D.C Circuit. The Appeals Court denied the petition, thus prompting petitioners to appeal to the U.S. Supreme Court. On September 2, 2007, the Supreme Court ruled that the EPA absolutely had the authority to regulate greenhouse gas emissions from motor vehicles and that the reasons provided by the Agency for not regulating were simply not sufficient and were “divorced from the statutory text” (Qtd. in National Association of Clean Air Agencies 2012, p. 3). The Supreme Court held the Clean Air Act’s definition of air pollutants to be sufficiently broad to encompass greenhouse gases. What is more, the Court found EPA’s decision to reject was arbitrary in that it was not based on criteria outlined in the Clean Air Act, but in other—political—reasons. Denying regulation because of “uncertainty” would not suffice. Instead, EPA must provide a logical explanation and judgment as to whether or not greenhouse gas emissions contribute to global warming. Although the Court did not require EPA to regulate greenhouse gas emissions, it did prohibit the Agency from deferring a decision because of uncertainty alone. EPA, therefore, once again had to decide whether to regulate greenhouse gases. This time, however, its final conclusion (whatever it might be) would have to be grounded in the criteria codified in the Clean Air Act (National Association of Clean Air Agencies 2012).

The Supreme Court ruling reopened the EPA as a policymaking venue capable of addressing greenhouse gas emissions. However, procuring a positive decision was just as much a function of politics as science. Indeed, anecdotal evidence from this period implies that, so long as the Bush Administration remained in office, the EPA would likely refrain from regulating. For example, in a
Under the Clean Air Act, which was essentially used to alert the public and stakeholders that the agency was considering a new rule, the EPA Administrator wrote that “the ANPR demonstrates [that] the Clean Air Act, an outdated law originally enacted to control regional pollutants that cause direct health effects, is ill-suited for the task of regulating global greenhouse gases” (Qtd. in National Association of Clean Air Agencies 2012, p. 5). In other words, while EPA was required to consider greenhouse gas regulation, it did not believe such action was appropriate.

The election of Barack Obama in 2009 promptly changed the EPA’s anti-regulation policy. Soon after assuming office in 2009, the Obama Administration, and more specifically EPA Administrator Lisa Jackson, began reversing Bush-era environmental policies and practices (Felker 2009). Before any greenhouse gas regulations could be developed, the EPA had to first demonstrate greenhouse gases fell within the Clean Air Act’s definition of air pollutants. On December 15, 2009, EPA published an Endangerment Finding, which emphatically concluded six greenhouse gases, including carbon dioxide, met the Act’s definition of air pollutant and could be reasonably anticipated to endanger public health and welfare. In crafting its decisions, EPA explicitly addressed the enormous uncertainties associated with global warming, arguing that warming trends were real and that scientists have more than demonstrated the link between human greenhouse gas emissions and climate change. In fact, the Agency drafted a 500-page response to public commentary and grounded its final decision in a sweeping analysis of existing scientific findings on climate change (Moreno and Zalzal 2010).

EPA’s attention to detail is partially an outgrowth of the enormous uncertainty engendered by anticipatory policy problems and partially an outgrowth of the contentious political environment associated with global warming. A considerable onus existed for EPA to justify policymaking actions, especially in light of the fact that it did not constitute a typical policymaking entity.
Commenting on the complexity of the situation, one administration official, who chose to remain anonymous, indicated: “If the administration gets it wrong, we’re looking at years of litigation, legislation and public and business outcry. If we get it right, we’re facing the same thing. Can we get it right? Or is this just too big a challenge, too complex a legal, scientific, political and regulatory puzzle?” (Qtd. in Broder 2010, para. 9-10). Thus, in stepping into this policy void EPA had to contend with the weight of a decades-long policy conflict. While the Clean Air Act offered a rare opportunity to combat greenhouse gases, the EPA’s every move would be scrutinized and contested.

As evidenced in prior cases, questions pertaining to the applicability of existing statutes versus the need for new legislation are central to anticipatory policymaking. The enormous uncertainty and novelty associated with anticipatory problems logically raises important questions about the viability of existing regulatory mechanisms. It is exceedingly difficult to determine the best or most appropriate policy response to a problem that doesn’t exist in the present or, at least, is not fully developed. Yet, while global warming’s uncertainty no doubt played a part in the regulatory conflict, the EPA’s decision to regulate was equal parts politics and scientific decision making. John Broder (2010) of The New York Times reported that, upon assuming office, President Obama vowed to reduce greenhouse gas emissions with or without Congressional consent. The President essentially issued an ultimatum, offering Congress the opportunity to enact climate change legislation but threatening EPA regulation should lawmakers fail to act. According to Broder, “The deeply polarized Senate’s refusal to enact climate change legislation essentially called his bluff” (2010, para. 6). Thus, EPA regulation constituted an opportunity to circumvent the muddied waters of Congress and to accomplish an important part of the President’s domestic agenda. What is more, the blessing of the Supreme Court no doubt made this route an even more appealing option for the President.
Industry groups, as well as some members of Congress, took offense at the proposed regulatory standards. Fred Upton (R-MI), chairman of the House Energy and Commerce Committee, said: “This move represents an unconstitutional power grab that will kill millions of jobs—unless Congress steps in” (Qtd. in Broder 2011, para. 16). A contingent of Republican legislators, most of whom represented coal, oil, and gas states, mounted a multi-pronged legislative attack against EPA’s proposed regulation, which included, among other things, a series of resolutions that would effectively block the EPA from regulating greenhouse gases, a bill to formally amend the Clean Air Act to prohibit greenhouse gas regulation, and budget stipulations indicating EPA could not use any of its allocations on the regulation of greenhouse gas emissions (Prugh 2011; Jay 2011). Of these various proposals, the Energy Tax Prevention Act of 2011 (H.R. 910), which formally amended the Clean Air Act to bar EPA regulation, was approved by the House in April 2011, but failed to clear the Senate (Gribbin 2011; Kamalick 2011).

In the face of political turmoil, the EPA pressed on with the regulatory process. With its Endangerment Finding complete, it could now devise standards for automobiles as well as stationary sources under the Clean Air Act. In May of 2010, EPA, working in conjunction with the National Highway Safety Administration, announced the Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards Rule (LDV Rule). The rule required automakers to meet increasingly stringent motor vehicle emissions from 2012 to 2016. The standards are graduated, in order to afford manufacturers time to prepare for the new emissions requirements. Among its many provisions, the LDV rule has a “bank and trade” policy. Specifically, while all automakers are required to meet the imposed emissions standards, which peak at a fuel economy of roughly 34.1 miles per gallon in model year 2016, they can bank emissions credits should a particular fleet produce emissions below the standard. Those banked credits can be saved for future use or sold to
another manufacturer unable to meet its yearly emissions targets (Alphonso et. al 2010; Moreno and Zalzal 2010; Yacobucci and Bamberger 2010).

The LDV rule has only recently taken effect, making it impossible to fully evaluate the program’s success. Beyond mandating cuts in emissions, which obviously represents the program’s most important goal and implements predetermined benchmarks, EPA administrators believe the LDV rule will offer considerable benefits to consumers. Individuals purchasing a 2016 motor vehicle will save as much as $3,000 over the lifetime of a vehicle. Additionally, savings on gas purchases as well as improved vehicle reliability are expected (Moreno and Zalzal 2010).

While EPA is primarily responsible for regulating emissions, the Clean Air Act also includes a provision allowing the Agency to grant waivers to those states wanting to require more stringent fuel economy standards than imposed by the national government. In 2007, the Bush-era EPA denied a waiver request by the state of California that would have allowed the state to adopt more stringent fuel efficiency requirements. However, in June of 2009, EPA overturned the prior Administration’s denial after crafting an agreement between the state and a number of prominent automakers. The Agency further indicated that states that choose to adopt the same emissions standard developed by California will automatically be granted the waiver (Yacobucci and Bamberger 2010).

By declaring greenhouse gases a pollutant under the Clean Air Act, EPA officials were also required to develop rules regulating emissions from stationary sources, such as factories, manufacturing facilities, and electric power plants. Establishing rules for stationary sources constituted a far more complex and, in the eyes of many, important undertaking, as stationary sources are estimated to be responsible for nearly 69% of all greenhouse gas emissions in the U.S. What is more, these facilities are owned and operated by powerful corporate entities and often employ many Americans, again heightening political tensions (McCarthy and Parker 2010).
The Clean Air Act, as currently written, requires any new or recently modified stationary source emitting (or potentially emitting) 100 to 250 tons per year of pollutants, like lead, sulfur dioxide, and nitrogen dioxide (allowable emissions vary depending on the pollutant) to undergo a formal review and permitting process. As part of this review, facilities are required to install the “Best Available Control Technology” (BACT) or “an emissions limitation which is based on the maximum degree of control that can be achieve” (Environmental Protection Agency 2012b, para. 8). BACT is generally determined on a case-by-case basis, with the final decision reflecting a number of considerations, including energy, environmental, and economic impact (Environmental Protection Agency 2012b). State-permitting agencies are responsible for conducting this review process, although the EPA sets stringency guidelines (McCarthy and Parker 2010).

Ensuring that these provisions could meaningfully regulate emissions from stationary sources proved an arduous undertaking. Arguably the biggest point of contention was the threshold for determining an emitting facility, which, as described above, stood at 100 to 250 tons annually of the regulated pollutant. In the case of greenhouse gases, this threshold was exceptionally low, as these gases are typically emitted in far greater bulk than typical pollutant. In fact, this would effectively require residential and small commercial business to obtain a permit. EPA estimates as many as 41,000 new sources would require permitting each year if these rules were not amended. As many as 6.1 million new sources would likely require a permit if these rule were to stand. Prior to greenhouse gases, roughly 250 permits were being processed a year (Environmental Protection Agency 2010b; Coalition for American Jobs 2010). The EPA conceded this standard was not feasible and applying “thresholds to sources of GHG emissions would create immediate and insuperable administrative burdens for permitting authorities and perhaps absurd results” (Chappell 2010, p. 28).

In light of this dilemma, EPA chose to establish a new rule, which is referred to as the “tailoring rule,” that specifically applies to greenhouse gases. EPA chose to implement the new rule
in a series of phases. In the first phase, which was scheduled to be implemented between January and June of 2011, only new or modified facilities emitting or projected to emit more than 75,000 tons per year of greenhouse gases would be required to determine BACT. During the second phase, scheduled to occur between July 2011 and June 2013, permitting requirements would cover new construction projects emitting 100,000 tons per year of all greenhouse gases and existing facilities that increase emissions by at least 75,000 tons per year. This phase also explicitly aims to curb carbon dioxide emissions, requiring all facilities that emit at least 100,000 tons per year of carbon dioxide to obtain a permit. EPA estimates as many as 550 sources will be required to obtain a permit for the first time during this phase. An additional 900 permits were expected as a result of emissions increases in existing facilities. The EPA explicitly stated that emissions from small farms, restaurants, and most commercial facilities—save very large facilities—would not be regulated. Even so, the Agency proudly touted that stationary facilities responsible for 70% of the country’s emissions would be regulated under this rule. The final rule further stated the Agency would pursue expanded rulemaking in the future, in order to attempt to capture smaller sources. EPA officials noted that, if established, the new rule would cover emissions below 50,000 tons per year (Environmental Protection Agency 2011).

Upon completing the tailoring rule, EPA Administrator Jackson proclaimed: “After extensive study, debate and hundreds of thousands of public comments, EPA has set common-sense thresholds for greenhouse gases that will spark clean technology innovation and protect small businesses and farms” (Qtd. in Bravender 2010, para. 11). “There is no denying our responsibility to protect the planet for our children and grandchildren. It’s long past time we unleashed our American ingenuity and started building the efficient, prosperous clean energy economy of the future,” added Jackson (para. 12). Environmentalists widely supported the new rule. “It’s clear that EPA is trying to fine-tune it and make sure that the permit requirements are truly limited to the biggest sources. I
think the EPA is trying to act very responsibly, and they're trying to say to the Congress and the public, ‘We’re not the green monsters you think we are,’” stated Frank O'Donnell, President of Clean Air Watch (para. 19). Conversely, industry groups lamented the measure, again arguing it constituted an inappropriate application of the Clean Air Act. Howard Feldman, director of regulatory and scientific affairs at the American Petroleum Institute, stated: “The Clean Air Act is not designed to regulate greenhouse gas emissions, and this tailoring rule doesn't fix the problems with the Clean Air Act doing it’’ (para. 21).

The tailoring rule is a classic example of policy maintenance. By virtue of their enormous uncertainty and the fact that they often require long-range planning, anticipatory problems often require policy maintenance. Existing statutes often need to be recalibrated as these problems slowly reveal themselves over time. In the case of global warming, this type of maintenance was not necessarily engaged in response to the emergence of new information, but as a critical first step toward recalibrating the Clean Air Act to encompass greenhouse gases. Indeed, greenhouse gases constituted such radically different—such novel—pollutants that they required a revision of literally decades-old threshold requirements.

A number of other features of the EPA’s promulgation and implementation of the tailoring rule are worth noting. For one, the phased approach reflects both political pragmatism and perhaps even a luxury of anticipatory policymaking. Politically speaking, implementing a rule in stages diffuses some of the tension between the regulator and the regulated. Industry railed against emissions standards for decades and was obviously extremely apprehensive about the new EPA standard. While it was unlikely to assuage industry fears entirely, a phased approach did, at the very least, offer industry much-needed time to reconfigure strategic expectations and goals to meet new regulatory demands.
More importantly, the ability to pursue a phased approach speaks to the temporal dimensions of anticipatory problems. To be sure, few implementation schemes are simply “rolled out” overnight. As Schulman (1981) argues, most large-scale policy requires years to reach complete functionality. This does not, however, dismiss the fact that because they tend to emerge slowly over an extended period of time, anticipatory problems lend themselves to a phased implementation scheme. To be sure, global warming was, in the eyes of many, an immediate threat, and measures had to be taken quickly if EPA hoped to reverse long-term warming trends. However, this problem was not so pressing—such an immediate threat to public health and welfare—that failure to Act fast would endanger public lives. Instead, EPA had a fairly substantial window within which it could meet a set of predetermined goals and still make inroads, more or less, into curbing future trends. This luxury not only allowed the Agency to try to accommodate industry groups, it also afforded the agency time to gather more information in order to help develop a stronger policy response. Indeed, the final tailoring rule chose to forgo provisions regulating small sources—the third phase—until a future date.

Finally, the tailoring rule demonstrates that “policy maintenance” does not necessarily require participation from a legislature (Hogwood and Peters 1983). Indeed, in both of the prior cases discussed in this thesis, policy maintenance followed a pattern wherein the implementing agency or stakeholders requested that Congress make alterations to an existing statute, either in terms of its funding provisions or authorizing language. The global warming case deviates from this pattern. EPA explicitly avoided congressional participation, although its motives were likely more politically driven than an outgrowth of anticipation per se. Relying on Congress would be tantamount to conceding the issue entirely. At best, it would slow the regulatory process dramatically; at worst it would prevent the EPA from regulating emissions altogether.
Determining a BACT for greenhouse gases was a similarly complex process. In 2009, the EPA convened a special panel to help determine what pollution-reducing technology stationary sources should be required to install. However, the panel, which included an eclectic mix of industry representatives, environmentalists, and state regulatory agencies, was unable to reconcile “divergent points of view” and failed to procure a final recommendation (Qtd. in Lomax 2010, para. 2). One participant commented: “There were points in this process where you could not get enough Novocain to make it bearable” (Qtd. in Lomax 2010, para. 3).

Despite this potential setback, EPA once again forged ahead. In this instance, EPA provided industry substantial flexibility, allowing BACT to be determined on a case-by-case basis in regard to greenhouse gases. Put differently, industries would not be required to adopt any one specific technology. Industry representatives, who feared EPA would force them to adopt costly and unproven technologies, welcomed this decision. Commenting on what he believed was a reasonable measure, William Becker, executive director of the National Association of Clean Air Agencies, stated: “EPA’s guidance will provide industry greater certainty, quicker permitting decisions and a smoother path toward greenhouse gas implementation. This should put to rest the exaggerated claims of some stakeholders that greenhouse gas permitting will have disastrous economic consequences” (Qtd. in Schelmetic 2010, para. 8).

The political battle over the EPA’s regulation of greenhouse gas emissions continues to this day. On June 26, 2012, the U.S. Court of Appeals for the District of Columbia Circuit dismissed a series of four lawsuits filed by the states of Virginia and Texas, the U.S. Chamber of Commerce, and various fossil fuel interests charging the Clean Air Act did not give EPA authority to regulate greenhouse gas emissions and arguing that EPA’s decision to regulate was arbitrary. However, the Court concluded the Agency’s regulatory approach was “unambiguously correct” (Qtd. in Banerjee 2012, para. 4). The Court went on: “EPA simply did here what it and other decision-makers often
must do to make a science-based judgment: It sought out and reviewed existing scientific evidence
to determine whether a particular finding was warranted.... This is how science works” (Qtd. in
Banerjee 2012, para. 13).

In many respects, this ruling and the Court’s statement regarding the scientific process
represented affirmation of the painstaking steps EPA had taken to ensure that the Endangerment
Finding and other regulatory measures were grounded in strong scientific analysis. Indeed, in the
wake of the ruling, EPA-head Lisa Jackson stated: “I am pleased that the U.S. Court of Appeals for
the D.C. Circuit found that EPA followed both the science and the law in taking common-sense,
reasonable actions to address the very real threat of climate change by limiting greenhouse gas
pollution from the largest sources” (Qtd. in Banerjee 2012, para. 6). However, Texas Attorney-
General Greg Abbott harshly criticized the ruling, stating it “failed to rein in the unelected
bureaucrats at the agency who are holding our country's energy independence and fragile economy
hostage to a radical environmental agenda” (Qtd. in Banerjee 2012, para. 8). As Abbott’s statement
might imply, opponents of emissions regulation will continue to fight on, be it in the halls of
Congress or, quite possibly, through a Supreme Court appeal.

It is far too early to determine the effectiveness of the EPA’s efforts. Even so, this analysis
gives cautious reason to conclude that EPA has filled a critical void in the climate-change policy
arena by expanding the scope of existing statutory authority. While Congress can intervene and
clarify the EPA’s authority under the Clean Air Act, doing so would require breaking the current
partisan deadlock (McCarthy 2011). Such a prospect is unlikely, at least though the remainder of
2012.
Conclusion

The global warming case aptly demonstrates the continued applicability of many of the same explanatory factors identified in prior cases. An acute level of uncertainty engendered a political discourse rife with analogy, claims of crisis and proximity, and attempts to identify a sympathetic problem population. Further, uncertainty prompted narratives “linking” global warming to other problems, most notably national security threats. Agenda setting was protracted, spanning various Congressional sessions and Presidential administrations. Agenda setting was also indicator-driven, as surges in policymaker attention were fueled by a wealth of scientific reports and findings. The need to project outwards, sometimes decades into the future, necessitated the development of constructed benchmarks, or measures of policy effectiveness, such as the vast array of emissions models and scenarios. And, of course, regulatory agencies were required to revisit existing laws and provisions, a process known as policy maintenance, in order to recalibrate existing policy to accommodate global warming’s distinctive features. These patterns were, more or less, observed in all three cases.

Yet despite these similarities, the global warming case also represents somewhat of an outlier. Specifically, while all the above-described factors and concepts provide a well-rounded explanation of the policymaking dynamics associated with this case, “politics,” it seems, functioned as the trump card. Global warming represents the most politicized anticipatory problem examined in this study. Neither the pandemic policy domain, nor the nanotechnology domain, was inhabited by such powerful and entrenched interests, both inside and outside government. Indeed, global warming in many ways represents a “wedge-issue” (Achenbach and Eilperin 2011), and is perhaps tantamount to problems like health care reform, the economy, and even national security in the sense that both major parties have staked out nearly contradicting positions on this issue. It is, without question, the defining environmental issue of our times.
What is more, this noticeably charged political environment fueled an equally divisive problem definition debate, which pitted global warming against jobs and the economy. This narrative proved incredibly difficult to overcome, as proponents of emissions standards struggled to convince policymakers and the public that climate change legislation did not represent a threat to their self-interest—indeed to their wallet. Neither of the previous cases was marked by such powerful challenges problem definition.

It is precisely this feature—this remarkable politicization—that best explains the second distinctive feature of the global warming case: policy failure. The U.S. has yet to commit to an emissions reduction regime, and is widely perceived as a laggard in—if not an impediment to—climate policy internationally. The EPA’s recent regulatory actions clearly attempted to fill this void. Even so, although the recent Court of Appeals ruling certainly reaffirms the legitimacy of these actions, a concerted effort is underway to undermine EPA’s authority to govern this area.

Global warming has come to represent an important issue in the 2012 Presidential election, which, as of this writing, is only months away. The positions staked out by President Obama and his challenger, Republican nominee Mitt Romney, suggest the U.S. is no closer to achieving a “grand bargain” or even a semblance of consensus on the issue of greenhouse gas emissions. In an April, 2012, interview with Rolling Stone magazine President Obama indicated: “I suspect that over the next six months, [climate change] is going to be a debate that will become part of the campaign, and I will be very clear in voicing my belief that we’re going to have to take further steps to deal with climate change in a serious way” (Qtd. in Romm 2012, para. 4). The President also said: “[T]here’s a way to do it that is entirely compatible with strong economic growth and job creation – that taking steps, for example, to retrofit buildings all across America with existing technologies will reduce our power usage by 15 or 20 percent” (para. 4). Conversely, Republican-challenger Mitt Romney has promised to weaken the EPA’s power to regulate greenhouses gases and has openly questioned climate
science. (Volcovici 2012; Romm 2012). “My view is that we don’t know what’s causing climate change on this planet. And the idea of spending trillions and trillions of dollars to try to reduce CO2 emissions is not the right course for us,” stated Romney in October of 2011 (Qtd. in Romm 2012, para. 7).

The future of American climate-change policy hinges on partisan politics. President Obama and Mitt Romney have communicated divergent positions. Similar discontinuities exist within Congress. How long can the U.S. feasibly wait before aggressive anticipatory action is required? How soon until the much-feared tipping point is reached? And, most importantly, what political actions are needed to overcome this deadlock and broker a substantive emissions policy? For better or worse, only time—however much remains—will tell.
This thesis identifies anticipatory action as a distinctive type of policymaking, one that differs, in substantial ways, from other forms of government problem solving and intervention. The defining characteristic of the anticipatory policy problem is its temporal dimension. Specifically, anticipatory problems have yet to occur, although they are projected—anticipated—by some policy actors to emerge sometime in the future. This orientation toward the future means anticipatory problems are marked by varied levels of uncertainty, as policymakers cannot definitively determine if, how, when, or to what extent the problems needing to be remedied will materialize. Indeed, policymakers only truly “know” that these problems could occur sometime in the future and that, at least for the issues examined in this study, their occurrence can be extremely detrimental to human health, the economy, and the environment.

As evidenced in the nanotechnology, pandemic influenza, and global warming case studies, this temporal context and its associated uncertainty are overriding factors shaping the policy making process. In each case, the anticipatory problem influenced policy development throughout and within the several stages of the cycle by which issues arise, programs are formulated, and new laws become implemented. Accordingly, this concluding chapter examines and summarizes the core features of the anticipatory policy type by highlighting how anticipatory problems impact the problem definition, agenda setting, policy formulation, policy design, implementation, and evaluation phases of the policy process. Each stage and the dynamics it encompasses are reviewed separately so as to underscore the main features and impacts of the anticipatory problem type.

After presenting these characteristic conceptual and empirical features of anticipatory policy making, this chapter then goes on to consider the governance implications of a policy process that aims to be proactive rather than reactive. That government can and often does act in an anticipatory fashion has been amply demonstrated by this thesis. To what extent does the reality of anticipatory
policymaking show that government can refute the criticism that it is ineffective by virtue of its inherent reactivity? Should we expect—better yet, demand—that government engage in a greater amount of anticipatory policymaking? Scholars have long debated the core features of “good government,” a normative concept prescribing the way in which government ought to operate and be constituted to achieve optimum societal results (Osborne and Gaebler 1993; Denhardt and Denhardt 2007; Eggers and O’Leary 2009). It has been more than two decades now since the “reinventing government” movement got underway. In keeping with this tradition, I intend to argue that, in certain instances, anticipatory policymaking can improve public governance and therefore should be considered an important tenet of good government. It is an argument that must be made within limits, however, for anticipation, too, is a virtue that turns into a vice when carried too far or when applied in the wrong circumstances.

The final section in this chapter offers some thoughts as to how existing government institutions might be modified to better promote anticipation as a routine endeavor. Attempts to reform American government to facilitate greater anticipation and foresight are by no means novel (Toffler 1970; Bezold 1978, 2006; Guston and Sarewitz 2002). This closing section represents a modest attempt to “weigh-in” on the debate surrounding government reform and to outline a series of reform proposals based on the findings of this thesis.

Anticipation: A Distinctive Policy Type

Policy typologies are founded on the assumption that policy gives form to politics just as much as politics gives form to policy (Lowi 1964, 1972). The scholarly literature demonstrates that the various kinds of policy problems identified by Lowi and others (see, for example, Wilson 1995; Anderson 1997; Heckathron and Maser 1990; Miller 1990; Ripley and Franklin 1986, 1991; Frohock 1979; Shull 1983) correspond to characteristic political conflicts with crucial implications for interest
group mobilization, strategy, and participation. Similarly, by focusing on different policy types, analysts have used categorization as a parsimonious intellectual device for describing, patterning, and even predicting the behavior of government decision makers when responding to these conflicts and the substantive issues around which they are organized.

For purposes of clarification with respect to the literature presented in Chapter 2, Figure 6-1 provides a broad framework for identifying anticipatory policy as compared with other types of public policymaking. Two descriptive dimensions are used to differentiate policy types. The first dimension, occurrence of the problem, denotes the temporal aspect of a policy problem, which can be categorized as in the past (the problem belongs to a previous historical situation), present (the problem has an immediate impact on people’s lives), or future (the problem is projected to occur at a later time). The second dimension, understanding of the problem, underscores the fact that knowledge of a situation or condition can range from limited (meaning great uncertainty surrounds the problem’s nature and scope), to comprehensive (meaning policymakers have a fairly robust factual understanding of the problem).

**Figure 6-1: A Typology of Anticipatory/Nonanticipatory Policymaking**

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<th>TEMPORAL OCCURRENCE OF PROBLEM</th>
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<td>Compensatory</td>
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Compensatory policies are those that deal with problems that have occurred in the past and are marked by comprehensive understanding. Government cannot remedy problems in this domain because they concluded at some previous time. Rather, the focus is action after the fact to at least acknowledge the problem’s occurrence and perhaps to mitigate the long-term damage that it produced. Examples of this type of problem include episodes of historical wrongdoing such as
slavery, the displacement of Native Americans, or the internment of Japanese Americans during World War II. Compensatory policy may consist of symbolic action such as an official apology, or it can involve tangible government benefits and programs in the spirit of reparations for the injured group.

Reactive policy concerns those problems occurring in the present for which the level of substantive understanding can range from limited to comprehensive. The reactive category can be considered to subsume virtually all of the various policy types developed by Lowi and others (see, for example, Lowi 1964, 1972; Wilson 1995; Anderson 1997; Heckathron and Maser 1990; Miller 1990; Ripley and Franklin 1986, 1991; Frohock 1979; Shull 1983). Most of government’s work—from repairing roads to providing welfare benefits, policing neighborhoods to regulating industry—represents a reaction to ongoing problems. These problems vary enormously along different analytical dimensions, as past scholars have addressed, but here we are interested only to note that some are rather well documented and understood, while others are more mysterious in their character. Reactive policy issues make up the bulk of topics covered by the daily media.

Finally we come to anticipatory policy, which deals with problems projected to occur sometime in the future and marked by limited understanding. In many respects, these two features go hand-in-hand. By and large, problems yet to occur must present considerable uncertainty, as it is exceedingly difficult—if not impossible—to document their actual features. As argued throughout this thesis, it is precisely these dimensions of the problem—limited understanding and future occurrence—that define anticipatory policymaking.

It should be noted that two cells of Figure 6-1 remain empty because they do not designate meaningful policy types. In other words, there are no identifiable subsets of issues on the agenda in U.S. policy making consisting of either poorly understood past issues, or comprehensively understood future issues.
With these observations as backdrop, it is now in order to scrutinize the essential features of the anticipatory policy process as they have been revealed by the three case studies in this thesis.

A. Problem Definition

1. Analogy is readily employed to minimize the uncertainty inherent in anticipatory problems.

To limit uncertainty under conditions of anticipation, problem definers rely on analogies to compare forecasted threats to an array of known events and issues. Anticipatory problems cannot be associated with only one specific “type” of analogy or metaphor, as an array of analogy types were employed throughout the various case studies (Rochefort and DeLeo 2011; Stone 2002). Proponents of the new technology proclaimed nanotechnology “the next Industrial Revolution,” a historical analogy invoking a period of unprecedented economic growth and social change. Nanotechnology detractors, by contrast, compared it to the controversial example of Genetically Modified Organisms (GMOs). The GMO analogy was also, at least in part, a political assertion in that it sought to warn policymakers against ignoring public concerns when ushering in a new technology. In the global warming case, proponents of international cooperation and emissions regulations argued that what was needed was no less than the same type of leadership observed in World War II, a political analogy highlighting the need for committed policy entrepreneurs and issue advocates. Environmentalists further maintained that World War II was historically analogous to climate change because both events represented extraordinary international crises demanding widespread global cooperation and long-term policy commitment. Perhaps the most colorful analogy portrayed global warming as analogous to a baseball player on steroids. Although this analogy defies easy conceptual categorization, it represented a mean of dismissing claims that occasional cooling trends contradict contemporary theories of global warming.
Analogy has served as a powerful definitional tool for proponents and opponents of policy change alike. In the avian influenza case, both the organized interests advocating for substantive preparedness policies as well as those opposing preemptive government action analogized the current avian influenza situation to prior pandemic events. Those arguing that avian influenza constituted a pressing threat to public health held the virus resembled the strain that caused the 1918 swine flu pandemic—the deadliest pandemic in history. Conversely, those warning against premature action compared avian influenza to the 1976 swine flu debacle, which saw the Ford Administration launch a nationwide vaccination program for a pandemic that never was. Thus, just as a multiplicity of analogy types cropped up in the various case studies, so too did analogy serve a variety of policy ends.

2. *A heightened state of uncertainty gives problem definers almost free rein to strategically link existing “pet-solutions” to the anticipated problem.*

In their analysis of recurring problem-definition claims, Rochefort and Cobb (1994) observe that organized interests often strategize to attach ready-made solutions to emerging policy problems. Problem definers, in other words, possess preferred solutions that beget—or help “construct”—problems as they emerge. A very similar dynamic was observed in this thesis insofar as the great uncertainty associated with anticipatory problems afforded organized interests an optimal context for identifying pre-existing policy positions as feasible responses to the nanotechnology, global warming, and pandemic problems. And because these problems did not exist in the present, it was exceedingly difficult to dispute claims that a particular solution would mitigate or prevent the problem.

Global warming concerns prompted discussion of a wealth of “green technologies” that purportedly could be used to minimize warming trends. Recognizing basic capitalist misgivings that...
expanded regulation represented a danger to the economy, these advocates presented solutions that could be both environmentally friendly and profitable. What is more, the proposed technologies hailed from virtually every industrial sector—from health care to automobiles, agriculture production to building products—which was further evidence of the extent to which anticipatory problems at once provoke and accommodate a multitude of policy remedies. In the avian influenza case, global health advocates seized on concerns about a looming pandemic to argue that growing cases and deaths abroad demanded greater investment in third world health infrastructures—a policy solution they had been touting for years. This trend was evidenced—albeit somewhat in the converse—in the nanotechnology case. In this instance, nanotechnology was presented as the solution to a range of policy problems. Industries from an array of fields argued that with the help of nanotechnology they could solve scores of salient policy issues. Thus, no matter that the connection between the solutions being presented and the policy problem being anticipated is not always obvious or well supported by evidence, anticipatory issues open up new policy space within which established stakeholder interests find it easy to project pre-conceived programs and laws.

B. Agenda Setting

3. Anticipatory problems reveal themselves through the slow accumulation of indicators.

Problem indicators, which are measures or metrics of a social problem, represent one of a number of mechanisms of problem identification in the policy process (Kingdon 2003; MacRae 1985; Jones and Baumgartner 2005). As indicated earlier, Birkland (2006) predicts that problems in domains not prone to disaster—i.e., situations similar, in many ways, to this study’s conceptualization of anticipatory problems—will reveal themselves through the slow accumulation of standardized signs and measurements. Such indicators amass over time, allowing the development of policy that precedes onset of a full-blown problem event.
Of course, avian influenza represents the classic example of this trend. It is an example used by Birkland (2006) himself. As the number of avian influenza cases and deaths—indicators—slowly accumulated abroad, American policymakers were prompted to develop preparedness policy in anticipation of a potential pandemic. Although the indicators in the global warming and nanotechnology cases were not so “neat and tidy” as counts of cases and deaths, these problems were also revealed through accumulating indicators. The gradual procession of scientific studies identifying and describing nanotechnology’s risks fueled debates about how best to ready the nation for the technology’s potential human health, environmental, and even social dangers. Scientific studies performed the same function in the global warming case, as groups like the IPCC published reports tracking climate change trends. Indeed, something as simple as rising yearly temperature readings represented a powerful portent of climate change, and so these figures were commonly marshaled as both factual evidence and symbolic depiction of a looming problem.

The swine flu case, which was not presented in this thesis as an anticipatory problem type, demonstrated a different pattern of indicator accumulation. Here, the number of cases and deaths rapidly amassed over a period of months—mere weeks, in fact. American policymakers had little time to prepare for a coming event; the event was already unfolding in real time. The ensuing policy process can be best characterized as reactive, not anticipatory. Policymakers reverted to a crisis mode of response, centralizing decision making authority and even restricting individual liberties. By contrast, none of these actions would have been deemed suitable by policy makers for anticipatory circumstances, which are perceived as slow in the making and under long-term observation.
4. Focusing events from exogenous domains have the capacity to influence—promote or impede—the movement of anticipatory problems onto the institutional agenda.

Focusing events, or large-scale disasters that allow certain problems to “leapfrog” their way to the top of the policy agenda, are generally assumed to be policy domain-specific (Birkland 1997, 2006; Kingdon 2003). To clarify, an earthquake might prompt a sudden burst of attention to earthquake response and preparedness, while a nuclear meltdown might result in a surge of concern about nuclear power plants. An earthquake, however, is unlikely to catalyze nuclear policy to the top of the policy agenda, just as a nuclear meltdown is unlikely to do the same for earthquake policy. This being said, Birkland (2006) observed that in certain rare instances focusing events may be sufficiently large, or of a character, that they can promote various, seemingly unrelated, problems to the forefront of public discussion. As an example, he cites the September 11, 2001, terrorist attacks as relevant in spotlighting key issues in the transportation, aviation, and national security domains.

Far from a rare event, however, anticipatory problems appear to be inherently susceptible to the influence of focusing events occurring in exogenous domains. Anticipatory problems—any problem that has not occurred—cannot reveal themselves through a focusing event and remain an anticipatory problem. However, events in other domains did impact the agenda-setting processes in two out of the three cases that have been examined here. Evidence suggests that Hurricane Katrina served to heighten concerns with avian influenza, as policymakers were simply unwilling to be “caught off guard” on another pending emergency. Global warming was also influenced by an exogenous event, although, on this occasion, it did not catalyze the anticipatory problem onto the agenda but impeded policy change. Specifically, the Gulf Oil Spill effectively halted the most promising emissions legislation to date, the “American Power Act,” by undercutting the viability of offshore drilling as a policy concession within the law making process. That no comparable pattern was observed in the nanotechnology case may simply be testament to this field’s newness (and the
possibility that the right triggering event has not yet occurred). In general, however, it seems the fluid, unsettled nature of policy analysis regarding anticipatory problems creates permeable boundaries of interpretation. Under these conditions, understandings of what’s relevant and what’s irrelevant to discussion—and to the definition of the issue—can shift with the news of the day even if that news concerns a policy domain one might have previously considered extraneous.

5. Anticipatory problems incrementally access, and are afforded a prolonged tenure on, the policy agenda.

This study presented a variety of measures, including counts of committee hearing mentions, Congressional Record references, and bills introduced, providing an overview—a snapshot—of the overarching agenda-setting pattern associated with each of the three problems examined. While minor variations can be observed in each case, this study demonstrates that anticipatory problems tend to gain access to the policy agenda incrementally, often times over a period of a number of years. What is more, all of these problems were afforded a protracted term on the governmental agenda. In many cases, the anticipatory problem managed to hold a degree of congressional attention for upwards of four years.

Patterns of incremental agenda access and prolonged attention are by no means unique to the anticipatory problems. Major social issues, like health care reform, taxes, and the budget, regularly appear and reappear on the institutional agenda (often for protracted periods of time), a sequence described by scholars as the issue attention cycle (Downs 1972). Even so, this pattern remains an interesting characteristic of the anticipatory policy type, given that no agreed-upon problem is actually in need of solving by officials. Of special significance here is the distinctive temporal characteristic of anticipatory problems. In all of the cases, agenda attention rose in conjunction with the slow accumulation of problem indicators. This link was especially pronounced in the avian influenza case, where upticks in agenda activity mirrored the rise in cases and deaths. In
both the nanotechnology and global warming cases, policymaker attention peaked in the face of reports indicating the risks associated with these threats. Moreover, one could argue that because they have an elongated time horizon—meaning they aren’t likely to occur until sometime in the future—anticipatory problems invite policymakers to engage in the luxury of engaging a more measured and extended debate. This distinction is critical to differentiating anticipatory problems from the types of problems typically associated with disaster domains, like natural or manmade disasters (Birkland 1997). While both classes of problems can cause devastating harm, anticipatory problems accommodate a more deliberative agenda setting process—in effect, an institutionalized disposition of “wait and watch”—whereas disasters in the immediate insist on rapid reaction.

C. Policy Formulation

6. Anticipatory problems tend to be associated with a policy formulation process transcending multiple domains and jurisdictional venues.

Anticipatory problems produce decentralized policy formulation. To be sure, a core set of venues and interest groups steered much of the policy formulation process in each of the three cases. Public and global health interest groups and committees, like the Senate Health Education Labor and Pensions (HELP) Committee, were central to avian influenza policymaking. Working in conjunction with academic and business groups, like the NanoBusiness Alliance, the House and Senate Science committees drafted much of the 21st Century Nanotechnology Research and Development Act. And, of course, climate change activists and environmentally conscious policymakers, like former Vice President Al Gore, have long spearheaded efforts to reduce greenhouse gas emissions. Yet despite the presence of certain dominant groups, anticipatory issues attract and accommodate an array of “splinter” venues and interest groups which, given the
atmosphere of uncertainty, can not only argue they are somehow impacted by the problem but are vested with legitimacy as stakeholders and participants in the policy process.

In many respects, this phenomenon dovetails closely with the finding that anticipatory problems are particularly conducive to narratives wherein existing solutions get attached to a problem (Rochefort and Cobb 1994). It also bespeaks the essential openness of the policymaking environment when anticipatory matters come under review. For example, proponents of expanded funding for bioterrorism research calculatedly listed avian influenza as one of a number of human and manmade biological threats, thus allowing avian influenza discourse to percolate in domains and venues otherwise dedicated to homeland security and global terror policy. This enabled those stakeholders concerned with bioterrorism to ride the wave of concern associated with pandemic influenza. Nanotechnology cut across a multitude of domains, as organized interests set out to capitalize on prospective federal funding opportunities. And even global warming, a topic long synonymous with environmentalism, was construed by some to be a foreign policy threat, especially when considered within the context of proposals to regulate oil production. Thus, in all three cases American policymaking institutions willingly entertained a variety of sub-narratives, in turn fueling a decentralized policymaking process.

7. Policies formulated to address anticipatory problems require ongoing technical, factual, and political maintenance.

Beyond promoting decentralized formulation, uncertainty also demands that officials develop policy under the expectation that it will be revisited later and likely undergo substantial eventual alteration. This process, called policy maintenance, is especially important to anticipatory policies, which are crafted in the face of enormous information gaps (Hogwood and Peters 1983). In certain instances in the cases researched here, policymakers explicitly acknowledged this reality during the formulation stage by integrating mechanisms into their proposals that would mandate
future revisions. The best example of this was the 21st Century Nanotechnology Research and Development Act, which put “sunset provisions” on all major funding appropriations. The funding renewal phase, which occurred years after the 21st Century Nanotechnology Research and Development Act was originally enacted, was far from a mere formality and culminated in a series of amendments greatly bolstering risk research.

In the other cases, the maintenance process, while not as obvious, was still present. For example, National Strategy on Pandemic Influenza was written as a loosely structured “plan,” implying that policymakers were aware that the reality of pandemic crisis would bring about unforeseen dilemmas. (And, as a point of fact, the National Strategy was revisited in the face of an actual pandemic problem, the swine flu.) The global warming case is, of course, an outlier because no substantive policy change has occurred in this domain. Even so, retrofitting the “Clean Air Act” to cover greenhouse gas emissions required considerable policy maintenance at the bureaucratic level. Despite the fact that the EPA sought to avoid congressional action, the agency itself engaged in an extensive rulemaking process that culminated in new standards for cars and stationary emitters of greenhouse gases.

D. Policy Design

8. Because they are aimed at problems yet to occur, anticipatory policies take the characteristic form of strategies and preparedness plans.

Anticipatory policy designs are inherently proactive in that they present a course of action designed to either stave off a problem or, in the event that the emerging problem occurs, mitigate its impact. Policies with such a future orientation are best described as strategies or plans. At times, policymakers will literally label their anticipatory policy a “plan” or “strategy,” the best example being the National Strategy for Pandemic Influenza. The National Strategy amounted to a classic public
health preparedness plan in that it promoted the identification and surveillance of future avian flu outbreaks and offered a series of broad guidelines and incentives to help governments, private individuals, and businesses ready themselves for a potential pandemic.

More often, however, these concepts become embedded in the policy design itself without being stated directly in the title or text of a legislative or bureaucratic proposal. The 21st Century Nanotechnology Research and Development Act offered a series of incentives aimed at developing a nanotechnology R&D pipeline and eventually bringing products to market. Regarding the regulation of nanotechnology’s risks, surveillance and preparedness plans were again key components of the anticipatory policy. In fact, the 21st Century Nanotechnology Research and Development Act demanded consideration and identification of nanotechnology’s risk prior to marketization, a provision many argue constitutes a radically proactive approach to governance (Guston and Sarewitz 2002). Finally, global warming emissions policies set greenhouse gas reduction targets upwards of 50 to 100 years out, a strategic horizon rarely seen in other policy fields. In sum, strategy and planning represent core elements of the anticipatory policy design, whether packaged as such or not.

9. Policies designed to address anticipatory problems are marked by exceptional ambivalence regarding market-based versus regulatory policy instruments owing to the many inherent uncertainties surrounding issues of this type.

Policy instruments refer to the devices used by government to implement a policy (Howlett and Ramesh 2003). With confusion about the scope and nature of a problem, the optimal response and use of policy tools can hardly be definitive. The politics of a decentralized process of policy formulation means a myriad of demands on policymaking institutions at once. Policy outputs reflect these interest group demands, magnifying the likelihood of conflicting goals and policy instruments.
It is within this context that the thorny question of regulation versus market-based action comes under consideration in anticipatory policy making.

Often times, this confusion manifest itself the adoption of seemingly contradictory policy instruments, such as market-based mechanisms that seek to incentivize private actors to perform functions of interest to the government, and regulatory mechanisms that prohibit or restrict certain behaviors. The most extreme example is, of course, nanotechnology. In this instance, policymakers simultaneously called on industry to forge ahead with R&D and rapid marketization while demanding that the technology’s risks be minimized before its introduction into society. Similarly, market-based mechanisms (e.g., tax breaks) were commonly incorporated in global warming policies as the way to entice industries to “go green.” However, just as government sought to incentivize these groups, regulated industries chided emissions standards as detrimental to their economic success. This trend was evidenced in the avian flu case, as a host of policy proposals focused on reducing liability restrictions on the private industries responsible for developing vaccines. While these provisions were no doubt aimed at ensuring a rapid “ramp-up” time to vaccine development, they did so at the expense of public health risk regulation, most notably the requirement that medicines demonstrate safety before reaching the market.

E. Policy Implementation

10. Heightened uncertainty magnifies the likelihood that implementing agencies will need to contend with crucial political and administrative questions about the applicability of existing statutes versus new oversight regimes when anticipatory issues are under consideration.

This particular feature of the anticipatory problem type could also be interpreted as a question of policy design because it speaks to the actual content of public policies. However, as evidenced in the various cases, questions relating to the viability of existing authorizing statutes
versus the need to create new oversight regimes became especially prominent during the implementation stage. Although it is not uncommon for policy conflicts to bleed into the implementation stage, bureaucratic agencies were especially prominent in these debates (Howlett and Ramesh 2003). It was also likely a testament to the fact that government bureaucrats were far more adept at weighing-in on technical scientific questions, which were made all the more complex by the enormous confusion surrounding anticipatory problems. Bureaucrats commonly questioned whether they could expand the scope of existing authority in order to regulate the anticipatory problem in question. This dilemma is a logical outgrowth of conditions of uncertainty. To what extent are anticipatory policy problems different from the types of problems already being regulated? On the one hand, a truly novel problem will defy, or at least challenge the use of, existing regulatory rules. On the other hand, many new problems actually reprise classic governmental themes and can thus be easily monitored under the auspices of existing regulatory law. Ultimately, however, it is exceedingly difficult for bureaucrats to resolve this quandary in the absence of an actual policy problem.

Questions relating to the viability of existing statutes versus the need for new legislation were especially pronounced in the nanotechnology case. EPA officials struggled to determine whether existing authorizing legislation, most notably the Toxic Substances Control Act (TSCA), could be used to regulate nanoparticles. While many stakeholders argued that nanoparticles did not technically constitute new chemicals and thus could be regulated through TSCA, others believed the Act was ill equipped to apply to particles of such radically different size and structure. EPA found itself at the center of a similar controversy in the global warming case, although this instance focused on the viability of the Clean Air Act (CAA). Over the course of at least eight years (a period spanning two presidential administrations), EPA examined and debated the capacity of the CAA to regulate greenhouse gases. Under the Obama Administration, EPA determined CAA could in fact be used
for these purposes and chose to forge ahead with regulation, despite objections from congressional Republicans. While most environmentalists would have greatly preferred Congress enact a new statute regulating domestic climate change at the domestic level and a global treaty curbing global warming on the international level, political realities necessitated that they comprise an alternative policy solution. In the pandemic influenza case, the balance between old and new policy tilted differently. The President went so far as to use an emergency declaration to skirt the boundaries of existing public health legislation and ultimately provided the Secretary of HHS with unprecedented authority to unilaterally authorize quarantine facilities outside of immediate hospital settings.

11. In the absence of new policy, a great amount of conflict in anticipatory policy development will center on the implementation stage, in particular the use or neglect of statutes already in existence.

This feature of the anticipatory policy type is partially an outgrowth of conflict over existing statutory law versus the need for new legislation. In instances where policymakers choose not to develop new policy, which occurred in both the nanotechnology and global warming cases, stakeholders of all kinds will mobilize during the implementation stage to shape the application of existing statute in line with their particular problem definitions and policy goals. In the case of anticipatory problems, the lack of a manifest problem affords organized interests considerable flexibility in constructing arguments concerning the applicability of existing law. This situation echoes Rose’s (1993) contention that, in the absence of a material problem, political actors “can exploit uncertainty about the future by willfully asserting faith in their proposals, which have yet to be proven wrong” (p. 91).

This phenomenon was boldly exhibited in the global warming case. After Congress failed to provide legislation regulating greenhouse gas emissions, EPA determined the CAA could be used to combat global warming. While the statute had to be adapted to better account for the distinctive
features of greenhouse gases, EPA was able to act in the face of legislative gridlock. Similarly, although this particular debate has yet to be fully settled, EPA set out to apply TSCA to nanomaterials after it became apparent that neither major revisions to the Act nor an entirely new statute was likely. This trend was not observed in the pandemic influenza case simply because major policy change was achieved via the *National Strategy on Pandemic Influenza* and other statutes, thus negating the need to stretch the bounds of existing statutory law.

F. Policy Evaluation

12. *The absence of a manifest problem necessitates that policymakers devote special attention to constructing measures or benchmarks that can be taken as convincing indicators of policy progress.*

For a policy to be deemed successful during the evaluation stage, changes in the problem condition must be connected to the introduction of a particular policy intervention (Anderson 2003). In public policy making, demonstrating this causal relationship is typically rife with difficulties, and the metrics used to determine success are often disputed. However, it is especially difficult to evaluate anticipatory policies because they set out to address nonexistent problems. Without an identifiable social ill, it is virtually impossible to determine conclusively the effectiveness of a government intervention. Yet because policy appraisal is derived from the evaluation process, the onus remains to demonstrate the effectiveness of anticipatory policies.

To this end, the three cases demonstrate that, in the absence of a tangible policy problem, policymakers will construct benchmarks that can be used as surrogates for measured progress against a “real” policy problem. Although these benchmarks varied from case-to-case, they all reflected the challenge of defining policy success in the here and now when the overall framework of discourse was future-oriented. Soon after establishing the *National Strategy for Pandemic Influence*, Bush Administration officials developed scorecards measuring the relative state of pandemic...
preparedness. In the global warming case, emissions reduction proposals were benchmarked against models forecasting future warming trends. These models allowed policymakers to project the future success of policies, despite the fact that it was impossible to predict actual warming trends. And in the nanotechnology case, market forecasters provided various projections of the potential economic impact of nanotechnology R&D in the wake of the 21st Century Nanotechnology Research & Development Act’s passage. These future projections were critical to legitimizing the Act, as the technology was not projected to reach its full economic potential until several years down the road.

In sum, where tangible measures of success are absent, policymakers will create their own focusing on process activities as well as provisional and manufactured outcomes.

To summarize this analysis, Figure 6-2 lists key features of the policy process and their presence or absence in the nanotechnology, pandemic influenza, and global warming cases.

<table>
<thead>
<tr>
<th>Features of Anticipatory Policy Process</th>
<th>Nanotechnology</th>
<th>Pandemic Influenza</th>
<th>Global Warming</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Use of analogy</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. Promotion of “pet solutions”</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. Slow indicator accumulation</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>4. Cross-domain focusing event</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. Incremental agenda access, prolonged tenure</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6. Trans-domain policy formulation</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>7. Importance of policy maintenance</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>8. Strategy and planning as policy content</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>9. Confusion over market-based v. regulatory instruments</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>10. Debate over existing v. new statutes/regulations</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>11. Political and administrative conflict surrounding implementation of existing statutes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>12. Constructed evaluation measures</td>
<td>Yes</td>
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</table>
Anticipation: The Road to Better Government?

The three cases explored in this thesis present anticipation as a laudable policymaking goal. However, a handful of recent examples suggest that anticipation may not always such a good thing. One of the most glaring examples is the 2003 invasion of Iraq. Deemed a “preventative war” or “preemptive war,” the Bush Administration justified the invasion on the grounds that it would forestall Iraq’s use of weapons of mass destruction (WMDs), which were allegedly hidden in clandestine laboratories scattered throughout the Middle Eastern country. Yet these WMDs never were found, and to its critics the Bush Administration’s preemptive strategy amounted to arguably the biggest foreign policy debacle of the 21st century (Caraley 2004). As of this writing, 4,474 American soldiers have been killed in Iraq, while more than 44,000 have been seriously wounded (White 2012; Jean-Louis et al. 2012). Total long-term costs are estimated to be anywhere from $3 to $5 trillion (Clifton 2012). Many believe the war also permanently undermined the United Nations by demonstrating the ability of a single nation to act unilaterally and defy established norms of international engagement (“Chirac…” 2003).

Similarly, one could say the concept of anticipation was manipulated in 2005, when Republican politicians launched a national campaign to privatize Social Security. President George W. Bush called on Congress to pass legislation that would, among other things, allow younger workers to divert portions of their payroll taxes into personal retirement accounts, which could later be used to fund their retirement. The President argued that Social Security faced impending (if only eventual) insolvency, so Congress needed to act immediately to stave off crisis. He stated: “Each year we put off the coming crisis, the higher the price our children and grandchildren will have to pay. Leaving our children with such a mess would be a generational betrayal” (Qtd. in Przbyla 2005, para. 2).
Democrats, however, countered that the President’s claims of crisis were nothing more than a manufactured attempt to drum up support for his domestic agenda. Then House Democratic Leader Nancy Pelosi scolded the Bush Administration by stating: “The American people deserve an open and honest debate over the future of Social Security. All they are getting from the Bush Administration is half-truths and misinformation” (Qtd. in Sutherland 2005, para. 21). Former U.S. Senator Edward Kennedy complained that the Bush Administration “tries to make a crisis on any political problem” (Qtd. in Sutherland 2005, para. 9). Senator Kennedy also called the Social Security crisis “nonexistent” and deemed it a transparent ploy to stimulate support for a private investment program (Qtd. in Sutherland 2005, para. 10). In the end, the American public was unconvinced that privatization was either necessary or advisable, the Democrats won the day, and Social Security remained unchanged. Even so, the Social Security example boldly illustrates the downside of anticipation and its associated rhetoric.

Misguided application of the anticipatory approach can also be seen when the practice of preventative medicine, a staple of Democratic health care reform proposals, is carried too far (House Democrats 2012; Krauthammer 2009). Preventative medicine tries to identify and treat health ailments during their early stages, as opposed to waiting for smaller problems to evolve into potentially life threatening diseases (National Library of Medicine 2011). It is often justified on economic grounds. Proponents are quick to note that late-intervention “emergency care” constitutes a large portion of wasteful health expenditures (Coyner 2011).

Yet many critics make the case that the medical system overemphasizes prevention in many areas. Welch, Schwartz, and Woloshin (2011), for example, argue that modern medicine’s heightened ability to detect and identify abnormalities has prompted an epidemic of overdiagnosis with many patients receiving treatments doing them more harm than good. These authors cite a wealth of instances of overdiagnosed diseases, including diabetes, hypertension, and an array of cancers. One
study cited by the authors found that overdiagnoses of breast cancer are, in fact, more prevalent than actual cancer diagnoses. According to the president of the Royal College of General Practitioners, Iona Heath:

The evidence review suggests that for every 2000 women invited to screening for 10 years one death from breast cancer will be avoided but that 10 healthy women will be overdiagnosed with cancer. This overdiagnosis is estimated to result in six extra tumorectomies and four extra mastectomies and in 200 women risking significant psychological harm relating to the anxiety triggered by the further investigation of mammographic abnormalities. (Qt’d. in Welch et al. 2011, p. 88)

In other words, preventative medicine is not only failing to make us healthier, but is likely making us sicker under some circumstances.

Anticipation, then, seems both a potential blessing and curse. Questions pertaining to how government ought to operate are central to the literature on “good governance,” a normative stream of political science that prescribes solutions aimed at improving public policy development and administration. Good governance studies are rooted in the assumption that structural and cultural alterations can improve public-sector performance. Osborne and Gaebler (2002) have proposed that government should adopt an “entrepreneurial model” wherein public institutions “constantly use their resources in new ways to heighten both their efficiency and their effectiveness” (2002, p. xix). Denhardt and Denhardt (2007) advocate for a “New Public Service” approach to public management, one that sees citizens not as consumers or clients of public services, but rather as important participants in the policy process. Eggers and O’Leary (2009) establish what they describe as a roadmap to policy success, highlighting a number of common policymaking “traps” that commonly derail policy initiatives, including overconfidence, parochialism, complacency, and a general lack of creativity. While all of these studies vary in terms of how they define good governance, many call on government to become more nimble and strategic (Osborne and Gaebler 2002; Eggers and O’Leary 2009). Thus, although they never use the term “anticipation,” one could
persuasively argue that these scholars, many of whom have backgrounds in the business or consulting fields, would see anticipation as a welcome characteristic of government.

Consistent with the work of these scholars of good governance, this thesis is also partially inspired by criticism of the public sector, in particular the contention that government falls short because it is inherently (and merely) reactive. In 1970, futurist Alvin Toffler articulated this very theme in his best-selling book *Future Shock*. Toffler argued that the rise of information-producing technologies during the Industrial Era fundamentally altered the context of governance and social interaction. Widespread access to information and knowledge threatened to create a decisional overload—an overwhelming amount of information rendering American policymaking institutions incapable of effective action. To cope with this development, Toffler wrote, the populace had to fundamentally redefine the core tenets of American democracy and adopt a system of “anticipatory governance.” Anticipatory governance refers to a system of practices and procedures in which citizens and policymakers work together to collectively shape the future. Anticipatory governance is founded on a mutual sense of future consciousness, meaning that policymakers and citizens identify and assess information about problems and opportunities that loom ahead when choosing productive courses of action (Bezold 2006).

Toffler’s (1970) concern with information and, more specifically, the ability of government institutions to process information, dovetails with this study’s observation that anticipatory problems reveal themselves through problem indicators. Toffler stated that access to information is critical to shaping the future. Similarly, this study found that before any action could be taken on an anticipatory problem, that problem must first reveal itself through a variety of measures or indicators. In short, cultivating knowledge about the future by gathering, synthesizing, and analyzing information is of vital importance. In the absence of information, discourse about the future becomes reduced to mere speculation, thus negating the utility of even the most well intentioned
plans or strategies and inviting the kinds of distortion that can arise due to politics or excessively ambitious goal-setting. However rational and efficient the logic of anticipatory intervention by government, experience also shows it is quite tempting to project the benefits of policy action without giving due consideration to possible unintended outcomes. Again, the Iraq War seems a good case in point.

The dominant policy actors and institutions in the global warming, pandemic influenza, and nanotechnology cases all demonstrated noteworthy concern with gathering and analyzing information about the future. This is likely an outgrowth of the cultural and professional norms associated with these particular policy domains, which all vest an enormous amount of legitimacy in science. Information gathering and analysis of empirical data are central to scientific process. Moreover, science strives to describe, explain, and, ideally, predict—anticipate. In each of these cases, indicators were generated through a variety of scientific processes, including epidemiology, risk assessment, and sophisticated climate models. Participants working in these domains—whether trained as scientists or sitting as policymakers on important committees—were adept at processing and analyzing this information, often grounding their arguments in scientific findings. Without these institutionalized scientific practices, the policymaking institutions and actors investigated in this study would not have even been aware of future issues surrounding nanotechnology development, avian flu, and global warming, much less would they have been capable of legislating on them.

Anticipation is thus inherent to the work of certain policy domains. Public health is founded on the objective of anticipating future disease outbreaks. Historian Elizabeth Etheridge (1992) shows that the Center for Disease Control & Prevention (CDC) was created as a “sentinel” for public health, scanning the globe for emerging viruses. Similarly, in the area of technology, R&D is justified on the assumption that government investment will pay future dividends once new products go to market. Climatologists are trained to analyze weather trends and make inferences as
to their future implications. In policy domains with longstanding scientific and technical traditions, anticipation is not only the norm, it is in fact essential to the successful operation of decision making institutions.

In this regard, the three cases examined in this thesis suggest the system functioned precisely as recommended by Toffler (1970), albeit minus the extensive public collaboration feature he also extols. Government institutions gathered information and used that information to help them shape the future. Yet, as described above, the system does not always anticipate appropriately. Indeed, even in domains accustomed to scientific thinking, like health and medicine, anticipation can go very wrong. To clarify, access to information cannot guarantee successful anticipation. For this study also demonstrates that anticipatory policymaking hinges on effective political facilitation.

The reality of politics can buttress or foil the best-laid plans of anticipation. This study cannot conclude, with most proponents of anticipatory governance, that anticipation always represents a desirable good. In some instances, we should not expect government—or any other social institution—to be able shape the future. However, we should always expect government to at least consider the future. We should expect government to entertain questions relating to the implications of any emerging threat or policy initiative. We should expect government to have the capacity to gather and analyze information suitable for forecasting the trajectory of present trends. And, if need be, we should expect government to produce policy outputs capable of preventing, or at least preparing us for, looming danger. Most important, the tired cliché that government is, and can only be, reactive should not lower our expectations of government’s capabilities. Anticipation is not a function that falls outside the standard process of public policy making, properly conceived.

But if good government is our goal, then we would be wise to better equip government to anticipate in ways both methodical and accurate. Anticipation should not be a specialty of the “science” domains; it can be practiced across the entire spectrum of government. Empowering
government to anticipate requires strengthening information-gathering, processing, and communication capabilities on an institutional level. With this principle in mind, the next section offers a number of modest reforms to improve government’s ability to generate indicators and information about the future. It is not supposed these reforms would transform government into some oracular entity, devoid of political conflict. Instead, they simply aim to infuse the policy process with better information about the future. For better or worse, how policymakers choose to interpret and respond to this information will always remain a question of politics.

**Institutionalizing Futurism**

Finally, if we are to institutionalize anticipation as a routine activity on the federal level, there are three reforms that would go far in strengthening government’s information-gathering, analysis, and evaluation capacities. The first reform would embed policy analysts and experts charged with considering future policy problems within congressional committees. The second proposal calls for creation of a cabinet level position responsible for analyzing and reporting anticipatory policy issues to the U.S. President. The third proposal does not call for institutional change, *per se*, but instead argues for a large-scale policy initiative to broaden the federal government’s overall understanding of problem indicators.

**Congress**

As noted in the introduction to this thesis, Congress has previously experimented with institutionalizing anticipation. In 1976, the Congressional Clearinghouse on the Future was founded as a Legislative Service Organization (LSO) and charged with helping “members develop legislative initiatives to address emerging policy challenges, and…communicate with their constituents on long-range issues” (Woodrow Wilson Center 2002, para. 1). While the Clearinghouse stewarded a number
of policy and planning endeavors, including development of a comprehensive catalogue of major emerging issues facing our nation, it was dissolved in 1994 in the wake of a series of rule changes relating to LSOs (Woodrow Wilson Center 2002).

Based on the research in this thesis, it seems implausible that establishing a separate legislative entity for the purpose of anticipation could achieve that result. The case studies show it is experts and specialists working in relatively narrow policy domains who typically initiate and spearhead the anticipatory policy process, as these actors are commonly the ones who first identify emerging problems hidden from view by other groups in society. These individuals and groups have the competence to analyze complex indicators pertaining to emerging trends in their respective fields and, equally important, their professional, industrial, and corporate standing gives them legitimacy as policy participants. Their role, then, is just the opposite of generalists who would be broadly tasked with anticipating emerging issues in a multitude of fields under simultaneous observation.

With this fact of specialization in mind, my recommendation is to embed relevant experts within the structure of congressional committees and to charge them with the primary task of anticipating emerging trends and issues specific to the business of the committee to which they are attached. This notion of embedded expertise has been applied in other anticipatory governance models, the most notable example being Guston and Sarewitz’s (2002) “real-time technology assessment” approach. Real-time technology assessment places social scientists and philosophers within laboratory settings, tasking them with fostering discourse regarding the likely social and ethical implications of the products and technologies being developed. The basic premise underlying this model is that by fostering these discussions “upstream,” critical problems might be identified during the R&D process, as opposed to waiting for unpleasant surprises after a product has already gone to market.
Congressional anticipation specialists, an apt if awkward designation, should be hired as full-time committee staff and made responsible for identifying anticipatory problems, gathering empirical information relating to emerging problems, aiding in the analysis and interpretation of information provided by external stakeholders, and helping to forecast the long-term policy implications of policy proposals—anticipatory or otherwise. This information should be relayed, in turn, to committee members, who will thereby be better equipped to legislate in regard to anticipatory problems and to develop an orientation to the future as a fundamental aspect of their institutional role.

Executive Branch

Whereas my first reform described an institutional adaptation that was decentralized in character, i.e., embedding experts in a far-flung array of different legislative committees across two houses of Congress, a second reform takes a more centralized approach to stimulating the federal government’s development and use of anticipatory capacity. Executive Branch agencies and departments, such as the CDC, EPA, and, one might well imagine, CIA, are often among the first institutions to anticipate new problems facing American decision makers. In fact, certain bureaucratic agencies, by their very nature, have a built-in surveillance function along with highly trained professional staff capable of gathering and interpreting a variety of complex problem indicators. Yet, as no less an example than September 11, 2001, has shown, such departments often fall prey to a “silo” phenomenon that rigidly categorizes incoming information according to programmatic jurisdiction (Kettl 2007; Osborne and Gaebler 2002). Meanwhile, anticipatory problems can straddle multiple domains and necessitate that policymakers recognize the fact of interconnectivity. Particularly if the Congress, by its structural composition, must be specialized in
its approach to anticipation, there needs to be a place within government for a more integrated and coordinated orientation that can offset the dangers of insularity.

Few institutions within U.S. government are better suited to develop comprehensive strategies dealing with overlapping social problems than the Executive Office of the President. No president can afford the luxury of narrow specialization or niche expertise. The presidency is government’s premier “big picture” assignment. Accordingly, my third reform is to recommend creation of a cabinet level position on emerging policy problems. The occupant of this position should advise the President directly on anticipatory strategy and preparedness plan development. In effect, this advisor would act as an ombudsman between the categorical agencies of the federal bureaucracy and the President, based on consistent monitoring of agency needs and concerns with regard to anticipatory threats inside their respective substantive domains. Although this post should not usurp the right of department heads and others to communicate with the President, the regular streaming of information through a centralized cabinet post could promote quicker identification of overlapping concerns. The promised benefit is no less than a more cohesive interagency awareness and response at the highest level of the polity.

Understanding of Problem Indicators

Spurred by the growing number of economists working in national government and policy institutes, interest in developing a comprehensive set of “social indicators” surged in the 1970s. This so-called social indicator movement strived to develop robust statistical measurements of social problems, which could then be used to evaluate the effectiveness of social welfare programs and other government initiatives. Interest in social indicators waned throughout the 1980s, as scholars and policymakers alike began to question the goal of quantifying all social problems in an accurate and timely way. Despite a minor revival in the 1990s, the social indicators movement has yet to
reclaim the enthusiasm with which it was once associated (Cobb and Rixford 1998; Andrews et al. 1989).

This present study does not support renewal of the social indicator movement, nor any notion that all policy problems can be reduced to statistics. At the same time, however, my research has documented that sound policy indicators are vital to identifying and responding to anticipatory issues. Therefore, my third and final proposal recommends that the federal government launch a comprehensive initiative to improve the identification, analysis, and evaluation of all current problem indicators used to track conditions in different sectors of society. This initiative should encompass the entirety of the federal government—all agencies, offices, and commissions—and solicit input from inside and outside the public sector about the scope of the inventory process and its conclusions. The goal of this project is not to question the validity of specific indicators, although that may well be one outcome of the process, but rather to strengthen the use of indicators in general within the federal government, be it through data collection techniques, fieldwork, or any other activity leading to the identification of new problems.

The details of such an unprecedented and far-reaching review are obviously beyond the bounds of this thesis project. The process of anticipation depends on a myriad of measures—ranging from raw numbers, to standardized social surveys, to published scientific reports—and it would behoove the national government to recognize the multitude of indicator types that exist and to assess their distinctive contributions within the policymaking function. Moreover, this initiative should consider mechanisms for improving the communication of problem indicators to the general public, as theories of good governance never fail to link enhanced citizen participation to effective democracy (Denhardt and Denhardt 2007; Osborne and Gaebler 2002). In sum, if government can gain a better understanding of the metrics of anticipation, it will be in a better position to take action against emerging threats. Or, as they say, forewarned is forearmed.
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