FROM FARMS TO FRONTLINES: THE TRANSFORMATION OF BIOSECURITY POLICY IN THE UNITED STATES

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Abstract

The transformation of biosecurity policy in the United States reflects evolving challenges at the intersection of agriculture, public health, and national security. This thesis examines the evolution of U.S. biosecurity, focusing on the impacts of industrial animal agriculture and the lessons learned from the COVID-19 pandemic. Biosecurity—traditionally aimed at protecting populations and environments from biological threats—has broadened significantly, shifting from a state-centric, threat-driven framework to a more global, interconnected approach that incorporates human, animal, and environmental health.

This thesis employs discourse analysis and securitization theory to investigate how biosecurity threats are framed, the referent objects they aim to protect, and the implications of these constructions. It highlights the pivotal role of industrial poultry production in the emergence of zoonotic diseases, tracing the historical development of the industry and the paradoxical role of biosecurity measures that both mitigate and perpetuate systemic vulnerabilities. The analysis of governmental strategies, including the National Biodefense Strategy and USDA initiatives such as the “Defend Our Flocks” campaign, underscores the influence of agricultural biosecurity on national pandemic preparedness plans.

Key findings reveal that U.S. biosecurity policies have been shaped by industrial agriculture's priorities, often emphasizing containment and surveillance over proactive measures addressing root causes of biological risks. While these strategies have adapted to lessons from zoonotic disease outbreaks, including avian influenza and COVID-19, they frequently reflect securitized frameworks that prioritize economic stability and trade over ecological and social dimensions of health governance. The thesis advocates for integrating the One Health approach into biosecurity frameworks, emphasizing systemic reforms to address the interconnected drivers of biological threats.

By critically analyzing the evolution of U.S. biosecurity policy, this thesis contributes to understanding the complex dynamics of managing biological risks in an era of heightened global interdependence. It suggests the need for further exploration of practices that balance public health imperatives with ecological and economic considerations.

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Chapter 1: An Introduction to Biosecurity

1.1 Introduction

In early 2024, an outbreak of highly pathogenic avian influenza (HPAI) began sweeping through poultry farms across the United States, raising significant concerns for both agricultural stability and public health. Farmers reported devastating losses as the virus spread rapidly among flocks, triggering state and federal containment measures to limit further transmission. The economic repercussions were immediate, disrupting food supply chains and underscoring the fragile interdependencies between agriculture, trade, and public health. While outbreaks of avian influenza are not new, the scale and frequency of recent events have amplified their significance within contemporary biosecurity discussions.

These outbreaks exemplify the evolving challenges of managing biological threats in a globalized and interconnected world. They also highlight the limitations of existing biosecurity policies, which often focus on reactive measures rather than preventive strategies that address the root causes of such events. As zoonotic diseases like avian influenza continue to emerge, they prompt critical questions about the adequacy of the United States' approach to biosecurity, particularly in the wake of lessons learned from COVID-19.

Biosecurity, traditionally understood as the protection of populations and environments from biological threats such as infectious diseases, invasive species, and bioterrorism, has long been a cornerstone of U.S. public health and national security policy (White House, 2018). The COVID-19 pandemic revealed the strengths and profound limitations of existing biosecurity policies, forcing a reevaluation of the Nation's biosecurity strategy (World Health Organization [WHO], 2024). As the virus spread rapidly across borders, overwhelming healthcare systems and disrupting global economies, the weaknesses of conventional biosecurity frameworks became evident. The pandemic has thus accelerated a rethinking of biosecurity, prompting the United States to expand its focus from a largely state-centric, threat-driven approach to one that recognizes the globalized, interconnected, and multisectoral nature of biological risks.

Before COVID-19, U.S. biosecurity policy was shaped by concerns over agricultural threats and various outbreaks of animal diseases such as avian influenza (Collier et al., 2004). In the early 2000s, events such as the 2001 anthrax attacks in the U.S. led to the establishment of key legislation, such as the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, which aimed to strengthen the nation's defenses against biological threats (Bush & Perez, 2012; United States Customs and Border Protection [CBP], 2024). However, these measures were often reactive, designed to mitigate immediate threats rather than anticipate and prevent the emergence of new ones. The pre-pandemic biosecurity framework was primarily structured around protecting the homeland through border controls, targeted surveillance, and emergency preparedness plans focused on high-consequence pathogens (Koblentz, 2010).

COVID-19 disrupted this paradigm, exposing the inadequacy of an isolated, national response to a pandemic in an era of unprecedented global mobility and environmental change (WHO, 2024). The pandemic exposed critical vulnerabilities in public health infrastructure, gaps in pandemic preparedness, and the challenges of managing the spread of a zoonotic disease in an interconnected world (Gostin et al., 2020). As the virus spread, traditional methods of containment—travel restrictions, border closures, and quarantine measures—proved insufficient to slow its global transmission. This realization has driven a significant shift in how the United States now views and addresses biosecurity threats.

At the core of the U.S. biosecurity strategy is the need to conceptualize and define threats. But how does the United States conceptualize biosecurity across governmental organizations? Different agencies, such as the Centers for Disease Control and Prevention (CDC), the Department of Homeland Security (DHS), and the Department of Agriculture (USDA), may prioritize distinct aspects of biosecurity based on their mandates (Youde, 2021). For instance, while the CDC focuses on preventing infectious disease outbreaks, the USDA emphasizes safeguarding food supplies from diseases that threaten livestock and crops. This leads to an intricate web of policies and strategies that, while occasionally fragmented, are designed to address a wide array of potential biosecurity risks.

To understand how the United States prepares for, deals with, and prevents biosecurity threats, it is essential to examine both the reactive and proactive measures taken by the government. As demonstrated during the COVID-19 pandemic, reactive measures such as rapid vaccine production and contact tracing proved critical but also revealed shortcomings in preparedness (WHO, 2024). Proactively, the U.S. government has placed increasing emphasis on strengthening surveillance systems, building domestic biomanufacturing capacities, and enhancing early warning systems for zoonotic diseases (Rutjes et al., 2023). This shift toward preventive biosecurity underscores the need for a whole-of-government approach to deal with the complexities of biological threats. One of the central questions in biosecurity is the definition of the referent object of security—who or what is being secured? In the case of the U.S., the referent object has expanded from protecting the nation's agricultural infrastructure to securing public health, economic interests, and even national security (Gronvall, 2022). This broader focus has led to new interpretations of what constitutes a biosecurity threat. The pandemic highlighted how intertwined the concepts of health security and national security have become, as a pathogen like COVID-19 can disrupt both human life and the economic and political stability of a country (Leitenberg, 2021). But how is the nature of the threat defined? Why is it considered a threat, and who determines this? Government agencies, scientists, and policymakers play pivotal roles in shaping the discourse around biosecurity risks. For example, zoonotic diseases such as COVID-19 are classified as significant biosecurity threats because of their potential for rapid global transmission and high mortality rates (WHO, 2024). The U.S. government, guided by expert input from organizations like the World Health Organization (WHO) and the World Organisation for Animal Health (WOAH), frames these diseases as existential threats to both human and economic security (Youde, 2021). The heightened awareness of such threats post-COVID has led to intensified calls for more robust global cooperation, better data sharing, and investment in One Health strategies that recognize the interconnectedness of human, animal, and environmental health (Rutjes et al., 2023).

Finally, what responses are suggested for dealing with these threats? The U.S. biosecurity strategy has increasingly favored comprehensive, multi-sectoral responses that involve not only federal agencies but also state governments, private corporations, and international partners. These responses include enhancing public-private partnerships, such as those seen during Operation Warp Speed, improving genomic surveillance, and investing in resilient health infrastructure (Forbes, 2023). In addition, the U.S. government has sought to modernize its legal and policy frameworks to account for emerging technologies such as synthetic biology, which could be both a tool for and a threat to biosecurity (Gronvall, 2022).

1.2 Research Methodology

This thesis explores the evolution of biosecurity policy in the United States, with a specific focus on the role of animal agriculture and the impacts of the COVID-19 pandemic. It seeks to understand how the pandemic has reshaped the referent object of security, redefined the roles of governmental and international institutions, and prompted the development of new strategies that address both the immediate risks of emerging pathogens and the broader ecological and socioeconomic factors that exacerbate them. My central research question is *"How has the United States' conceptualization of biosecurity evolved over time?"*

The study employs discourse analysis as its primary method to critically examine the evolution of U.S. biosecurity policies. Foucauldian discourse analysis and securitization theory provide the analytical framing, offering tools to explore how biosecurity threats are constructed, the referent objects they aim to protect, and the broader implications of these constructions. Together this method and framing provide complementary tools for analyzing the construction of biosecurity threats and the policies designed to address them, particularly in the context of agricultural practices and their influence on national frameworks.

Discourse analysis serves as the primary method for examining the language and narratives embedded in key U.S. biosecurity documents, including the National Strategy for Pandemic Influenza (2005), the National Biodefense Strategy (2018, 2022), and various USDA campaigns such as "Defend Our Flocks." This analysis is grounded in a Foucauldian tradition, which views discourse as both a product of and a mechanism for exercising power (Foucault, 1972; Fairclough, 1992). Specifically, the study investigates how these texts construct biological threats, define referent objects of security (e.g., humans, livestock, ecosystems), and articulate policy responses.

The analysis focuses on identifying key rhetorical strategies and framing devices, such as the invocation of zoonotic spillover risks or the portrayal of pandemics as existential threats. By examining these narratives, the study uncovers the implicit assumptions, priorities, and power dynamics underlying biosecurity policies. For instance, documents are analyzed to determine whether they prioritize economic stability, public health, or ecological sustainability—and how these priorities align or conflict with one another. The approach is informed by scholars who emphasize the role of discourse in shaping political and social realities, such as Hajer (1995) and Jasanoff (2004).

Securitization theory complements the discourse analysis by providing a framework to understand how certain issues, such as zoonotic diseases, are framed as security threats. This approach, derived from the Copenhagen School (Buzan, Wæver, & de Wilde, 1998), examines the processes through which actors—such as government agencies—successfully present issues as requiring extraordinary measures to protect a specific referent object of security. In the context of this thesis, securitization theory is used to analyze how U.S. biosecurity policies have shifted from protecting agricultural assets to addressing broader concerns such as public health and bioterrorism.

The primary sources of data for this study are official government documents, including strategies, reports, and campaigns from agencies such as the USDA, CDC, and DHS. These texts are treated as "data" for the discourse and securitization analyses. Additionally, a review of peer-reviewed literature provides the theoretical foundation and contextual framing for the study.

To ensure clarity in analysis, a distinction is made between materials that inform the theoretical framing and those that constitute the primary data:

- Framing Materials: These include academic articles on securitization theory, Foucauldian discourse analysis, and biosecurity (e.g., Foucault, 1972; Buzan et al., 1998; Hinchliffe & Bingham, 2008). These sources contextualize and guide the analysis.
- Data: These are the primary texts under analysis, such as the National Biodefense Strategy (2018, 2022) and the USDA's "Defend Our Flocks" campaign. These texts are dissected to uncover their discursive and securitizing elements.

The analysis moves beyond summarizing these documents to critically interrogating their assumptions and implications. This critical approach ensures that the study contributes not only to understanding biosecurity as a policy domain but also to broader debates about power, governance, and risk in contemporary society. While this methodological approach allows for a rich analysis of the construction and prioritization of biosecurity threats, it is limited by its reliance on textual analysis. The study does not include interviews with policymakers or practitioners, which could provide additional insights into the implementation and operationalization of these strategies.

By combining discourse analysis with securitization theory, this thesis offers a framework for analyzing the evolution of U.S. biosecurity policies. This methodological approach highlights the interplay between language, power, and policy, uncovering the often-overlooked influence of agricultural practices on contemporary biosecurity frameworks.

In modeling my analysis, I drew on McDonald's (2013) *Discourses of Climate Security*, particularly his structural approach to examining how specific issues are framed as security threats. McDonald's framework highlights the importance of analyzing not just the language used to securitize an issue but also the institutional and socio-political contexts that shape which narratives gain prominence and how they are operationalized. Following this approach, I examined U.S. biosecurity policies through the lens of discourse analysis and securitization theory, paying close attention to the institutional settings—such as the USDA, DHS, and CDC—that influence the construction of biological risks.

McDonald's method of tracing competing narratives and their alignment with existing power structures informed my analysis of how biosecurity discourses prioritize certain threats, such as zoonotic diseases or bioterrorism, while sidelining others, like ecological sustainability. By applying McDonald's structural approach, I critically assessed how institutional and rhetorical dynamics interact to define the referent objects of security, such as humans, livestock, or ecosystems, and how these definitions shape the resulting policy responses. This modeling allowed my analysis to move beyond textual critique to consider the broader power asymmetries and governance structures underpinning biosecurity discourses.

Guiding this research and analysis was a sub-set of working questions: Within different biosecurity discourses, how is the referent object of security defined (who/what is being secured) and what responses are suggested for dealing with that threat?

The first chapter explores the evolution of the concept of biosecurity in the United States, tracing its origins from protecting agricultural assets to its current broad application in public health, especially post-COVID-19. It discusses how biosecurity frameworks shifted from focusing primarily on bioterrorism and agricultural threats to a more comprehensive approach that includes zoonotic diseases and pandemic preparedness. The chapter highlights the weaknesses exposed by the COVID-19 pandemic and examines how different government agencies like the CDC, USDA, and DHS approach biosecurity with varied priorities.

Focusing on the industrialization of poultry farming in the U.S., the second chapter examines how large-scale poultry production has contributed to the emergence of zoonotic diseases. It details the historical development of the poultry industry, the role of biosecurity in preventing disease outbreaks, and how intensive farming practices have driven the need for stringent biosecurity measures. The chapter also explores government regulations and initiatives, such as the USDA's "Defend Our Flocks" campaign, which aims to standardize biosecurity practices across the poultry sector (United States Department of Agriculture Animal and Plant Health Inspection Service [USDA APHIS], 2024).

In the third chapter, I shift to a comparative analysis of various U.S. government pandemic preparedness plans, including the National Strategy for Pandemic Influenza, National Strategy for Countering Biological Threats, and National Biodefense Strategies (2018 & 2022). The analysis reveals that these plans have been deeply influenced by biosecurity protocols developed in the livestock sector, such as surveillance systems, early detection mechanisms, and containment strategies. The chapter further discusses the adoption of the One Health framework, which acknowledges the critical interconnections between human, animal, and environmental health, and evaluates how these strategies reflect broader trends in integrating agricultural practices into public health governance.

Despite extensive work by scholars to describe the ways biosecurity is constructed and used to justify actions and its impacts, the wide range of situations it can be applied to makes the concept difficult to understand and apply to policy. Biosecurity discourses primarily differ based on the referent object of security depending on what is valued by those producing the theory. By examining the shifts in U.S. biosecurity policy from a historical and contemporary perspective, this thesis aims to contribute to ongoing discussions of biosecurity, specifically those relating to who/what is secured and why.

1.3 Literature Review

1.3.1 What is biosecurity and how is it defined?

Biosecurity is fundamentally a simple concept that has existed for centuries: keep life (bio) protected from disease (security). The exact origins are difficult to track down and interpretations vary between countries. Since the United States is the focus of this research, the evolution and interpretation of biosecurity in the U.S. will be the primary focus. The use of the term biosecurity in the U.S. initially referred to efforts aimed at protecting crops and livestock from infectious disease (Baker, 2009). In this context, the term was largely focused on ensuring the health of livestock and crops, particularly against invasive species or pathogens that could disrupt domestic agriculture. 2001 is widely viewed as the point in time when the use of the term biosecurity began to be applied to human health and safety. The terrorist attacks on September 11th and the subsequent anthrax attacks, struck fear in Americans regarding not only National security but biological security as well (Bush & Perez, 2012). Widespread instances of pandemic disease surprisingly have played less of a role in the application of the term biosecurity to the protection of human health.

The modern understanding of biosecurity now integrates elements of biological warfare defense, pandemic preparedness, and bioterrorism prevention. It is increasingly connected to policies aimed at safeguarding both human and environmental health from a wide range of biological threats (Fidler & Gostin, 2008). In particular, the One Health framework, which links human, animal, and environmental health, has reinforced the interdisciplinary nature of biosecurity, acknowledging that biological threats are not confined to any single sector (Bates, 2010). This shift in focus has been accompanied by growing federal oversight and investment in biosecurity infrastructure, including initiatives from agencies such as the Centers for Disease Control and Prevention (CDC) and the Department of Homeland Security (DHS) (Peters, 2006).

Biosecurity entails a comprehensive set of strategies and measures aimed at safeguarding human and animal health, as well as ecological integrity, from the threat of infectious diseases and harmful biological agents. This involves proactive interventions to prevent the introduction, spread, and impact of pathogens across various sectors, including agriculture, public health, and environmental conservation. As described by Braun (2013), biosecurity consists of practices, procedures, knowledges, and techniques that are concerned with securing and protecting valued forms of life from disease and other harmful biological risks. Most forms of biosecurity measures can be classified as pre-emptive practices of bio-exclusion, which “seek to intervene in the conditions of emergence” or disrupt a link in the chain of disease transmission and infection (Braun, 2013, p. 53). These practices exist within a system of disease surveillance where constant monitoring seeks to identify the next potential disease threat before it reaches epidemic levels. Through a combination of surveillance, risk assessment, quarantine protocols, and biocontainment measures, biosecurity aims to minimize the risk of disease outbreaks and mitigate their socio-economic and environmental consequences.

1.3.2 Why is disease securitized?

The securitization of diseases, such as infectious pathogens, reflects the recognition of their potential to pose significant threats to national and global security. Scholars have noted that diseases are securitized due to their capacity to disrupt social order, destabilize economies, and undermine state sovereignty. According to Davies and Youde (2018), the securitization of diseases involves framing them as existential threats that require extraordinary measures beyond the scope of traditional public health responses. This securitization process is driven by political factors, as governments seek to assert control over perceived threats and mobilize resources for disease prevention and control efforts (Lakoff, 2008). Additionally, the securitization of diseases is influenced by broader geopolitical dynamics, including concerns about bioterrorism and the potential for diseases to spread across borders and impact international relations (Kamradt-Scott, 2015). These concerns are rooted in past bioterrorism events such as the 2001 anthrax attacks, code-named "Amerithrax," where letters laced with anthrax were distributed through the mail and resulted in the deaths of five Americans and the hospitalization of 17 others (Federal Bureau of Investigations [FBI], 2016).

The expansion of biosecurity to encompass threats of bioterrorism and biological invasion alongside the traditional focus on protecting animals and crops from disease reflects the evolving nature of biological risks and the recognition of interconnected global security challenges. This broadening of scope can be attributed to several factors. Firstly, the increasing awareness of the potential for deliberate misuse of biological agents for terrorist purposes has prompted a reevaluation of biosecurity practices to address these new threats (Barker, 2009). Secondly, globalization and increased interconnectedness have heightened the risk of invasive species and diseases spreading across borders, necessitating a more comprehensive approach to biosecurity (Hulme et al., 2013). Additionally, advancements in biotechnology have raised concerns about the accidental or intentional release of genetically modified organisms or engineered pathogens, further emphasizing the need for robust biosecurity measures (Engel-Glatter, 2013). By incorporating these emerging threats into the biosecurity framework, policymakers and practitioners can better anticipate and mitigate the diverse range of biological risks facing societies today. By securitizing diseases, governments and international organizations aim to justify interventions such as border controls, quarantine measures, and emergency response protocols to mitigate the spread of infectious agents and protect public health and national security interests.

1.3.3 Evolution of biosecurity over time and place:

The concept of biosecurity has undergone a significant evolution over time and across various geographical contexts, reflecting changes in perceptions of risk, advancements in scientific knowledge, and shifts in socio-political dynamics. Early manifestations of biosecurity can be traced back to ancient civilizations, where rudimentary practices such as quarantine and sanitation were employed to mitigate the spread of infectious diseases (Hinchliffe et al, 2012). However, it wasn't until the latter part of the 20th century that biosecurity emerged as a distinct field of study and practice, driven by concerns surrounding emerging infectious diseases, bioterrorism threats, and the processes of globalization.

Use of the actual term biosecurity originated with animal agriculture practices before later being applied to the realm of human health. In agricultural contexts, the evolution of biosecurity measures has been influenced by the intensification of farming practices and the globalization of food production systems. The industrialization of agriculture has heightened the risk of disease outbreaks and facilitated the transboundary spread of pathogens (Allen & Lavau, 2015). Consequently, biosecurity protocols have become essential components of livestock management, focusing on strategies such as biocontainment, vaccination, and disease surveillance to prevent the introduction and transmission of infectious agents (Boklund et al., 2018).

Similarly, within the realm of public health, the concept of biosecurity has evolved in response to emerging zoonotic disease threats and concerns about bioterrorism. As the One Health framework began to gain traction in the 1990s, a greater focus was placed on the interconnectedness of human, animal, and environmental health with specific attention being paid to the increasing presence of zoonotic diseases which spread from animals to humans. Greater knowledge about the origins of the HIV/AIDS epidemic and H5N1 outbreaks during this time served as critical examples as to why understanding this interconnectedness was so important. Other key events that took place around this time included the terror attacks of September 11, 2001 and subsequent anthrax incidents which prompted a reevaluation of biosecurity practices, leading to efforts to enhance surveillance capabilities, strengthen laboratory biosafety and biosecurity measures, and develop rapid response protocols for disease outbreaks (Cole & Dodds, 2020). As noted by Fidler (2004), governing global health security involves navigating complex political, economic, and ethical considerations, as nations grapple with issues of sovereignty, equity, and access to medical resources. The evolution of biosecurity as a concept reflects the dynamic interplay between scientific progress, socio-political dynamics, and global health imperatives. By tracing its historical trajectory and examining its diverse applications across different contexts, scholars can gain valuable insights into the multifaceted challenge of managing biological risks and safeguarding the health of human, animal, and environmental populations.

1.3.4 Theoretical Underpinnings of Biosecurity

Biosecurity is both a conceptual framework and a set of practices that intersect with the broader dynamics of power and governance, drawing extensively from the theories of biopolitics and securitization. These theoretical foundations illuminate how biosecurity operates as a mechanism for managing life, controlling disease, and addressing threats within geopolitical and social contexts. By understanding these theories, we can critically examine the narratives, assumptions, and implications underpinning contemporary biosecurity policies.

Michel Foucault's theory of biopolitics, articulated in his lectures on *Security, Territory, Population*, offers a critical lens for understanding biosecurity as a form of governance that regulates life at the population level. Foucault (2007) argues that modern states exercise power not solely through coercion but through the regulation and optimization of biological and social processes, often under the guise of securing public health. Biosecurity fits within this framework by deploying measures such as surveillance, quarantine, and vaccination to mitigate biological risks and maintain social and economic stability. These strategies extend state control over life itself, shaping populations through mechanisms that balance protection with exclusion (Foucault, 2007; Braun, 2007).

A key critique of biosecurity within this biopolitical framework is its differentiation between those deemed safe and those perceived as threats. For example, during the COVID-19 pandemic, surveillance technologies and lockdown measures disproportionately impacted marginalized communities, highlighting the exclusionary nature of biosecurity (Braun, 2007;

Wenham et al., 2020). Such measures not only protected populations but also reinforced existing social hierarchies by imposing greater burdens on vulnerable groups. These dynamics reflect the dual function of biopolitical governance: securing life while simultaneously enabling control and exclusion.

The securitization framework, developed by the Copenhagen School, complements the biopolitical perspective by exploring how health risks are transformed into security issues. Securitization theory emphasizes the speech acts and institutional processes through which certain issues—such as pandemics or zoonotic diseases—are framed as existential threats requiring extraordinary measures (Buzan, Wæver, & de Wilde, 1998). In the context of biosecurity, securitization legitimizes policies like travel bans, digital surveillance, and emergency legislation by framing health crises as threats to national or global stability.

This process of securitization was evident during the COVID-19 pandemic, where governments worldwide enacted rapid and often militarized responses, including border closures, contact tracing, and quarantine enforcement. These measures expanded state authority under the pretext of protecting public health but often prioritized security over civil liberties, exacerbating inequalities between and within nations (Ingram, 2005; Wenham et al., 2020). Wealthier nations, for instance, leveraged their resources to secure vaccines and enforce stringent biosecurity measures, further marginalizing low-income countries and communities (Singh et al., 2022).

By framing disease outbreaks as existential threats, securitization also reshapes governance practices, concentrating power within state and institutional actors while marginalizing alternative approaches, such as community-led health responses. This prioritization reflects broader dynamics of geopolitical power and the reinforcement of global hierarchies in health governance.

Biosecurity also has a significant geopolitical dimension, where disease management intersects with global power structures and international relations. The establishment of initiatives such as the Global Health Security Agenda reflects efforts to address health risks on a global scale. However, these collaborations often prioritize the interests of powerful nations, perpetuating inequalities in resource distribution and access to healthcare (Ingram, 2005). For example, the inequitable global distribution of COVID-19 vaccines underscored the geopolitics of biosecurity, with wealthier countries securing large quantities while low-income nations faced shortages (Singh et al., 2022).

Within this context, borders play a central role as dynamic sites of biosecurity intervention. The management of biological threats extends beyond traditional territorial boundaries, emphasizing the movement of pathogens and their capacity to redefine notions of sovereignty. This aligns with Foucault's (2007) assertion that biopolitical governance increasingly focuses on managing flows and risks rather than static territories. Strategies such as health surveillance at borders, quarantine protocols, and digital tracking systems reflect this shift, demonstrating how biosecurity measures reinforce state authority while responding to the fluid dynamics of global health threats.

The interplay between biopolitics and securitization highlights the inherent tension within biosecurity practices: the balance between protection and control. While these measures aim to safeguard populations, they often do so by reinforcing power structures that marginalize vulnerable groups and prioritize state interests. Scholars such as Braun (2007) and Singh et al.,

(2022) emphasize the need to critically evaluate these dynamics, questioning whether biosecurity policies sufficiently address equity, sustainability, and social justice.

Understanding biosecurity through the lenses of biopolitics and securitization reveals that it is not merely a technical endeavor but a deeply political practice. As states continue to navigate the challenges of emerging health threats, there is a pressing need for biosecurity frameworks that balance security imperatives with ethical considerations, promoting policies that are both effective and equitable.

Chapter 2: Poultry Production and Biosecurity

Initially focused on the containment of pathogens and prevention of bioterrorism, biosecurity has expanded to encompass a broader understanding of how human activities, ecosystems, and animal health are interconnected (Behravesh, 2016). Nowhere is this interconnectedness more evident than in the industrialization of poultry production in the United States (Allen & Lavau, 2015). Large-scale poultry farming, driven by the demand for cheap meat and eggs, has created environments that foster the rapid spread of pathogens, posing risks not only to animal health but also to human populations (Gilbert et al., 2017). High-density confinement of animals, combined with globalized supply chains, has been linked to outbreaks of zoonotic diseases like avian influenza, which can jump from animals to humans, highlighting a key biosecurity challenge in modern food systems (Gilchrist et al., 2007).

The average American consumes nearly 100 pounds of chicken every year, more than double the amount of beef and pork (National Chicken Council, 2021). While chicken reigns supreme as American's meat of choice, this is a relatively recent development. Prior to 1990, beef led in annual consumption. Chicken's rise in popularity can primarily be attributed to its increase in availability and affordability that grew out of industrialization efforts in the 1900s. As the number of chickens produced in the U.S. grew at an astonishing rate, the number of farmers shrunk. This can be attributed to the consolidation of chicken farms by integrators which are agricultural firms that control every aspect of production from the eggs hatched to the processing center (Boyd & Watts, 1997). The rapid growth of industrial chicken production was sparked by mass scientific innovation in the feed industries (Boyd, 2001). This enabled farmers to raise chickens with more efficient feed-conversion ratios and shorter growth timelines. From 1930 to 1960 and beyond chicken husbandry transformed into chicken science making Herbert Hoover's

1928 goal of “a chicken in every pot” a reality. With this rapid growth in chicken production came an equally rapid growth in the number of diseases transmitted from animals to humans (Wallace, 2016). This can be attributed to the confinement systems in which chickens are raised and the involvement of humans in their care.

It is currently estimated that 60% of known infectious diseases and 75% of new and emerging diseases in people come from animals (Centers for Disease Control and Prevention, 2021a; Behravesh, 2016). That translates to roughly 450,000 illnesses in the United States alone that can be directly linked to animals (Centers for Disease Control and Prevention, 2020). Recent outbreaks of Swine Flu (H1N1) and Avian Flu (H5N1) are examples of such epidemics, highlighting the interconnectedness of human and animal health systems (Gilbert et al., 2015; Wallace, 2016). As rates of globalization have increased, so has the emergence and spread of new zoonotic diseases (Allen & Lavau, 2015; Wallace, 2016). Many of these new diseases arise due to humans and animals living in closer proximity to one another, increasing the chance of zoonotic spillover (Braun, 2007; Behravesh, 2016). This proximity is partially attributed to humans occupying a larger share of the natural landscape through deforestation and urbanization (Hinchliffe & Bingham, 2008), but also to the rise in industrial animal agriculture, which creates high-density environments that facilitate pathogen transmission (Gilchrist et al., 2007; Wallace, 2016).

Due to the global nature of disease and its wide-ranging political, economic, and social impacts, zoonotic disease emergence has increasingly been analyzed through a geopolitical lens. For example, Gilbert et al. (2015) highlights how industrialized livestock systems create conditions for zoonotic disease emergence and spread across borders. Similarly, Ingram (2005) explores how disease outbreaks are shaped by geopolitical factors, including resource inequalities and the prioritization of national security in global health governance. These analyses emphasize that zoonotic diseases are not just biological events but are deeply embedded in global political and economic systems.

2.1 The Emergence and Growth of the American Poultry Industry

Prior to 1930, chickens consumed for meat were a by-product of egg production (Boyd & Watts, 1997). Intentional husbandry of broiler (meat) chickens was almost unheard of in the United States. This began to change when a small number of farmers started to raise broiler chickens for commercial purposes. By 1935 chicken was still considered a delicacy that was only enjoyed on occasion with the average American consuming less than half a pound per year (Boyd & Watts, 1997).

There were two main factors that led to the growth of the chicken industry from the 1930s to the 1950s and beyond. The first was the discovery of vitamin D in 1926 which enabled chickens to be raised indoors all-year-round (Boyd & Watts, 1997). The second was World War II which rationed all meats except for chicken. Prior to the introduction of vitamin D chickens could not be kept indoors for extensive periods of time because they would suffer from a nutritional deficiency known as leg weakness. Taking the place of the sun, vitamin D enabled chickens to be kept indoors until maturity which led to continuous flow production (Boyd, 2001). This introduced what is called a biological time-space compression (Boyd, 2001) which combined with the establishment of the National Poultry Improvement Plan (NPIP) in 1933 to accelerate advances in breeding, disease control, and husbandry. When chicken production began to industrialize farmers quickly realized disease was a significant barrier they would have to overcome. Increasing flock sizes led to an increase in the prevalence of common poultry diseases like pullorum and typhoid so the government stepped in with the NPIP program to reduce mortality rates so that more intensive confinement operations could flourish through the provision of things like antibiotics (Boyd & Watts, 1997).

The second accelerator in chicken industrialization was meat rations that took place during World War II. Beef, pork, veal, and lamb were all rationed during WWII which significantly reduced their consumption by Americans. Chicken, however, was not subject to rationing and had the added benefit of a price ceiling that was set above the cost of production. This combined with a growing demand from US civilians and military personnel to create unprecedented commercial opportunities (Boyd & Watts, 1997).

While American consumers provided the demand for chicken, feed dealers provided the supplies necessary to scale production. Between 1940 and 1950 various feed dealers began to extend credit to farmers raising chickens and then receiving payment when the birds were sold to processing plants (Pew, 2011). These contract-grow-out arrangements started as informal agreements by feed dealers who wanted to secure their markets. Growers sought to benefit from these arrangements as they received up front capital to invest in the birds (Boyd & Watts, 1997). The emergence and rise of contract grow-out arrangements and vertical integration within the American poultry industry can be traced back to a series of scientific, technological, and market innovations that fundamentally transformed poultry farming from small-scale, independent operations to highly integrated industrial enterprises. Advances in breeding techniques and confinement housing allowed for the production of genetically uniform birds optimized for meat production, while innovations in veterinary medicines and feed formulations significantly improved growth rates and feed efficiency (Boyd, 2001; Wallace, 2016). Meanwhile, developments in processing technologies and retail consolidation enabled large integrators to standardize production and gain control over supply chains, creating economies of scale that pushed smaller, independent farmers out of the market (Gilbert et al., 2015; Harman, 2021). Additionally, shifts in financial markets facilitated the growth of vertically integrated firms that could control all aspects of poultry production, from breeding to processing and retail distribution (Boyd & Watts, 1997). Together, these factors drove the industry's transition towards efficiency, standardization, and centralized control, reshaping not only the poultry supply chain but also the broader dynamics of agricultural production in the United States.

Scientific innovations, particularly in breeding techniques, played a critical role in the evolution of the poultry industry. The development of specialized broiler breeds in the mid-20th century, which were optimized for rapid growth, high feed conversion efficiency, and uniformity, allowed integrators to produce birds that met specific market demands. These advances enabled a predictable and standardized output, reducing variability and increasing the profitability of poultry production (Boyd, 2001). The introduction of confinement housing systems further accelerated this shift by enabling year-round production, increasing stocking densities, and reducing mortality rates through controlled environmental conditions (MacDonald & McBride, 2009). Together, these innovations created the conditions necessary for large-scale, industrial poultry production, laying the groundwork for contract farming systems.

Veterinary medicine also played a crucial role in the intensification of poultry farming. The widespread use of antibiotics, vaccines, and other pharmaceuticals allowed for higher stocking densities by mitigating the risks of disease outbreaks, which are more common in confined settings (Gilchrist et al., 2007). This reduced mortality rates and improved overall productivity, making it more economically viable for integrators to contract with growers who could meet stringent production requirements.

At the center of all of these innovations was the driving force of the feed industry striving to capitalize on the post-WWII overabundance of cheap feed grains. This surplus created an economic incentive for agribusiness firms to develop intensive livestock production systems that could take advantage of the low-cost feed (Goodman et al., 1987). Corn, being a high-calorie feedstock, was especially well-suited for the rapid fattening of poultry, leading to shorter production cycles and increased efficiency.

Vertical integration allowed poultry companies to internalize the supply of these critical inputs, reducing transaction costs associated with feed procurement. By controlling the entire supply chain—from feed mills to hatcheries, grow-out farms, and processing plants—integrators could maximize efficiency and profitability. This alignment of grain overproduction with integrated production systems exemplifies what Goodman, Sorj, and Wilkinson describe as the "industrial appropriation" of agriculture, where traditional farming practices are subsumed into the industrial production model to maximize capital accumulation.

This process of industrial appropriation involves the incorporation of agriculture into the circuits of industrial capital, leading to a shift from diversified, locally controlled farming systems to specialized, capital-intensive operations. In the case of poultry, this transition is marked by the shift from independent, diversified farms to contract grow-out operations where farmers produce under strict guidelines set by integrators. Farmers, in essence, become subcontractors in a highly controlled production process, losing much of their autonomy as independent producers.

Vertical integration, in this context, can be seen as a strategy to exert control over the agricultural production process, ensuring that each stage of the supply chain is optimized for efficiency and profit. By internalizing these stages, agribusiness firms reduce their dependence on external suppliers and the uncertainties of the open market, which aligns with the broader trends of industrial agriculture as described by Smith & Kloppenburg (1990). This model shifts the locus of power from the farm to the corporate headquarters, where decisions about production, processing, and distribution are made. The standardization of inputs and outputs, enabled by scientific and technological advancements, further facilitates this process of appropriation (Smith & Kloppenburg, 1990).

2.2 The Rise of Big Chicken and Big Disease

Disease has always been a part of chicken husbandry. Early producers had to deal with pullorum and typhoid that spread rapidly in flocks. As flock sizes grew while farm size shrank, the occurrences of these diseases became more common. Knowing this, integrators maintained close connections with research laboratories. This enabled them to develop and distribute vaccines for known diseases. During the 1950s and 1960s feed producers and growers began experimenting with antibiotic use to prevent disease amongst densely populated flocks. Experiments conducted by the American Cyanamid laboratories found that chicks fed antibiotics grew 10% more than chicks who were not (Boyd, 2001). Later experiments discovered that antibiotics also increased the rate of feed-conversion efficiency in addition to preventing disease. The FDA quickly approved the use of several antibiotics such as penicillin and chlortetracycline as feed additives and antibiotics became the cheapest way to grow big chickens quickly (Boyd, 2001).

However, the administration of subtherapeutic levels – for reasons other than treating infection – is not without criticism. Many cite the millions of pounds of antibiotics fed to animals as the reason for rises in the proliferation of antibiotic-resistant bacteria (Boyd, 2001). Despite such criticisms, it is undeniable the role antibiotics played in the rise of the industrial chicken industry. Confinement operations would not be possible without their use. Many integrators see antibiotics as a necessary evil needed in order to keep up with the demand of the just-in-time production system we have built.

On-farm biosecurity measures in poultry industry in the U.S. are extensive and typically require workers to wear a full protective suit (or at the bare minimum boot covers) to prevent the introduction of disease to the flock and transfer of disease from one flock to another. Other biosecurity measures include frequent pressure-washing and sanitization of equipment and vehicles used as well as restrictions on who is allowed on farm premises and inside production sheds. On-farm biosecurity measures can therefore be generally categorized as practices of exclusion because of the "enclosing agro-ecosystems to prevent the introduction of disease" (Allen & Lavau, 2015, p. 347). Within these enclosed agro-ecosystems of industrial broiler production exist systems of surveillance to ensure biosecurity. Surveillance can be conducted both by the state and the agribusiness themselves. In the U.S. agribusinesses conduct self-surveillance of disease so that they are able to detect any biosecurity breaches early in the production process and limit the financial losses associated with product forfeited due to disease (Allen & Lavau, 2015).

Although the majority of literature discusses biosecurity measures for factory farms under the rhetoric of the "contamination approach" – where biosecurity breaches are seen as coming from the outside in – the majority of disease typically exists within a production system. In the highly industrialized broiler production system of the U.S. almost all broiler chickens are genetically identical, having been bred to grow very large in half the time they did fifty years ago (Allen & Lavau, 2015). These genetically identical flocks are raised in extremely close proximity to maximize the number of birds that can be produced within a single space. In addition to the spaces in which they are raised, broiler chickens are fed a diet full of antibiotics which serve to weaken their immune systems in large part due to the intense biosecurity measures ensuring the birds have as minimal contact with disease as possible. Allen and Lavau (2015) state that disease production in these cases is "intra-active" in which disease arises from the encounters that occur within an isolated population as opposed to being the result of a population encountering an outside group. This is how new diseases are able to emerge within industrial animal production systems. The standardization of on-farm biosecurity measures within the U.S. model of integration in many ways normalizes disease outbreak because there are so many measures in place to prevent it, it must be a prevalent issue. Allen and Lavau (2015) argue that disease is "a contingent outcome" that results from the ecologies of production present in industrial broiler production facilities. The intra-action that leads to disease as a contingent outcome of livestock production makes it difficult to pinpoint biosecurity breaches. The surveillance of biosecurity within the livestock sector is so focused on outside threats coming in that often times there is a lack of attention paid to processes going on within the system that lead to disease.

The focus on external threats in livestock biosecurity is deeply tied to economic and political imperatives, where the prioritization of trade and market stability often overshadows internal systemic vulnerabilities. Industrialized farming systems, characterized by high-density confinement and reliance on global supply chains, are framed as engines of economic growth, leading to policies that emphasize safeguarding trade flows rather than addressing the risks inherent in these production models (Gilbert et al., 2015; Ingram, 2005). This framing aligns with the securitization of biosecurity, where the protection of agricultural assets becomes a state priority, legitimizing surveillance systems and border controls while neglecting the internal drivers of disease, such as overcrowding and unsanitary conditions (Buzan, Wæver, & de Wilde, 1998; Braun, 2007).

This governance model, informed by Foucault's concept of biopolitics, illustrates how biosecurity serves as a tool for regulating both animal and human populations, often under the guise of ensuring public and economic health (Foucault, 2007). The emphasis on surveillance and compliance within industrial systems reinforces state and corporate power, creating a cycle where the underlying vulnerabilities—such as genetic homogeneity in livestock or overuse of antibiotics—are perpetuated rather than addressed. By prioritizing external threats and enforcing standards that protect trade over comprehensive health measures, biosecurity practices marginalize smaller producers and communities who lack the resources to comply with these regulations, further consolidating corporate control and exacerbating inequalities within the agricultural sector (Wallace, 2016). This dynamic highlights the need for a more critical and holistic approach to biosecurity, one that interrogates the power structures shaping its priorities and includes systemic reform as part of its governance framework.

The systemic vulnerabilities of industrial poultry production underscore the paradox at the heart of biosecurity in the livestock sector. While biosecurity measures aim to prevent and mitigate the spread of disease, the industrial practices they are designed to safeguard—such as high-density confinement, vertical integration, and globalized supply chains—are themselves significant drivers of zoonotic disease emergence (Wallace, 2016; Gilbert et al., 2015). This tension highlights the need for a critical re-evaluation of biosecurity frameworks, shifting from reactive measures focused on external threats to proactive strategies that address the root causes of disease within industrial systems. Without such reform, biosecurity risks becoming a tool for preserving unsustainable practices rather than protecting public and animal health (Foucault, 2007; Braun, 2007).

The role of the U.S. government in shaping and regulating animal biosecurity practices is crucial in understanding how these frameworks are implemented and enforced. Federal agencies such as the USDA and CDC play central roles in defining biosecurity standards, overseeing disease surveillance, and responding to outbreaks. However, as the following section will explore, these regulatory efforts often reflect broader political and economic priorities, balancing public health concerns with the interests of industrial stakeholders. By examining U.S. government involvement, we can better understand how biosecurity is operationalized and the implications for health governance in the agricultural sector.

2.3 U.S. Government and Biosecurity Regulations

The roots of U.S. governmental involvement in agricultural biosecurity date back to the establishment of the Bureau of Animal Industry (BAI) in 1884, under the U.S. Department of Agriculture (USDA). The BAI was created to address livestock diseases that threatened both the agricultural economy and public health, such as contagious bovine pleuropneumonia and Texas fever. This marked the beginning of federal efforts to regulate animal health and prevent disease outbreaks through inspection, quarantine, and other control measures.

The U.S. government's direct engagement with biosecurity in the context of industrial animal agriculture intensified during the 1960s-1980s, a period characterized by the rapid expansion of confined animal feeding operations (CAFOs). The shift toward vertical integration in the poultry, swine, and cattle industries led to the concentration of large numbers of animals in confined spaces, creating conditions that heightened the risk of disease transmission. During this period, the USDA began to develop more targeted animal health programs aimed at managing diseases that could severely impact the livestock industry. This included the establishment of surveillance programs and the enforcement of biosecurity standards to protect animal populations from diseases like avian influenza, foot-and-mouth disease, and swine fever.

The formal concept of biosecurity became more prominent in the 1990s, driven by concerns over zoonotic diseases, global trade, and bioterrorism. The Animal Health Protection Act of 2002 was a significant legislative step that granted the USDA broad authority to prevent, control, and eradicate diseases and pests that threaten livestock. This act empowered the USDA to establish quarantine zones, restrict animal movements, and enforce biosecurity measures at the federal level.

Additionally, the outbreak of highly pathogenic avian influenza (HPAI) in the early 2000s spurred the U.S. government to enhance its biosecurity framework. In response, the USDA's Animal and Plant Health Inspection Service (APHIS) expanded its National Poultry Improvement Plan (NPIP), which focuses on certifying hatcheries and flocks as disease-free through rigorous testing and biosecurity protocols.

The biosecurity practices developed within the context of industrial animal agriculture have not only transformed agricultural policies but have also informed broader national strategies for disease prevention and control. The increasing frequency of zoonotic diseases—those that can transfer from animals to humans—has led to a recognition of the interconnectedness between animal health and public health, a principle that aligns with the One Health framework. As industrial farming has intensified, so has the government's focus on integrating agricultural biosecurity into the national pandemic preparedness plans.

The development of the White House's national pandemic preparedness frameworks, such as the National Strategy for Pandemic Influenza (2005) and subsequent plans, reflects the influence of livestock disease management practices, particularly biosecurity protocols applied in Confined Animal Feeding Operations (CAFOs). These frameworks share core principles with strategies developed to mitigate outbreaks like avian influenza, including early detection, rapid response, and containment measures. The One Health approach, which emphasizes the interdependence of human, animal, and environmental health, serves as a conceptual bridge linking livestock disease management with broader public health preparedness (Behravesh, 2016). Through this lens, biosecurity measures in agriculture—such as targeted surveillance systems, vaccination protocols, and movement restrictions—have informed pandemic strategies that prioritize minimizing risk at the human-animal interface.

Livestock biosecurity provides practical models for pandemic preparedness by demonstrating the effectiveness of coordinated, multi-agency responses to disease outbreaks. For example, the management of avian influenza outbreaks in poultry relied on disease surveillance networks and rapid mobilization of resources, which are mirrored in national frameworks for human pandemics (Gilbert et al., 2015). Moreover, CAFOs highlight the importance of standardized containment protocols to prevent disease spread, an approach adopted in pandemic plans that emphasize quarantine and travel restrictions during outbreaks (Gilchrist et al., 2007). These shared methodologies reveal how the challenges and successes of managing livestock diseases have shaped human health strategies, particularly in addressing zoonotic spillover risks.

At a deeper level, the integration of livestock biosecurity practices into pandemic frameworks reflects broader political and economic imperatives. Industrial agriculture's vulnerability to disease outbreaks underscores the importance of safeguarding trade and market stability, which aligns with the securitization of biosecurity at both national and global levels (Wallace, 2016; Ingram, 2005). This influence is evident in how pandemic preparedness plans prioritize interagency collaboration, a principle rooted in livestock biosecurity systems that rely on partnerships between agricultural, public health, and emergency management agencies. As such, pandemic frameworks extend the principles of livestock biosecurity to address the complexities of human disease management while reinforcing the interconnectedness of health governance systems.

Outbreaks of avian influenza, particularly highly pathogenic strains like H5N1 and H7N9, have played a significant role in shaping U.S. biosecurity policies and public health preparedness frameworks. These outbreaks served as moments of crisis where zoonotic threats were framed as existential dangers requiring extraordinary responses, consistent with securitization theory (Buzan, Wæver, & de Wilde, 1998). Campaigns like the USDA's Defend the Flocks were developed in this context, providing a critical link between agricultural biosecurity and broader pandemic preparedness efforts (USDA APHIS, 2024). Through educational outreach, such campaigns institutionalize biosecurity practices within the poultry industry while reinforcing the government's securitized narrative of disease containment and prevention. The discourse surrounding avian influenza outbreaks and these campaigns reveals how zoonotic diseases are positioned as national security threats, shaping both public perception and governmental response.

Avian influenza outbreaks have frequently been described in terms that heighten their urgency and position them as threats to national and global stability. The language used in government reports, public health communications, and media coverage often emphasizes the potential for these diseases to cause widespread human pandemics, leveraging worst-case scenarios to justify aggressive intervention measures. For example, during the H5N1 outbreaks of the early 2000s, the discourse surrounding the disease centered on its high mortality rate in humans and its potential to mutate into a strain capable of sustained human-to-human transmission (Gilbert et al., 2015). This securitized framing justified the expansion of surveillance systems and rapid containment measures within the poultry industry, aligning with biopolitical governance as described by Foucault (2007), where the state's power is exerted through the management of life and health.

The Defend the Flocks campaign operationalizes this securitized view by positioning individual poultry producers as critical agents in preventing disease outbreaks (USDA APHIS, 2024). The campaign's materials emphasize practices such as biosecurity audits, controlled access points, and strict monitoring of bird health. These recommendations reflect broader principles outlined in national pandemic preparedness frameworks, such as the 2005 National Strategy for Pandemic Influenza and the 2018 and 2022 National Biodefense Strategies. The alignment between these frameworks and the campaign illustrates how zoonotic disease management in livestock informs human health strategies, reinforcing the interconnectedness of animal and human health systems (Behravesh, 2016).

The language used in campaigns like Defend the Flocks plays a critical role in shaping biosecurity norms (USDA APHIS, 2024). Terms such as "defense," "protect," and "secure" emphasize the role of individual producers in maintaining not just the health of their flocks but the stability of national food systems and international trade. This rhetoric reflects a securitized discourse that constructs disease as an external threat, downplaying the systemic risks inherent in industrial poultry production, such as high-density confinement and genetic uniformity (Wallace, 2016). By focusing on external vectors like wild birds and contaminated equipment, the campaign mirrors the broader narrative in pandemic preparedness plans, which often prioritize containment over structural reform of industrial farming practices (Gilchrist et al., 2007; Hinchliffe & Bingham, 2008).

At the same time, Defend the Flocks serves as a complement to pandemic preparedness plans by fostering a culture of vigilance and compliance within the poultry sector. The campaign's emphasis on early detection and rapid reporting parallels the surveillance and response mechanisms outlined in the national biodefense strategies (USDA APHIS, 2024). These efforts demonstrate the practical application of biosecurity principles, translating the high-level goals of government frameworks into actionable steps at the industry level. However, this approach also reflects the limitations of securitization: by framing disease prevention as the responsibility of individual producers, the systemic drivers of zoonotic outbreaks—such as the commodification of animal agriculture and the ecological consequences of industrial farming—are often left unaddressed (Gilbert et al., 2015).

The influence of avian influenza outbreaks on pandemic preparedness plans is evident in the emphasis on interagency collaboration, international partnerships, and the integration of animal health into broader public health frameworks. For example, the 2018 National Biodefense Strategy explicitly acknowledges the role of zoonotic diseases in shaping biosecurity risks, while the 2022 strategy, informed by the COVID-19 pandemic, further emphasizes global equity and the importance of addressing health disparities. Campaigns like Defend the Flocks reinforce these priorities by promoting early intervention at the source, aligning with the One Health approach to mitigate risks at the human-animal interface (Behravesh, 2016).

While these strategies represent progress in integrating animal and human health, critical analysis reveals persistent gaps. The focus on surveillance and containment often obscures the underlying vulnerabilities of industrial farming systems, which create ideal conditions for the emergence and spread of zoonotic pathogens (Wallace, 2016). Moreover, the securitized framing of biosecurity risks may inadvertently perpetuate inequities by prioritizing economic stability and trade over the ecological and social dimensions of health governance. As U.S. biosecurity policies continue to evolve, it is imperative to address these structural challenges and adopt a more holistic approach that balances security with sustainability and equity.

2.4 The Paradox of Industrial Animal Agriculture and Biosecurity

The U.S. government's regulatory approach to biosecurity in agriculture, as discussed in Section 2.3, reveals a system deeply intertwined with industrial priorities. While these regulations aim to mitigate the risks of disease outbreaks and protect economic stability, they often fail to address the systemic vulnerabilities embedded within industrial farming practices. This oversight highlights a central paradox of biosecurity: the very measures designed to safeguard health and stability may inadvertently perpetuate the conditions that heighten biosecurity risks (Allen & Lavau, 2015; Wallace, 2016).

Government biosecurity regulations, such as those implemented through the National Poultry Improvement Plan (NPIP) or pandemic preparedness strategies, are fundamentally reactive (Boyd & Watts, 1997; Behravesh, 2016). These frameworks emphasize containment and surveillance, focusing on detecting and responding to outbreaks rather than preventing the emergence of diseases. While these measures have undoubtedly reduced the immediate risks of disease spread, their effectiveness is limited by the structural vulnerabilities of industrialized farming. High-density animal confinement, genetic uniformity, and reliance on antibiotics create environments where pathogens can thrive and evolve (Gilchrist et al., 2007; Braun, 2007). Yet, these systemic risks remain under-addressed, as biosecurity policies often prioritize maintaining production efficiency over addressing root causes.

For example, the NPIP's focus on certifying disease-free hatcheries assumes that disease threats primarily originate from external sources. This "outside-in" approach to biosecurity reinforces the narrative that external vectors, such as wild birds or contaminated equipment, are the primary threats, sidelining the role of intra-systemic factors like overcrowding, unsanitary conditions, and genetic homogeneity in fostering disease emergence (Allen & Lavau, 2015; Wallace, 2016).

The securitization of biosecurity, particularly in the wake of avian influenza outbreaks, frames zoonotic diseases as existential threats to national security (Buzan et al., 1998; Gilbert et al., 2015). This framing has justified the expansion of surveillance networks, border controls, and compliance-focused campaigns like *Defend the Flocks*. While these measures align with national and global health priorities, they also reflect a broader trend of prioritizing trade stability and economic interests over ecological and social dimensions of health governance (Hinchliffe & Bingham, 2008; Ingram, 2005).

By emphasizing surveillance and rapid containment, biosecurity policies often marginalize alternative farming systems, such as agroecology or small-scale diversified farms, which may offer more sustainable approaches to disease prevention. These systems, which rely on ecological balance rather than industrial intensification, are less vulnerable to the cascading failures associated with zoonotic outbreaks. Yet, their potential is overshadowed by the dominance of industrial models, which benefit from government support and regulatory frameworks tailored to large-scale operations (Wallace, 2016; Gilbert et al., 2015).

Foucault's concept of biopolitics provides a useful lens for analyzing how biosecurity measures reinforce existing power structures (Foucault, 2007). By emphasizing the management of life and health through surveillance and control, these measures consolidate corporate power within the agricultural sector. Vertical integration, a hallmark of industrial farming, exemplifies this dynamic. Integrators wield significant influence over biosecurity standards, shaping practices to maximize efficiency and minimize disruptions to their supply chains (Boyd, 2001; Allen & Lavau, 2015).

This dynamic not only marginalizes smaller producers but also creates a cycle where systemic vulnerabilities are normalized. For example, the routine use of antibiotics to prevent disease in high-density flocks is a direct response to the risks created by confinement systems. Yet, this reliance on pharmaceuticals perpetuates the very conditions—such as weakened immune systems and the rise of antibiotic-resistant pathogens—that necessitate biosecurity measures (Gilchrist et al., 2007; Braun, 2007).

The current biosecurity framework's focus on external threats and containment reflects a narrow conceptualization of risk. To address the root causes of zoonotic disease emergence, a shift toward proactive, systemic change is essential. This includes rethinking industrial farming practices, integrating ecological principles into agricultural policy, and promoting diverse, decentralized production systems that are less susceptible to outbreaks (Gilbert et al., 2015; Wallace, 2016).

Additionally, biosecurity policies must move beyond their current securitized framework to embrace a more holistic approach that considers the interconnectedness of human, animal, and environmental health. The One Health framework offers a pathway for such integration, emphasizing the importance of addressing health risks at the human-animal-environment interface (Behravesh, 2016). However, implementing One Health principles requires more than rhetorical commitment; it demands structural reforms that challenge the dominance of industrial models and prioritize sustainability and equity (Wallace, 2016).

The paradox of industrial biosecurity highlights the need for a broader reconceptualization of how we manage biological risks. While government regulations play a crucial role in mitigating immediate threats, their long-term effectiveness depends on addressing the systemic drivers of disease within industrial agriculture. Without such reform, biosecurity risks becoming a tool for preserving the status quo rather than fostering genuine resilience (Allen & Lavau, 2015; Wallace, 2016).

A more holistic vision of biosecurity would recognize that health risks cannot be contained within artificial boundaries, whether they are physical, economic, or conceptual. By prioritizing systemic change and integrating ecological, social, and economic dimensions, the U.S. can develop a biosecurity framework that not only protects against zoonotic diseases but also promotes a healthier, more sustainable food system (Hinchliffe & Bingham, 2008; Behravesh, 2016).

2.5 Conclusion

The industrialization of poultry production in the United States exemplifies the tensions and paradoxes at the heart of modern biosecurity. While advancements in biosecurity measures, such as enhanced surveillance and containment protocols, have mitigated certain risks, these efforts often focus narrowly on external threats without addressing the systemic vulnerabilities inherent to industrial farming. High-density confinement, genetic homogeneity, and reliance on antibiotics foster conditions that not only facilitate the spread of zoonotic diseases but also perpetuate a cycle of dependency on reactive measures (Allen & Lavau, 2015; Gilbert et al., 2015; Wallace, 2016).

As this chapter has demonstrated, the regulatory frameworks underpinning biosecurity, while essential, reflect broader political and economic priorities that prioritize market stability over ecological sustainability and public health (Buzan et al., 1998; Hinchliffe & Bingham, 2008). The securitization of biosecurity has reinforced corporate control within the agricultural sector, marginalizing alternative farming practices that could mitigate disease risks more sustainably (Gilchrist et al., 2007; Wallace, 2016). Initiatives such as regenerative agriculture and the promotion of agroecological systems illustrate potential pathways to reducing biosecurity vulnerabilities, yet these remain under-supported compared to industrial models (Behravesh, 2016; United States Department of Agriculture [USDA], 2021).

The analysis also highlights the need for proactive reform. A truly effective biosecurity framework must move beyond containment and adopt strategies that address root causes. This includes diversifying production systems, improving animal welfare, and integrating the One Health framework to reflect the interconnectedness of human, animal, and environmental health (Behravesh, 2016; Braun, 2007). Without these changes, biosecurity risks remaining a tool for preserving unsustainable industrial practices rather than achieving long-term resilience and equity (Gilbert et al., 2015; Wallace, 2016).

Ultimately, the future of biosecurity in the livestock sector depends on its ability to reconcile the competing demands of economic efficiency, public health, and ecological integrity. As the U.S. continues to grapple with the challenges of zoonotic diseases, this reconciliation will be crucial to fostering a sustainable and health-conscious agricultural system (Allen & Lavau, 2015; Hinchliffe & Bingham, 2008).

<u>Chapter 3: U.S. Government Health Strategies</u>

The U.S. government's biosecurity strategies, including its pandemic preparedness plans, are deeply rooted in the lessons learned from the agricultural sector, particularly in managing zoonotic diseases. As discussed in the previous chapter, the poultry industry's emphasis on surveillance, containment, and rapid response to outbreaks such as avian influenza highlights the foundational role of agricultural biosecurity practices in shaping broader health frameworks. The protocols developed within animal agriculture—targeted biosecurity measures, quarantine protocols, and early detection systems—provide the blueprint for many elements of U.S. pandemic preparedness strategies. These strategies reflect a critical intersection of animal and public health, underscoring the interconnectedness emphasized in the One Health approach.

Building on these agricultural foundations, presidential administrations since 2004 have produced a series of national strategies aimed at addressing biological threats and increasing preparedness for potential pandemics. These frameworks, including the 2018 and 2022 National Biodefense Strategies, incorporate core principles of agricultural biosecurity, such as early warning systems and coordinated containment measures, into their broader public health mandates. While the 2018 strategy focused heavily on bolstering surveillance and rapid response capabilities, the 2022 iteration—shaped by the COVID-19 pandemic—expanded its scope to emphasize global health equity and systemic resilience. Both plans draw heavily from the agricultural sector's experience in managing zoonotic spillover events, reflecting an evolving understanding of biosecurity that integrates human, animal, and environmental health.

The U.S. government's reliance on the agricultural sector extends beyond direct disease management. The surveillance systems established to monitor livestock health, such as the National Animal Health Monitoring System (NAHMS), inform the design of national pandemic strategies by emphasizing the importance of early detection and interagency collaboration. Campaigns like the USDA's Defend the Flocks complement these efforts by institutionalizing biosecurity practices at the farm level, demonstrating the translation of agricultural expertise into national health policies (USDA APHIS, 2024). These campaigns not only protect the poultry industry from devastating economic impacts but also align with the government's broader efforts to mitigate the risks of zoonotic pandemics through a securitized lens.

As the following sections will explore, the evolution of U.S. health strategies—from the National Strategy for Pandemic Influenza (2005) to the 2018 and 2022 frameworks—demonstrates the increasing influence of agricultural biosecurity on national preparedness. These plans reflect a growing recognition of the vulnerabilities posed by zoonotic diseases and the critical role of animal agriculture in preventing and managing pandemics. At the same time, they raise important questions about the securitization of health and the balance between protecting public health, economic stability, and systemic reform.

One of the most significant influences of the livestock sector on these preparedness plans was the integration of the One Health framework. This approach, which has roots in the agricultural sector's long-standing focus on zoonotic diseases, was formally incorporated into both the 2018 and 2022 pandemic preparedness plans. The One Health approach emphasizes the need for a collaborative, multi-disciplinary response to diseases that affect both humans and animals. The integration of this concept into the national response plans reflects a growing recognition of the critical role that animal agriculture plays in shaping public health outcomes during pandemics, particularly when dealing with zoonotic diseases like H1N1, avian flu, and COVID-19.

Moreover, historical outbreaks such as H1N1, Avian Influenza, and COVID-19 have further shaped the evolution of U.S. biosecurity policies, highlighting the porous nature of national borders in the face of zoonotic spillovers. These pandemics illustrated the limitations of traditional state-centric biosecurity frameworks, prompting a shift towards more globally integrated and collaborative strategies. Lessons learned from these outbreaks have driven the incorporation of robust surveillance and rapid response mechanisms, not only to protect public health but also to safeguard the economic stability of critical sectors like agriculture.

By bridging the expertise of animal health and human health sectors, these pandemic preparedness plans demonstrate a comprehensive approach to biosecurity that acknowledges the critical intersections of public health, economic resilience, and food security. The evolution of U.S. biosecurity strategy thus reflects an adaptive framework, informed by past experiences with zoonotic diseases and shaped by the need for a more integrated, multi-disciplinary response to future biological threats.

3.1 National Strategy for Pandemic Influenza – 2005

The National Strategy for Pandemic Influenza (2005) is a seminal document that illustrates the U.S. government's early approach to integrating biosecurity into public health frameworks. Its primary aim was to establish a comprehensive framework for responding to influenza pandemics, particularly the threat of avian influenza, by emphasizing rapid containment measures and the importance of vaccine development. This strategy laid the groundwork for subsequent biosecurity frameworks, reflecting an era when the U.S. was increasingly aware of the global and transboundary nature of pandemics, particularly those with zoonotic origins. By applying securitization theory and Foucauldian discourse analysis, this section critically examines how the strategy's framing of biological threats, referent objects of security, and advocated measures were shaped by agricultural practices and broader geopolitical concerns.

The strategy constructs pandemics as both unpredictable and inevitable, describing them as a “recurring phenomenon” and emphasizing the unique risks posed by zoonotic spillover events, particularly from avian influenza strains (National Strategy for Pandemic Influenza, 2005, p. 1). This language positions pandemics as crises beyond human control, necessitating proactive, defense-oriented responses. Such framing taps into a Foucauldian understanding of biopolitics by positioning the state as a manager of life and risk, where populations are governed through anticipatory measures designed to mitigate potential disruptions to health, economy, and security.

One of the strategy’s central themes is rapid containment, prioritizing early detection, intervention, and vaccine stockpiling. It explicitly connects domestic preparedness with global surveillance, asserting that “an outbreak anywhere is a risk everywhere” (p. 3). This rhetoric amplifies the urgency of preemptive action, aligning with a technocratic risk-management paradigm that privileges measurable outcomes—such as infection rates and vaccination coverage—over structural reforms. From a Foucauldian perspective, this focus on quantifiable metrics reflects the strategic deployment of knowledge to justify and reinforce state authority. The expansion of laboratory networks and diagnostic tools, as proposed in the strategy, illustrates how scientific expertise is co-opted as an instrument of governance.

The emphasis on interagency collaboration, with defined roles for federal entities such as the Department of Health and Human Services (HHS), Department of Agriculture (USDA), and Department of Homeland Security (DHS), reflects an acknowledgment of the interconnectedness between human health, animal health, and national security. However, the strategy's lack of specificity regarding the mechanisms of coordination highlights potential limitations in its implementation. This ambiguity underscores critiques that securitized frameworks often prioritize rapid responses at the expense of resilient, integrated systems.

The strategy's approach is deeply informed by agricultural biosecurity practices, particularly those developed for managing zoonotic diseases like avian influenza within the poultry industry. Surveillance protocols proposed for tracking influenza in wild and domestic bird populations mirror those employed in industrial agriculture, emphasizing the early identification of outbreaks. Similarly, the focus on preemptive stockpiling of vaccines and antiviral medications parallels agricultural strategies for mitigating livestock epidemics. This agricultural influence reinforces the strategy's framing of pandemics as crises that demand centralized, authoritative control, echoing the practices of confined animal feeding operations.

This framing aligns with Buzan, Wæver, and de Wilde's (1998) concept of securitization, where pandemics are portrayed as existential threats requiring extraordinary measures. The repeated use of militarized language—such as "defense," "protection," and "threat mitigation"—broadens the scope of national security to include public health. While this framing heightens the perceived urgency of biosecurity, it also risks narrowing the focus to immediate containment measures, sidelining systemic drivers such as industrial farming practices, habitat destruction, and global trade dynamics that facilitate zoonotic spillover.

The strategy's reliance on rapid containment reflects a narrowly technocratic approach that often overlooks deeper ecological and social dimensions of pandemics. While it acknowledges the zoonotic origins of pandemics, proposed solutions—such as border controls, surveillance systems, and vaccine development—address symptoms rather than root causes.

Drawing from critiques by Hinchliffe and Bingham (2008), this approach exemplifies an anthropocentric bias that prioritizes human-centered risks over systemic ecological challenges.

Building on Jasanoff's (2004) concept of co-production, the strategy's emphasis on measurable outcomes reflects the interplay between science, policy, and social values in constructing biosecurity. By privileging quantifiable metrics, such as infection tracking and vaccine availability, the strategy risks reinforcing vulnerabilities within industrial systems, neglecting opportunities for structural reform that could address the socio-environmental contexts driving zoonotic spillover.

Moreover, securitization carries political implications. As Wæver (1995) observes, framing health risks as security threats allows governments to mobilize resources and authority in ways that may bypass democratic processes. This raises ethical questions about whose interests are prioritized in biosecurity frameworks. The strategy's emphasis on protecting economic stability and critical infrastructure suggests a bias toward safeguarding state and corporate interests, potentially at the expense of marginalized populations who bear the brunt of pandemics.

The National Strategy for Pandemic Influenza (2005) exemplifies the strengths and limitations of a securitized approach to biosecurity. While its focus on rapid containment and surveillance reflects the practical influence of agricultural biosecurity, it also reveals significant blind spots in addressing the systemic ecological drivers of pandemics. These tensions underscore the need for future strategies to adopt a more integrative approach—one that balances immediate risk mitigation with long-term resilience, equity, and sustainability. Incorporating broader ecological perspectives and fostering decentralized, community-based health initiatives could enhance the inclusivity and efficacy of U.S. biosecurity policy, aligning it more closely with the principles of the One Health framework.

3.2 National Strategy for Countering Biological Threats – 2009

The National Strategy for Countering Biological Threats (2009) marks an evolution in U.S. biosecurity policy, integrating bioterrorism and emerging biological risks into a unified framework. This strategy broadens the scope of biological threats to include both deliberate and naturally occurring events, framing these risks as existential challenges to national and international stability. By emphasizing surveillance, governance, and the expansion of state authority, the strategy reflects the influence of securitization theory and biopolitical governance while drawing from the biosecurity practices established within industrial animal agriculture.

The 2009 strategy exemplifies the securitization of biosecurity, positioning biological threats as existential risks to critical infrastructure and public health. According to Buzan, Wæver, and de Wilde (1998), securitization elevates certain issues to the status of national security threats, allowing for extraordinary measures. The strategy adopts a militarized discourse, using terms such as “defense,” “threat mitigation,” and “protection” to justify surveillance expansion and emergency interventions.

This framing echoes the influence of industrial animal agriculture biosecurity practices, particularly the methods used to manage zoonotic disease outbreaks within high-density farming systems. For example, protocols from the USDA's National Poultry Improvement Plan (NPIP)—such as surveillance, containment, and rapid response—are mirrored in the 2009 strategy’s emphasis on early detection and containment. This alignment demonstrates how agricultural biosecurity measures have shaped national biosecurity strategies, particularly in prioritizing state-centric, reactive solutions over systemic reform.

The strategy's focus on surveillance reflects its commitment to managing biological threats through continuous monitoring. Drawing on Foucault's concept of panopticism (1972), the strategy establishes an apparatus of observation that spans public health, intelligence, and agriculture. This omnipresent surveillance aims to identify potential threats before they escalate, extending the state's biopolitical control over populations and environments.

The integration of agricultural surveillance models is evident in the strategy's reliance on early-warning systems that mirror those used in industrial farming to detect outbreaks in livestock populations. These systems are designed to monitor not only human health but also animal and environmental health, aligning with the One Health framework. However, this approach prioritizes technical solutions, such as disease monitoring and diagnostic tools, while neglecting the structural drivers of zoonotic diseases, such as habitat destruction and intensive animal farming practices.

By framing bioterrorism as a core concern, the strategy expands the state's authority into domains traditionally associated with civil liberties, such as surveillance and emergency governance. This aligns with Agamben's (2005) critique of the "state of exception," where governments enact extraordinary measures under the guise of protecting populations. The inclusion of bioterrorism in the strategy reinforces a biopolitical paradigm in which the state seeks to control not only populations but also the sources of biological risk, both natural and man-made.

This emphasis on bioterrorism reflects the influence of industrial agriculture, where biosecurity measures are designed to preempt and contain external threats, such as pathogens introduced by wild species or contaminated equipment. In both contexts, the framing of threats as external obscures the systemic vulnerabilities created by intensive production systems. For instance, the globalized supply chains and high-density confinement systems that characterize industrial farming are rarely addressed as internal drivers of risk, despite their significant role in zoonotic spillover.

The strategy's call for international collaboration underscores the interconnected nature of biological threats but also highlights power asymmetries in global biosecurity governance. The U.S. is positioned as a central arbiter of global standards, dictating the terms of cooperation and resource allocation. This framing mirrors the dynamics of industrial animal agriculture, where resource-rich nations dominate regulatory frameworks and export practices that prioritize economic efficiency over ecological sustainability.

The strategy's reliance on agricultural biosecurity models reinforces these asymmetries. For example, surveillance protocols and containment measures developed for livestock management are scaled to global governance systems, creating a one-size-fits-all approach that may not address the specific needs of low-resource countries. Such frameworks risk perpetuating historical inequities, as resource-poor nations are often burdened with implementing measures designed to protect the interests of wealthier nations.

The securitization of biological threats in the 2009 strategy raises ethical and political concerns. While surveillance and containment are essential tools for managing risks, they often come at the expense of addressing root causes. The influence of industrial animal agriculture biosecurity practices underscores this limitation. High-density farming systems, antibiotic overuse, and habitat encroachment are significant drivers of zoonotic diseases, yet they are rarely critiqued within the strategy. Instead, the focus remains on mitigating immediate risks through technical and militarized solutions.

From a Foucauldian perspective, this reflects the state's biopolitical role in maintaining the status quo. By emphasizing containment and surveillance, the strategy prioritizes short-term stability over systemic reform, reinforcing a technocratic view of governance that privileges economic and state interests over ecological and social justice.

The 2009 National Strategy for Countering Biological Threats represents a pivotal moment in U.S. biosecurity policy, integrating lessons from agricultural biosecurity into a broader national framework. However, its reliance on securitization and surveillance risks perpetuating the vulnerabilities it seeks to address. To create a more effective biosecurity strategy, future policies must confront the structural drivers of biological threats, particularly those rooted in industrial animal agriculture.

By integrating the One Health framework and prioritizing systemic reforms, such as sustainable farming practices and habitat conservation, national biosecurity strategies can move beyond reactive containment to address the root causes of zoonotic diseases. This shift requires acknowledging the limitations of current frameworks and embracing a more holistic approach that balances state security with global health and ecological sustainability.

3.3 National Strategy for Biosurveillance – 2012

The National Strategy for Biosurveillance (2012) represents a pivotal evolution in U.S. biosecurity policy, emphasizing a whole-of-government approach as the cornerstone of an integrated response to biological threats. Building upon the frameworks established in earlier documents such as the National Strategy for Pandemic Influenza (2005) and the National

Strategy for Countering Biological Threats (2009), the 2012 strategy underscores the need for interagency collaboration across intelligence, public health, agriculture, and defense sectors to create a unified biosurveillance system.

The 2012 strategy situates the whole-of-government approach as essential to anticipating, detecting, and responding to biological incidents. By advocating for comprehensive collaboration, the strategy reflects an understanding of biosecurity as an inherently multidimensional challenge that requires coordination across diverse sectors and levels of government. Scholars such as Boin et al. (2010) emphasize that such an approach is critical for addressing systemic risks that transcend traditional organizational boundaries. The strategy's call for leveraging expertise and resources from agencies such as the Department of Health and Human Services (HHS), Department of Homeland Security (DHS), Department of Agriculture (USDA), and the Department of Defense (DoD) highlights its commitment to breaking down silos and fostering an integrated biosurveillance network.

Operationalizing the whole-of-government approach involves creating mechanisms for real-time data sharing, interagency coordination, and joint decision-making. The strategy emphasizes the importance of interoperability between federal, state, and local entities, as well as partnerships with private sector and international stakeholders. This reflects a securitization of biological threats wherein biological risks are framed as national security imperatives requiring a coordinated and robust response.

The strategy's reliance on interagency collaboration aligns with scholarship advocating for integrated governance to enhance situational awareness and crisis management (Comfort et al., 2010). By fostering a networked model of biosurveillance, the strategy aims to enable early detection and rapid response capabilities. For example, it promotes the integration of intelligence analysis with epidemiological data to identify emerging threats and mitigate their impact. However, this approach also raises questions about the capacity of agencies to effectively coordinate under conditions of resource scarcity and competing priorities. As Tierney (2014) notes, successful collaboration requires not only technological and procedural integration but also the cultivation of trust and shared objectives among stakeholders.

The whole-of-government approach also underscores the role of leadership and accountability in biosurveillance. The strategy identifies clear lines of responsibility, with federal agencies tasked with specific functions such as data collection, threat assessment, and resource deployment. However, scholars such as De Bruijne et al. (2010) caution that centralized coordination can create vulnerabilities if it fails to adequately engage decentralized actors, including state and local governments, which often serve as the front line in biological threat responses. The strategy's emphasis on hierarchical oversight may inadvertently overlook the critical role of community-level engagement and resilience in enhancing biosecurity.

While the whole-of-government approach marks significant progress in integrating diverse sectors, it also reflects the inherent tensions in balancing security and governance priorities. The strategy's framing of biosurveillance as a national security imperative risks marginalizing broader considerations of social equity and systemic drivers of biological threats. For example, scholars such as Hinchliffe and Bingham (2008) argue that biosecurity policies often prioritize human-centered risks over ecological and structural factors, such as environmental degradation and global health inequities, that contribute to the emergence of biological threats.

The strategy's technocratic orientation—focused on data integration, technological innovation, and institutional coordination—highlights both its strengths and limitations. By emphasizing real-time information sharing and predictive analytics, the strategy aims to enhance the nation's capacity to preempt and respond to biological incidents. However, this approach may inadvertently perpetuate a narrow framing of biosecurity that prioritizes immediate threats over long-term resilience. Agamben's (2005) critique of securitization as a potential pathway to normalized states of exception is particularly relevant here. The expansion of biosurveillance capabilities, while enhancing national security, also raises ethical concerns regarding privacy, civil liberties, and the potential for overreach.

Furthermore, the whole-of-government approach necessitates addressing disparities in resource allocation and institutional capacity. Cutter et al. (2003) emphasize that the effectiveness of resilience and security frameworks is often unevenly distributed, with marginalized and rural communities facing disproportionate vulnerabilities. The 2012 strategy's focus on national-scale solutions must therefore be complemented by targeted efforts to address the unique needs of underserved populations. Without such measures, the whole-of-government approach risks exacerbating existing inequities in biosecurity preparedness and response.

In conclusion, the National Strategy for Biosurveillance (2012) represents a critical shift in U.S. biosecurity policy, centering the whole-of-government approach as a framework for addressing the complex and interconnected nature of biological threats. While the strategy's emphasis on interagency collaboration and technological innovation marks significant progress, its success will ultimately depend on its ability to integrate equity, community engagement, and systemic transformation into the broader biosurveillance paradigm. By addressing these dimensions, future strategies can build a more inclusive and effective biosecurity framework that leverages the strengths of the whole-of-government approach while addressing its limitations.

3.4 National Biodefense Strategy: 2018 vs 2022

In 2018, the White House released a publicly accessible National Biodefense strategy with the purpose of "put[ting] in place for the first time, a single coordinated effort to orchestrate the full range of activity that is carried out across the United States Government to protect the American people from biological threats" (White House, 2018 p. 1). The report identifies two primary categories of biological threats: naturally occurring and deliberate/accidental. The strategy then outlines five goals with associated objectives for "strengthening the biodefense enterprise, establishing a layered risk management approach to countering biological threats and incidents" (White House, 2018). The strategy was developed alongside National Security Presidential Memorandum (NSPM)-14 in an effort to build a more coordinated and wide-spread biodefense network within the United States.

In 2022, the White House put out a second report titled "National Biodefense Strategy and Implementation Plan" which served as an update to the 2018 strategy following the COVID-19 pandemic. This revision was directly influenced by the hard lessons learned during the pandemic, which exposed critical vulnerabilities in the U.S. biodefense infrastructure. The pandemic revealed significant gaps in supply chain resilience, testing capabilities, public health coordination, and emergency response systems. While the foundational framework of threats, consequences, biological risk management, and assumptions remained largely unchanged, the 2022 strategy's objectives were substantially modified to address specific weaknesses exposed by COVID-19.

The evolution of the National Biodefense Strategy from 2018 to 2022 highlights a shift in how the U.S. government approaches biological threats and their governance. The 2018 strategy was primarily focused on national defense and biodefense, framing biological risks—

especially bioterrorism and pandemics—as existential threats that required military and intelligence responses. However, the 2022 National Biodefense Strategy, shaped significantly by the lessons learned from COVID-19, shifts toward a global health perspective and introduces a more comprehensive, resilience-based framework. This analysis, applying securitization theory and discourse analysis, critically examines how these two strategies differ in framing biological risks, their proposed responses, and the implications for global cooperation, health equity, and systemic vulnerabilities.

The 2018 National Biodefense Strategy adheres strongly to the post-9/11 securitization of biological threats. Framing biological risks—especially pandemics and bioterrorism—as existential threats to national security, the 2018 strategy justifies extraordinary state interventions and military involvement. According to Buzan, Wæver, and de Wilde (1998), this securitization process elevates biological threats to the level of national security, granting the government the authority to deploy military resources, surveillance systems, and biodefense technologies.

The discourse in the 2018 strategy is deeply rooted in the language of defense and rapid response. Terms such as "defense," "protection," and "proactive defense" dominate the strategy, reflecting a view of biological threats as crises requiring immediate containment measures to protect national stability. From a Foucauldian perspective, this mirrors the practice of biopolitics (Foucault, 1972), where the state manages populations by exercising control over biological life through surveillance, preemptive measures, and emergency responses. The state's primary role is to preserve societal stability through managing risks associated with biological events, sidelining deeper systemic issues like environmental degradation, public health inequalities, and industrial agricultural practices, which are the root causes of many zoonotic diseases and pandemics.

This militarized framing has ethical implications, notably in the infringement on civil liberties in the name of national security. Biopolitical governance ensures that the state's control over health risks can override democratic processes, with decision-making increasingly focused on maintaining stability through defense mechanisms. While this approach may be effective in curtailing immediate threats, it risks reinforcing institutional inequalities and state-centric solutions rather than engaging with the deeper, global, and ecological origins of biological risks.

Shifting to Global Health and Broader Risk Management in 2022

In 2022, the National Biodefense Strategy represents a noticeable shift towards a more integrated, global health-oriented approach to biological threats. This evolution is partly a response to the COVID-19 pandemic, which highlighted the inadequacies of the 2018 framework in dealing with systemic vulnerabilities and global health interdependence. While the 2022 strategy retains aspects of securitization—it still frames biological threats as risks to national security—it adopts a broader risk management framework that incorporates health equity, global cooperation, and ecological health. The emphasis on international collaboration is framed through the One Health approach, recognizing the interconnectedness of human, animal, and environmental health (Hinchliffe & Bingham, 2008).

The discourse in the 2022 strategy reflects this shift. While terms like "preparedness" and "resilience" still appear, they are now situated within the context of global solidarity and health equity. This reorientation reflects a recognition that biological threats do not recognize national boundaries and that national biosecurity efforts must be supported by strong, multilateral governance systems and global health infrastructure. The framing of health equity acknowledges that biological risks disproportionately affect marginalized populations, particularly in low-income countries, which were disproportionately impacted by the COVID-19 pandemic.

Securitization in 2022: Expanding Global and Ecological Security

While the 2022 strategy continues the securitization of biological risks, it shifts the discourse from military defense to a broader, multifaceted approach that includes ecological health and socioeconomic resilience. This broadening of the security agenda reflects a recognition that national security now involves global health systems, international cooperation, and the sustainability of ecological systems that facilitate the emergence of zoonotic diseases. By framing biological risks as global and interdependent, the 2022 strategy implicitly critiques the limitations of a defense-firstmodel, which prioritizes state security over global health and environmental stability.

Foucauldian analysis suggests that the biopolitical governance in the 2022 strategy expands the scope of security to encompass global health and environmental concerns, moving away from the containment of domestic populations toward international cooperation. This framing acknowledges the political economy of health, as outlined by Jasanoff (2004), where the management of biological risks is not only a technical issue but also a deeply political one, intertwined with the distribution of power, resources, and knowledge across national and international contexts. The global approach necessitates mechanisms for global data-sharing, vaccine distribution, and the development of integrated health systems that can address biological threats before they escalate into pandemics or bioterrorism events.

Despite the broader inclusivity of the 2022 strategy, several concerns remain about the biopolitical implications of expanding the scope of biosecurity. Agamben (2005) cautions that the expansion of surveillance and governance in the name of health security risks creating a state of exception, where extraordinary measures—such as surveillance, travel restrictions, and the militarization of biosecurity—become normalized. While the 2022 strategy frames these efforts in terms of global health security and health equity, the extension of state control over health risks could lead to new forms of biopolitical control over populations, particularly vulnerable groups that are subject to surveillance under the guise of protecting public health.

The strategy's framing of global health equity is crucial, but it is important to recognize that addressing health inequities requires not only international cooperation but also structural reforms. Health equity, as promoted in the 2022 strategy, cannot be achieved without addressing the root causes of inequality—such as poverty, inadequate healthcare access, and environmental degradation—which were exposed during the COVID-19 pandemic. Thus, the 2022 strategy's commitment to global health equity needs to be matched with concrete actions that redistribute resources, ensure universal access to healthcare, and address social determinants of health (Jasanoff, 2004).

The shift from the 2018 to the 2022 National Biodefense Strategy marks a significant evolution in biosecurity governance. The 2018 strategy, focused on national defense and militarized responses, reflected a narrowly focused view of biological threats as matters of state security. The 2022 strategy, shaped by the COVID-19 pandemic, embraces a broader, global health-oriented framework that incorporates health equity and global cooperation. While this shift is commendable, it still faces significant challenges in operationalizing these goals, particularly in terms of balancing national security priorities with global health needs and ensuring that global cooperation does not merely reflect the priorities of more resource-rich nations.

To move beyond the reactive, militarized models of biosecurity, future strategies must embrace more comprehensive approaches that address the root causes of biological risks, such as climate change, environmental destruction, and social inequalities. This holistic approach should not only prioritize global health security but also ensure that health equity and environmental sustainability are foundational principles guiding biosecurity policy. By addressing the systemic drivers of disease emergence alongside improving international coordination, future strategies will be better equipped to manage biological risks in a manner that promotes global health, sustainability, and equity.

3.4.1 Goal 1: Enable risk awareness *and detection* to inform decision-making across the biodefense enterprise (*update from 2018*)

Goal one of the 2018 and 2022 National Biodefense Strategies delineates a shared commitment to strengthening the nation's preparedness and response mechanisms against biological threats. In the 2018 strategy, goal one underscored the imperative of enhancing risk awareness and readiness through increased biosurveillance capabilities. This entailed the adaptation of detection and monitoring systems across federal agencies, healthcare facilities, and public health institutions to swiftly identify emerging infectious diseases and biosecurity risks (White House, 2018). The 2018 National Biodefense Strategy uses language that emphasizes proactive surveillance and the need for robust biosurveillance systems to identify biological threats before they escalate. Phrases such as “early detection” and “rapid decision-making” situate detection as a key element in securing national borders and critical infrastructure. This language constructs biological threats as external dangers—risks that must be identified and managed before they reach U.S. soil. The strategy frames detection as a state-centered responsibility, relying on federal agencies, intelligence networks, and defense collaborations to integrate biological risk data. This framing reinforces securitization theory, where biological threats are elevated to matters of national security requiring extraordinary surveillance measures (Buzan, Wæver, & de Wilde, 1998).

The use of language such as “biosurveillance” and “threat anticipation” reflects the biopolitical governance described by Foucault (1972), where the state exerts power over biological life through the control of information and population monitoring. The implicit assumption is that surveillance systems are inherently protective, creating a narrative of control and containment. However, this focus on external threats may overlook the domestic origins of biological risks, such as those arising from agriculture, environmental degradation, or domestic misuse of biological materials.

The 2022 strategy, by contrast, employs language that reflects a shift toward global interconnectedness and shared responsibility. Terms like “global health security”, “collaborative risk assessment”, and “international partnerships” signal a recognition that biological threats are not confined by borders. The 2022 strategy also integrates the One Health framework, emphasizing the interconnectedness of human, animal, and environmental health. This language fosters a sense of international collaboration and moves away from the us-versus-them framing of the 2018 strategy. By acknowledging that biological risks can emerge both within and outside U.S. borders, the 2022 strategy adopts a more nuanced approach to detection, emphasizing the need for equity and mutual accountability in global surveillance efforts.

3.4.2 Goal 2: Ensure biodefense enterprise capabilities to prevent bioincidents

Goal two of the 2018 National Biodefense Strategy focuses on enhancing capabilities to prevent, detect, and respond to deliberate and accidental biological threats, with a focus on strengthening medical countermeasure development, distribution, and response coordination (White House, 2018). Essentially it aims to reduce the incidence of naturally occurring infectious diseases and laboratory accidents both domestically and abroad. The strategy emphasized the importance of accelerating research and development efforts to produce vaccines, therapeutics, and diagnostics to mitigate the impact of biological incidents. Furthermore, it prioritized the establishment of robust systems for the rapid distribution and administration of medical countermeasures during emergencies, as well as the enhancement of coordination mechanisms among federal, state, local, tribal, and territorial entities to ensure a cohesive response.

The 2018 strategy frames prevention as a capability-driven goal, focusing on language such as “technological innovation,” “biodefense infrastructure,” and “countermeasure deployment.” This discourse constructs biological threats as events that can be mitigated through scientific control and state-managed solutions. The repeated emphasis on terms like “prevention measures” and “bioterrorism deterrence” reflects the securitization of biological risks, framing them as challenges that require militarized biosecurity responses. By positioning prevention within the scope of defense capabilities, the strategy underscores the state's authority as the primary actor in bioincident prevention, aligning public health with national security priorities.

The language used in this goal also reflects a reactive model of prevention, emphasizing the development of countermeasures after risks have been identified, rather than addressing the systemic drivers of biological threats. This approach risks neglecting the ecological and social factors—such as climate change, deforestation, and global inequities—that contribute to the emergence of biological risks. The biopolitical implications of this language are significant, as it reinforces the idea that scientific and technological intervention can prevent bioincidents, rather than addressing the need for broader systemic change (Foucault, 1972).

The 2022 strategy shifts toward a more collaborative tone, using language that emphasizes partnerships, capacity building, and prevention at the source. Terms like "integrated prevention efforts" and "cross-sectoral cooperation" underscore a commitment to global health equity and shared responsibility. This language reflects a growing acknowledgment of structural vulnerabilities, particularly in lower-income countries where the lack of resources amplifies biological risks. The incorporation of the One Health framework in the prevention goal highlights the interconnectedness of biological systems and reframes prevention as a systemic, preventive approach rather than a purely technological solution. This reorientation addresses some of the gaps in the 2018 strategy by emphasizing the ecological dimensions of bioincident prevention.

3.4.3 Goal 3: Ensure biodefense enterprise preparedness to reduce the impacts of bioincidents

Goal three of the 2018 National Biodefense Strategy focuses on improving incident response and recovery capabilities, with an emphasis on enhancing coordination among federal, state, local, tribal, and territorial entities (White House, 2018). The strategy highlights the importance of strengthening communication and coordination mechanisms to facilitate rapid and effective responses to biological emergencies. Additionally, it emphasizes the need for conducting exercises and training programs to enhance preparedness and ensure seamless coordination during crisis situations.

The 2018 preparedness goal employs language that emphasizes military-style readiness and infrastructure resilience. Terms such as "stockpiles," "emergency deployment," and "contingency planning" underscore the strategy's focus on rapid mobilization in response to biological incidents. This discourse situates preparedness within a securitized framework, where biological threats are framed as potential disruptors of national security and economic stability. The language used reflects a command-and-control model, emphasizing the need for centralized authority and hierarchical coordination across agencies to manage potential crises.

By positioning preparedness as an extension of defense infrastructure, the 2018 strategy focuses on the containment of threats, often overlooking the community-level capacities that are critical for effective response. This centralized approach aligns with biopolitical governance, where the state seeks to regulate populations and mitigate crises through bureaucratic and technological interventions (Foucault, 1972).

The 2022 strategy, however, adopts a more inclusive tone, using language that emphasizes community resilience and health system preparedness. Phrases like "collaborative readiness", "equitable preparedness," and "capacity building" reflect an understanding of the limitations of centralized, defense-focused approaches. The 2022 strategy explicitly incorporates lessons from COVID-19, acknowledging the disproportionate impact of biological incidents on marginalized communities and under-resourced regions.

The shift in language signals a transition from top-down preparedness to shared responsibility, where local communities, international partners, and non-governmental organizations play critical roles in building systemic resilience. By focusing on equitable preparedness, the strategy underscores the importance of addressing structural inequities that exacerbate the impacts of bioincidents.

3.4.4 Goal 4: Rapidly respond to limit the impacts of bioincidents

Goal four of both the 2018 and 2022 National Biodefense Strategies focuses on advancing the development and implementation of medical countermeasures to rapidly respond and mitigate the impacts of bioincidents (White House, 2018; White House, 2022). In the 2018 strategy, this goal emphasizes the importance of research and innovation in producing effective vaccines, therapeutics, and diagnostics to address gaps in medical countermeasure preparedness during biological emergencies. The strategy underscores the need for sustained investment in research and development efforts to ensure the availability of safe and effective interventions (White House, 2018).

Building on this, the 2022 strategy places a stronger emphasis on accelerating the development and deployment of next-generation medical countermeasures. It highlights the utilization of cutting-edge technologies such as genomics, synthetic biology, and artificial intelligence to expedite research processes and enhance the efficacy of medical interventions. Additionally, the 2022 strategy underscores the importance of enhancing the accessibility of medical countermeasures by focusing on the scalability and affordability of production methods. This includes initiatives to streamline regulatory processes, foster public-private partnerships, and incentivize industry innovation to expedite the translation of research into practical solutions (White House, 2022).

The 2018 strategy uses language that emphasizes speed and efficiency, with terms like “rapid deployment,” “containment protocols,” and “immediate countermeasures” dominating the response goal. This framing constructs biological threats as emergencies that require swift, decisive action to limit their impact. The strategy positions state agencies—particularly military and intelligence organizations—as the primary actors in managing bioincidents, reinforcing the securitized nature of biosecurity. This approach reflects a hierarchical model of response, where government control is paramount, and the public is primarily a recipient of state action.

The discourse around rapid response in the 2018 strategy also reinforces a defensive posture, focusing on containing threats rather than addressing their root causes. The use of language that emphasizes state intervention highlights the biopolitical implications of response strategies, where the state exerts power over populations through measures such as quarantines, curfews, and mandatory medical interventions (Foucault, 1972).

The 2022 strategy employs language that signals a shift toward inclusive, collaborative responses. Terms like “equitable access to countermeasures”, “community-driven responses,” and “international coordination” highlight the need for a globalized approach to biological incidents. The focus on equity and collaboration reflects the lessons of COVID-19, where unequal access to resources and disparities in healthcare infrastructure exacerbated the global impact of the pandemic. The 2022 response goal reframes biosecurity as a shared global responsibility, emphasizing the importance of community involvement and cross-border coordination in mitigating biological threats.

3.4.5 Goal 5: Facilitate recovery to restore the community, the economy, and the environment after a bioincident

Goal five of both the 2018 and 2022 National Biodefense Strategies focuses on facilitating recovery to restore the community, the economy, and the environment after a bioincident (White House, 2018; White House, 2022). The 2018 National Biodefense Strategy frames the recovery process through language that prioritizes the restoration of critical infrastructure, the rebuilding of the economy, and the re-establishment of social order after a bioincident. Phrases like “restoring functionality”, “rebuilding national resilience,” and “rapid economic recovery” dominate the discourse, highlighting an urgency to return to normalcy and minimize disruptions to the nation’s economic and security systems. This framing constructs recovery as a national imperative, emphasizing the role of state agencies in leading restoration efforts. Recovery is treated as a strategic extension of defense, focusing on rebuilding systems critical to national power and ensuring that future disruptions to security and economic stability are avoided.

The language used in the 2018 strategy reflects a securitized model of recovery, where biological threats are seen primarily as crises that disrupt the nation-state’s core functions (Buzan, Wæver, & de Wilde, 1998). This framing underscores a state-centric approach, with recovery efforts geared toward the protection of state sovereignty and the continuity of governance. However, this discourse often marginalizes the social and environmental dimensions of recovery, neglecting the inequities and vulnerabilities that bioincidents expose in communities most affected by such crises.

The biopolitical implications of this framing are also significant. The emphasis on economic and infrastructural restoration reveals a preoccupation with the management of populations as subjects of recovery rather than active participants. The language of “rapid recovery” assumes a top-down approach, where the state determines recovery priorities, often overlooking community-led initiatives or longer-term measures to address systemic vulnerabilities (Foucault, 1972).

In contrast, the 2022 strategy employs language that broadens the scope of recovery to include community well-being, environmental restoration, and global health equity. Terms such as “inclusive recovery,” “resilient systems,” and “equitable resource distribution” emphasize the importance of addressing the root causes of vulnerability exposed by bioincidents, rather than merely restoring systems to their pre-incident state. The 2022 strategy integrates lessons from COVID-19, recognizing that effective recovery must address the disproportionate impacts of bioincidents on marginalized populations and communities with limited resources.

The inclusion of the One Health framework in the recovery goal marks a significant departure from the 2018 strategy’s narrower focus. The 2022 language emphasizes the interconnectedness of human, animal, and environmental health, acknowledging that ecological degradation is often a driver of biological risks. By incorporating environmental restoration into the recovery process, the strategy positions recovery as a long-term effort to rebuild in ways that reduce future risks, aligning with the principles of sustainability and global cooperation (Hinchliffe & Bingham, 2008).

The 2022 strategy’s discourse also places a greater emphasis on equity. Language such as “restoring trust in public health systems” and “ensuring equitable access to recovery resources” reflects an understanding that bioincidents exacerbate existing inequalities. The strategy explicitly calls for recovery efforts that prioritize the needs of the most vulnerable, including low-income populations, communities of color, and regions with limited health infrastructure. This shift acknowledges that recovery must address the systemic inequities that bioincidents highlight and worsen, positioning the state as a facilitator of inclusive recovery efforts rather than merely a director of economic restoration.

From a securitization theory perspective, the 2022 strategy de-securitizes aspects of recovery by framing it as a shared responsibility involving local communities, international partners, and non-governmental organizations. This marks a move away from the defensive recovery narrative of 2018 toward one that emphasizes collaboration and global solidarity. However, challenges remain in operationalizing these goals, particularly in ensuring that recovery efforts are not co-opted by state-centric priorities or reduced to bureaucratic processes that perpetuate existing inequities.

3.5 Conclusion

The evolution of U.S. biosecurity strategies highlights the significant shifts in discourse and policy in response to emerging biological threats, reflecting the interplay between securitization, resilience, and systemic vulnerabilities. Early frameworks such as the 2005 National Strategy for Pandemic Influenza emphasized rapid containment and vaccine stockpiling, adopting approaches rooted in agricultural biosecurity (Homeland Security Council, 2005; Boyd, 2001). This strategy framed pandemics as inevitable crises that necessitated state-led interventions and prioritized surveillance and measurable outcomes over addressing the root causes of zoonotic spillovers, such as habitat destruction and industrial farming practices (Wallace, 2016; Gilchrist et al., 2007). By framing pandemics through a securitized lens, this strategy laid the foundation for subsequent policies that expanded the scope of biosecurity to address broader biological threats. The emphasis on centralized control and technological solutions underscored a reliance on containment measures that often sidelined opportunities for addressing systemic ecological and social vulnerabilities (Hinchliffe & Bingham, 2008).

The 2009 National Strategy for Countering Biological Threats built on this foundation by incorporating both deliberate and naturally occurring risks into its framework. This strategy employed militarized language to frame biological risks as existential threats, reinforcing state authority and emphasizing surveillance systems inspired by agricultural practices (Buzan et al., 1998; Allen & Lavau, 2015). However, its focus on containment often neglected the structural vulnerabilities associated with high-density production systems and globalized supply chains (Wallace, 2016; Gilbert et al., 2015). By positioning the state as the primary arbiter of biosecurity, the strategy reinforced the securitization of biological risks while sidelining opportunities for systemic reform. The language and measures proposed underscored a reactive posture, aiming to preempt threats but failing to confront the underlying socioeconomic and environmental conditions that exacerbate biological risks (Davies, 2008).

The 2012 National Strategy for Biosurveillance marked a shift toward resilience, emphasizing interagency collaboration and anticipatory governance to address biological risks (White House, 2012). This strategy aimed to integrate public health, intelligence, agriculture, and defense sectors into a unified biosurveillance network. While the strategy reflected progress in recognizing the interconnected nature of biosecurity, its technocratic focus on real-time data sharing and predictive analytics continued to prioritize technical solutions over addressing inequities in healthcare access and systemic drivers of zoonotic risks (Bingham & Hinchliffe, 2008). Moreover, it highlighted the increasing reliance on advanced technologies and centralized data systems, which, while effective for rapid responses, risked marginalizing community-based and decentralized health approaches essential for long-term resilience (Hinchliffe et al., 2012).

The 2018 and 2022 National Biodefense Strategies further illustrate the evolving nature of U.S. biosecurity policy. The 2018 strategy adhered to a securitized, defense-oriented framework, emphasizing rapid containment and state-centric governance (White House, 2018). This approach framed biological risks as threats to national security requiring immediate intervention to protect critical infrastructure and public health. In contrast, the 2022 strategy, shaped by the lessons of the COVID-19 pandemic, adopted a more inclusive perspective. It integrated the One Health framework, emphasizing global health equity, systemic resilience, and the interconnectedness of human, animal, and environmental health (White House, 2022; Behravesh, 2016). This shift acknowledged the limitations of prior frameworks while emphasizing the importance of addressing structural vulnerabilities and fostering global cooperation. The 2022 strategy underscored the need for a multi-stakeholder approach, advocating for international partnerships and equitable resource distribution to build a more robust and collaborative global biosecurity framework (Andrus et al., 2010; Hinchliffe & Bingham, 2008).

A critical thread running through these strategies is the influence of industrial animal agriculture on the development of biosecurity frameworks. Practices such as surveillance, early detection, and containment—central to managing zoonotic risks in agricultural settings—have directly informed national biosecurity policies (Boyd & Watts, 1997; Allen & Lavau, 2015). These measures have reinforced state-centric governance models, often prioritizing economic stability and infrastructural protection over systemic reforms. For example, protocols developed to manage avian influenza within the poultry industry have shaped national strategies that emphasize containment and surveillance while neglecting the ecological and socioeconomic drivers of zoonotic diseases (Wallace, 2016; Hinchliffe & Bingham, 2008). This reliance on agricultural biosecurity practices reflects a broader challenge in balancing immediate risk management with addressing the complex interdependencies between human activities, ecological systems, and global health.

The analysis of these strategies reveals a recurring tension between the imperatives of securitization and the need for more sustainable, equitable approaches to biosecurity. Securitization, while effective in mobilizing resources and political will, often prioritizes short-term containment over systemic reforms that address the root causes of biological risks (Buzan et al., 1998; Davies, 2008). This tension is evident in the persistent focus on rapid response and surveillance measures at the expense of addressing factors such as habitat loss, climate change, and socioeconomic disparities that facilitate the emergence and spread of zoonotic diseases (Daszak, 2013; Cunningham et al., 2017). Strategies rooted in securitization may achieve immediate containment but risk perpetuating cycles of vulnerability without broader systemic change (Lakoff, 2008).

The Foucauldian discourse analysis conducted throughout this chapter highlights how biosecurity policies serve as instruments of biopolitical governance, where the state exerts control over populations and biological risks through surveillance, containment, and anticipatory measures (Foucault, 2007; Braun, 2013). This governance structure is evident in the strategies' reliance on hierarchical systems of authority and centralized responses, which often marginalize localized or community-driven solutions. Foucault’s concept of biopolitics underscores the strategies’ focus on managing life and risk, emphasizing the prioritization of state stability over systemic equity. Additionally, securitization theory provides a lens to understand how framing biological threats as existential risks justifies extraordinary measures, such as expanded surveillance and emergency interventions (Buzan et al., 1998; Wæver, 1995). This framing elevates biosecurity as a matter of national security but risks entrenching power imbalances and perpetuating inequities in global health governance (Davies, 2008; Albert et al., 2021).

Discourse analysis across these strategies also highlights the gradual transition from narrowly defined, state-centric biosecurity concerns to more inclusive, interdisciplinary frameworks that incorporate global health equity and systemic resilience. The integration of the One Health approach represents a critical acknowledgment of the interconnected nature of biological threats (Destoumieux-Garzón et al., 2018). By emphasizing the links between human, animal, and environmental health, recent strategies point toward a more holistic understanding of biosecurity. However, operationalizing this vision remains challenging, particularly in reconciling the demands of global equity with the entrenched state-centric and technocratic orientations of biosecurity governance (Lee & Brumme, 2013).

Achieving a balance between immediate threat mitigation and long-term resilience will require addressing systemic drivers of risk, fostering collaborative governance, and embedding principles of global health justice into biosecurity policy. This necessitates a shift from reactive, containment-focused measures to proactive, preventative strategies that engage with the structural inequities and ecological disruptions at the heart of zoonotic spillovers (Daszak, 2013; Hinchliffe et al., 2012). Building a resilient biosecurity framework also demands greater investment in community-level health systems, equitable resource distribution, and interdisciplinary collaboration to bridge the gaps between policy, science, and society (Behravesh, 2016; Jasanoff, 2004). By addressing these dimensions, U.S. biosecurity strategies can evolve to meet the complex challenges of the 21st century while fostering a more just and sustainable global health landscape.

Chapter 4: Conclusion – The Evolution and Future of U.S. Biosecurity

Across its history, biosecurity has transformed from narrowly targeted agricultural measures to a broad, integrated framework encompassing human, animal, and environmental health (Allen & Lavau, 2014; Behravesh, 2016). Central to this transformation is the role of industrial animal agriculture, which has profoundly influenced national biosecurity strategies through practices such as surveillance, containment, and disease prevention (Gilbert et al., 2015; Boyd & Watts, 1997). These agricultural practices, deeply embedded in the fabric of U.S. biosecurity, have extended their influence into broader public health and pandemic preparedness frameworks, demonstrating the interconnectedness of systems traditionally viewed as distinct (Wallace, 2016).

Chapter 1 laid the groundwork by tracing the theoretical and historical underpinnings of biosecurity. Its origins in agricultural contexts—focused on protecting livestock and crops from disease—expanded into public health domains in response to bioterrorism and zoonotic disease threats (Hinchliffe et al., 2012; Fidler & Gostin, 2008). This historical lens revealed tensions between securitization and broader ecological sustainability (Braun, 2013). The securitization of disease, presented as a key driver of policy evolution, shaped priorities and constructed threats in ways that often reflected economic and political imperatives (Buzan, Wæver, & de Wilde, 1998). The chapter highlighted the evolving role of the referent object of security, whether defined as human populations, economic stability, or ecosystems, and emphasized the importance of understanding these shifts in shaping biosecurity frameworks (Gronvall, 2022).

Building on this foundation, Chapter 2 delved into the industrialization of poultry production as a case study of how biosecurity operates within agricultural systems. High-density confinement, genetic homogeneity, and antibiotic reliance were identified as systemic vulnerabilities that both necessitate and undermine biosecurity measures (Gilchrist et al., 2007; Allen & Lavau, 2014). These vulnerabilities illustrate the paradox of industrial agriculture: while biosecurity measures mitigate immediate risks, they often perpetuate the structural conditions that enable zoonotic disease emergence (Wallace, 2016). The chapter's analysis underscored the ways in which these practices normalize disease risks within industrial systems while marginalizing alternative farming models that prioritize ecological balance and disease resilience (Behravesh, 2016). These insights provided critical context for understanding the systemic constraints that shape national biosecurity frameworks.

Chapter 3 extended the discussion to national health strategies, examining the evolution of U.S. biosecurity policy from the 2005 National Strategy for Pandemic Influenza to the 2022 National Biodefense Strategy. This analysis revealed how principles originating in agricultural biosecurity—such as early detection, rapid response, and interagency collaboration—informed national frameworks (United States Department of Health and Human Services [HHS], 2005; United States Department of Agriculture [USDA], 2021). The integration of the One Health approach marked a significant development, reflecting an acknowledgment of the interconnectedness of health systems across species and environments (Behravesh, 2016). However, the chapter also critiqued the securitized framing of biosecurity, which often prioritizes containment over addressing root causes, such as habitat destruction, industrial farming practices, and the ecological degradation that facilitates zoonotic spillover (Hinchliffe & Bingham, 2008). This critical examination emphasized the persistent tensions between reactive strategies and the need for systemic reform.

The COVID-19 pandemic serves as a pivotal moment in the evolution of U.S. biosecurity, catalyzing significant revisions to national strategies. The 2022 National Biodefense Strategy emphasized resilience, global equity, and systemic reform, signaling a shift toward addressing vulnerabilities exposed by the pandemic (National Security Council, 2022). This framework highlights the potential for biosecurity policies to influence industrial agriculture, particularly through enhanced surveillance, sustainability initiatives, and stricter adherence to One Health principles (Behravesh, 2016). However, realizing this potential requires navigating tensions between economic imperatives and ecological sustainability, as industrial models often resist reform that challenges their established efficiency and profitability (Wallace, 2016). The pandemic also underscored the urgency of integrating global health perspectives into national biosecurity frameworks, reinforcing the interconnectedness of local and international efforts.

The progression of strategy titles—from biological threats to biosurveillance and biodefense—further illustrates the dynamic nature of U.S. biosecurity policy (Gronvall, 2022). Each shift reflects a broader conceptualization of risk, moving from isolated pathogen control to integrated, multisectoral approaches. The inclusion of biosurveillance underscores advancements in technology and data analytics (HHS, 2012), while biodefense signals a securitized understanding of health risks as threats to national stability (Buzan et al., 1998). These developments enhance preparedness but also raise critical questions about equity and the prioritization of state and corporate interests over community-led health initiatives (Wenham et al., 2020). The language of defense and security often centers power within state and institutional actors, sidelining local and grassroots efforts that could contribute to more equitable and resilient health systems (Braun, 2013). This narrative shift has implications for how future policies balance technical innovation with participatory governance.

The evolution of U.S. conceptualization of biosecurity is exemplified in its transition from a narrow focus on agricultural and bioterrorism threats to a broader, integrated framework that includes human, animal, and environmental health. Initially centered on protecting livestock and crops from disease, early biosecurity strategies reflected the economic priorities of safeguarding agricultural outputs. This agricultural-centric perspective expanded significantly following events such as the 2001 anthrax attacks, which underscored vulnerabilities in public health systems and led to the inclusion of bioterrorism in the national discourse on biosecurity.

Subsequent developments were shaped by the growing recognition of zoonotic diseases, such as the H1N1 pandemic in 2009 and COVID-19, which highlighted the interconnectedness of human, animal, and environmental health. The adoption of the One Health framework marked a pivotal shift, integrating these domains into a cohesive policy approach (Behravesh, 2016). The progression from narrowly defined threats to multisectoral strategies is reflected in key policies, including the 2005 National Strategy for Pandemic Influenza, which emphasized containment and response, and the 2022 National Biodefense Strategy, which incorporated global equity and systemic reforms into its goals (HHS, 2005; National Security Council, 2022). This evolution illustrates a shift not only in scope but also in governance, moving from reactive, siloed responses to proactive, interdisciplinary collaboration.

A related question examined how governmental and international institutions shape biosecurity. Institutions such as the USDA, CDC, and DHS play central roles in defining and implementing biosecurity measures, from disease surveillance to interagency coordination (USDA, 2021). International bodies like the World Health Organization (WHO) and the World Organisation for Animal Health (WOAH) provide frameworks for global cooperation and emphasize the importance of equity and data sharing in managing biological risks (Behravesh, 2016). Together, these entities drive the adoption of integrated approaches, such as the One Health framework, that address the transboundary nature of biological threats.

Finally, the question of how biosecurity policies balance immediate risks and systemic vulnerabilities underscores the tension at the heart of this field. While U.S. policies excel at mitigating immediate risks through surveillance and containment, they often fall short in addressing the root causes of vulnerability, such as habitat destruction and industrial farming practices (Wallace, 2016; Hinchliffe & Bingham, 2008). The COVID-19 pandemic highlighted the limitations of reactive strategies, prompting calls for systemic reforms that prioritize sustainability and resilience (Wenham et al., 2020). Addressing these structural drivers requires a paradigm shift toward policies that balance economic, ecological, and public health imperatives.

The evolution of U.S. biosecurity reflects an ongoing negotiation between historical precedents, emerging challenges, and competing priorities (Buzan et al., 1998). Its trajectory highlights both achievements and blind spots: while significant progress has been made in integrating human, animal, and environmental health, persistent gaps remain in addressing the structural conditions that underlie biological threats (Wallace, 2016). The emphasis on containment, while effective in managing immediate risks, often obscures the need for systemic reforms that address the root causes of vulnerability. The COVID-19 pandemic starkly illuminated these gaps, demonstrating the limitations of reactive strategies in the face of global interconnectedness and ecological instability (Wenham et al., 2020). By analyzing these patterns, future strategies can better anticipate and address the cascading effects of emerging threats.

A more inclusive and forward-looking biosecurity framework would move beyond the reactive logic of containment to embrace proactive strategies that prioritize systemic change. This includes fostering greater collaboration between public health, environmental science, and agriculture to create integrated policies that align with the principles of One Health (Behravesh, 2016). It also requires addressing power asymmetries within biosecurity governance, ensuring that marginalized communities and alternative farming systems have a voice in shaping policy (Hinchliffe & Bingham, 2008). By broadening the scope of biosecurity to include sustainability and equity as core principles, the United States can develop a framework that not only mitigates immediate risks but also fosters long-term resilience (Wallace, 2016). Achieving these goals demands a paradigm shift toward holistic governance structures capable of adapting to the complex realities of contemporary health challenges.

As the U.S. continues to grapple with the challenges of zoonotic diseases, the interplay between economic priorities, public health imperatives, and ecological sustainability will shape the future of biosecurity. Embracing systemic reform and fostering cross-sectoral collaboration are essential steps in building a biosecurity framework that protects against immediate threats while promoting a healthier, more equitable future (Hinchliffe et al., 2012). This vision requires a shift in mindset, recognizing that resilience is not merely the absence of disease but the presence of systems that support life in all its diversity and interconnectedness. By integrating these principles, biosecurity can evolve into a comprehensive framework that addresses both immediate needs and long-term global health challenges.

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