



Biosecurity as National Security: A Comparative Analysis of Biosecurity Strategies in the United States, China, and the European Union

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ABSTRACT

Biosecurity has increasingly moved beyond the traditional domain of public health to become an important component of national security. This shift raises questions about how major political actors define biological threats and translate them into national and international policy. This study comparatively examines how the United States, China, and the European Union (EU) conceptualize, institutionalize, and implement biosecurity policies related to pandemics, biotechnology risks, and bioterrorism. Drawing on securitization theory and the global health security literature, the study uses a comparative qualitative analysis of relevant policies, strategies, and institutional arrangements. It finds that all three actors increasingly frame biological threats as major security concerns, but they differ in their threat perceptions, institutional structures, and approaches to balancing security with scientific and economic openness. The United States increasingly links biosecurity to strategic competition and supply-chain security; China integrates it within a broader national-security framework; while the EU emphasizes collective resilience, institutional coordination, and strategic autonomy. These differences demonstrate that the securitization of biosecurity is not producing a single global model but rather distinct governance approaches shaped by different political and strategic contexts. The analysis further shows that these approaches have important implications for global health governance, scientific cooperation, international coordination, and the implementation of the 2025 WHO Pandemic Agreement. The study concludes that securitization can strengthen national preparedness and institutional capacity, but excessive emphasis on national control and strategic competition may weaken the international cooperation required to manage biological risks that transcend national borders.

Keywords: Biosecurity, National Security, Securitization Theory, Global Health Governance, Biotechnology, United States, China, European Union.

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1. Introduction

For most of the twentieth century, biological threats were governed as a technical and humanitarian matter, entrusted to epidemiologists, public health agencies, and the World Health Organization (WHO). The COVID-19 pandemic, alongside accelerating advances in synthetic biology, gene editing, and artificial-intelligence-assisted biological design, has decisively altered this arrangement. Biosecurity, understood broadly as the protection of human, animal, plant, and ecological systems from the deliberate, accidental, or natural release of dangerous biological agents, has been absorbed into the vocabulary of national security, strategic competition, and great-power rivalry (Duan, 2024). Pathogens, genomic data, and bio manufacturing capacity are increasingly discussed in the same breath as semiconductors, rare-earth minerals, and artificial intelligence: as strategic assets whose control confers national advantage (Cepa, 2026).

This securitization of biology raises important questions for International Relations and security studies. How do major powers with different political systems and strategic cultures conceptualize biological risk as a security problem? What institutional architectures have they built to manage that risk, and to what extent do these architectures converge or diverge? What are the consequences of an increasingly securitized approach to biology for international scientific cooperation and global health governance? This paper addresses these questions through a comparative analysis of biosecurity strategy in three of the world's most consequential actors: The United States, the People's Republic of China, and the European Union.

The paper contends that, though all three actors have brought biosecurity into the realm of national security, they have gone through distinct institutional and normative tracks. Biosecurity is a largely strategic process in the United States, which has de-risked the biological dimension in terms of export controls, procurement restrictions, and supply-chain de-linking with China. China has integrated biosecurity into Xi Jinping's "holistic national security concept" and incorporated it into a Party-driven comprehensive risk governance mechanism that views biotechnology as a threat and a strategic sector to

be developed. The European Union has taken a unique path of "collective securitization" (Bengtsson & Rhinard, 2019) which involves and creates supranational institutions like the European Health Emergency Preparedness and Response Authority (HERA), through incremental treaty-based integration, without the central security apparatus of the United States or China. The conflicting trends are of importance because they affect the possibilities for the sort of international co-operation needed for truly transboundary biological dangers.

The rest of the paper is organized as follows. The theoretical background based on the securitization theory and the literature on global health security is presented in Section 2. The comparative case-study methodology is explained in Section 3. Sections 4-6 explore, sequentially, the biosecurity approaches of the United States, China and the European Union. A comparative analysis of convergence and divergence is presented in section 7 for the three cases. Securitized biology has geopolitical and global health governance implications that are discussed in Section 8, especially with regard to the 2025 WHO Pandemic Agreement. The book ends with policy implications (Section 9).

2. Theoretical Framework

This study mainly uses securitization theory, developed by the Copenhagen School, and is supported by perspectives from global health security, human security, collective securitization, and great-power technology competition. Together, these approaches help explain how the United States, China, and the European Union define biological risks and develop different biosecurity policies.

The main framework is the Copenhagen School's securitization theory. Buzan, Wæver, and de Wilde (1998) argue that security is not only an objective condition but is also socially constructed through political processes. An issue becomes a security issue when political actors present it as an existential threat to an important referent object, such as the state, population, economy, or political system. When an issue is raised in this manner, it allows governments to take unprecedented steps that would not be tolerated in regular politics. As applied to health, this explains a number of factors about the treatment of some diseases as security

issues and other diseases as primarily public-health issues, including HIV/AIDS, SARS and COVID-19 (Elbe, 2006; Enemark, 2009). Securitisation theory is useful for this study as it enables biosecurity to be considered as a political process, and not merely a technical solution to biological risks. It also poses questions that raise important issues related to who is the subject of a biological threat, what is being protected, and what political and institutional repercussions result.

The second view is from the literature on global health security and human security. Fidler (2007) and McInnes and Rushton (2013) suggest a contradiction between state protection from biological hazards and individual and community health and well-being. Governments may have higher priorities for border control, surveillance, containment and economic protection when the primary focus is on national security. A human security approach, on the other hand, focuses more strongly on ensuring equitable access to vaccines, medicine, diagnostics and health services. This distinction is crucial to grasp the nature of the question as to whether current biosecurity policies have a narrower focus on a country's own needs than on broader global health needs, especially in the context of the COVID-19 pandemic leading to a concept of vaccine nationalism (McMahon, 2025).

The third is a collective securitization perspective which is especially suited to the European Union (EU). The EU is not a single state, and the development of its security policies is therefore a process of cooperation between the EU institutions, member states and the network of experts. Bengtsson and Rhinard (2019) extend the concept of securitization theory to this supranational context and demonstrate the possibility for collective development of security concerns instead of those of a single political entity. This lens in particular provides an understanding of the EU's biosecurity approach and how it tries to reconcile national interests and the security of the EU as a whole.

Lastly, there are two additional perspectives, realist and liberal-institutionalist, that offer a broader strategy perspective on great power tech competition. They provide insights into the intersection of biosecurity with competition over

strategic technologies, supply chains, and economic security such as semiconductors, AI, and critical minerals (Yin, 2024). Combined, these viewpoints enable the study to explore biosecurity as a security concern, a public-health problem, an aspect of collective governance and a new facet of great power rivalry.

3. Research Methodology

This paper adopts a qualitative most-different-systems comparative case-study design, with three actors whose political systems, institutional structures and strategic cultures are very different: a liberal democratic superpower (the United States), a one-party authoritarian state (China), and a supranational union of democracies (the European Union). This design offers scope for identifying which features of the securitisation of biosecurity are shared by very different political systems (which, for this particular analysis suggests structural drivers like pandemic experience or technology change) and which features are determined by domestic institutions and ideology.

The empirical material is based on primary legal and policy documents, such as the U.S. National Biodefense Strategy (2022), the BIOSECURE Act that was enacted in the Fiscal Year 2026 National Defense Authorization Act, China's Biosecurity Law of 2021, and the EU regulations creating the European Health Union and HERA, as well as secondary scholarly literature in International Relations, security studies, and global health governance studies, and recent reporting on legislative and institutional developments through 2026. Three dimensions are explored in each case study: (i) the conceptualization of biosecurity as a security problem; (ii) the institutional architecture developed to manage biosecurity; and (iii) policy instruments for implementing biosecurity.

4. The United States: Biosecurity as Strategic Competition

The United States has taken two parallel, but complementary paths towards biosecurity, one a public-health oriented pandemic-preparedness path and the other a strategic-competition path, primarily targeted at China. The 2022 National Biodefense Strategy and Implementation Plan (NBSIP), released by the Biden administration, outlines a 'whole-of-government' strategy for

federal efforts to prepare for, prevent, detect and respond to biological threats in a One Health paradigm, involving human, animal, plant and environmental domains. (The White House Office of Science and Technology Policy, 2022). This approach is in keeping with a technocratic, capabilities-based understanding of biosecurity, focused on genomic surveillance, rapid diagnostics, and vaccine platform technologies that have emerged from the COVID-19 pandemic and the 2022 mpox outbreak.

The securitized framing of biotechnology as a great power competition with China is also developing simultaneously as part of the preparedness track. Simultaneously, however, is the securitized framing of biotechnology as an arena of great power competition with China, which is increasingly developing along the parallel preparedness track. Biotechnology has been recognized by successive Democratic and Republican Administrations as a frontier technology area in which the United States must out-compete the People's Republic of China (Yin, 2024). This thinking has manifested itself in the BIOSECURE Act, which was originally introduced in 2023 and signed into law in December 2025 as Section 851 of the Fiscal Year 2026 National Defense Authorization Act (FY 2026 NDAA) (Foley Hoag LLP, 2025). The Act includes a ban on federal agencies entering into any contract with "biotechnology companies of concern," which includes firms like BGI, MGI, Complete Genomics, and WuXi AppTec, and applies to any entity connected to a foreign adversary's internal-security, intelligence, or military unit (United States Congress, 2024). Congressional findings to the legislation explicitly use the term of China's military-civil fusion in its description of the development of China's biotechnology, while genomic data is classified as a strategic asset akin to semiconductors (United States Congress, 2024).

The BIOSECURE Act is a very different American approach to securitisation: legislative, adversarial and focused on exclusion, specifically exclusion of a competitor from key resources, such as genomic sequencing platforms and biological data. This course is in line with the preceding trend of semiconductor export controls in the United States and more generally the techno-nationalist competition between China and

the rest of the world that is encapsulated by the concept of biosecurity (Cepa, 2026). The outcome is a split U.S. biosecurity stance: strong multilateral commitments to pandemic preparedness and health security cooperation, while restrictive unilateral biotechnology restrictions for partners that are not listed as "designated Chinese entities. This leaves the U.S. with a "split" biosecurity posture: robust multilateral commitments to pandemic preparedness and health security cooperation, contrasted by prohibitive unilateral biotechnology restrictions for partners not listed as "designated Chinese entities.

5. China: Biosecurity within the Holistic National Security Concept

China's biosecurity strategy is tied to Xi's holistic national security concept, which was first announced in April 2014 and which was then extended to the 11 domains of national security, such as political, military, economic, technological, ecological, and, since 2020, biological security (Jamestown Foundation, 2021). The doctrine is captured in the Biosecurity Law of the People's Republic of China, which was adopted by the National People's Congress Standing Committee in October 2020 and will come into effect in April 2021. The law consists of ten chapters and eighty-eight articles, including systems for risk monitoring, early warning, laboratory biosafety, and — significantly — for security management of human genetic resources and biological materials, as well as for the prevention of bioterrorism and biological-weapons threats (National People's Congress of the People's Republic of China, 2020).

The law stipulates that, according to Article 3, biosecurity is "an important part of national security" and that "a holistic approach to national security" must be taken to maintain biosecurity in the People's Republic of China (National People's Congress of the People's Republic of China, 2020). Article 4 designates the Chinese Communist Party as the leader for biosecurity governance, which is very different from the way Washington and Brussels have approached biosecurity: The Chinese approach sees biosecurity as a part of Party-led comprehensive security governance, while the American and European approaches place coordination between

different agencies or institutions at the center of the governance framework (Duan, 2024). It is wide-ranging and extends beyond pandemic and bioterrorism risk, to include biodiversity protection, invasive species and genetic resources governance, which are not usually considered within the sphere of security in western conceptualizations.

Meanwhile, China's biosecurity policy is not just defensive. Beijing's ambition to become a world leader in biotechnology has been echoed in Article 5 of the Biosecurity Law which explicitly states the country's commitment to promoting biotechnology innovation and developing the domestic bio industry (National People's Congress of the People's Republic of China, 2020). Such a dual logic – that biotechnology is a security threat that needs to be contained and a strategic industry that needs to be nurtured – is also at the heart of Beijing's semiconductor and AI policies, and it is this duality that has sparked the reciprocal securitization seen in the U.S. BIOSECURE Act, which explicitly refers to China's melding of biotechnology development and military modernization as justification for curbing U.S. interaction with Chinese biotechnology firms (United States Congress, 2024).

6. The European Union: Collective Securitization and Strategic Autonomy

The third model of biosecurity governance comes from the European Union, which is supranational and does not have a unified security or defence system. Since the 1990s, EU public-health cooperation has experienced a progressive “collective securitization” process, rather than a radical “speech act” as predicted in the initial Copenhagen School formulation, as securitizing actions are pushed by a “poly-actor” of Commission officials, member-state governments, and transnational epidemiological expert networks, and have created incremental institutionalization (Bengtsson and Rhinard 2019).

This has been a gradualist trend that has been solidified during and after COVID-19 in terms of concrete institutional constructs. The EU has finished the design of the "European Health Union" with three related measures: a regulation on serious cross-border threats to health, an extended mandate for the European Centre for

Disease Prevention and Control (ECDC), and an Emergency Framework Regulation (EFR) that empowers the new European Health Emergency Preparedness and Response Authority (HERA) (Public Health, European Commission, 2022). HERA was set up in the European Commission in September 2021 to carry out intelligence gathering to predict health risks and medical countermeasures preparedness and production within the member states (European Health Emergency preparedness and Response Authority, 2021). In 2022, HERA carried out a formal threat prioritization exercise, where three threat categories were identified (Pathogens with high pandemic potential, Chemical, biological, radiological and nuclear or CBRN threats, Antimicrobial resistance or AMR). Bioterrorism and biological-weapons risk were explicitly included in the EU's civilian health-security architecture (Preparing Europe for Future Health Threats and Crises, 2022).

The EU's biosecurity strategy is now explicitly geo-economics in nature, more recently. The European Commission's December 2025 Biotech Act proposes to define biotechnology as "a path to strategic autonomy and economic security," encircled by a companion Critical Medicines Act that aims to limit the Union's reliance on a handful of countries for active pharmaceutical ingredients, with China providing some forty-five percent (Cepa, 2026). In contrast to the restrictive, procurement-disincentivizing logic of the American BIOSECURE Act, the EU's approach is more focused on competitiveness and capacity-building – namely, to attempt to streamline regulation, mobilize a €10 billion investment partnership with the European Investment Bank, and establish regulatory sandboxes for biotechnology companies (Cepa, 2026). This is the distinctly European approach toward resilience and regulatory capacity building, which contrasts with the non-biotechnology world approach of outright exclusion of competitors from markets, while at the same time Brussels expresses its own concern over strategic dependence on China, which is also present in Washington.

7. Comparative Analysis: Convergence and Divergence

All three major powers seem to have one thing in

common: They all now view a pandemic, bioterrorist, or biotechnological threat as a matter of national or supranational security, not just a purely public-health matter. The convergence here is in line with what securitization theory looks like: that an issue can move onto the security agenda very quickly if the event becomes sufficiently 'focusing' and in this case the COVID-19 pandemic is a highly dissimilar political system. Each of these biosecurity institutions was developed or strengthened since 2020, and each has acknowledged that previous governance arrangements were not sufficiently resilient to face biological risks.

However, the cases differ from this minimal convergence in at least three ways. The first difference is the object of securitization. The first difference is the object of the securitisation. Yin (2024) notes that in the case of the U.S. the referent object becomes the nation-state in competitive terms in light of China, and biosecurity policy serves as a tool of strategic rivalry. The Chinese case is, however, about the Party-state and its comprehensive security framework; biosecurity, one of 11 interlocking sectors, is subject to party leadership (National People's Congress of the People's Republic of China, 2020). In the European case, the referent object is less concrete: a supranational "European Health Union" that is not necessarily defined by its opposition to an outside threat, but by collective preparedness and solidarity among the member states (Bengtsson & Rhinard, 2019).

Secondly, the institutional forms differ from case to case. The United States has been dependent on legislative measures, which are exclusionary and prohibitive in nature, such as the BIOSECURE Act. Comprehensive statutory codification is embedded in a governance hierarchy that starts at the top led by the Party in China. The EU model of supranational institution building (in the area of public health, European Commission, 2022) is also reflected in the way EU institutions are built over the regulation and creation of agencies. Thirdly, the situations differ in their control-openness levels. Biosecurity laws in China promote and at the same time limit the use of biotechnology, aiming to gain control over it; the American leg of the regulation process is becoming more restrictive, if not more promotionist, towards entities from China; and

finally, the European approach continues to be more focused on competitiveness and capacity-building, albeit with increasing security concerns. (Cepa, 2026)

Another aspect of comparison is in the field of bioterrorism and intentional biological attacks. All three actors have ratified the 1972 Biological Weapons Convention and each has an in-country approach to CBRN and bioterrorism prevention in its domestic laws: Chapter VII of China's Biosecurity Law explicitly covers prevention of bioterrorism and biological-weapon threats, and the threat taxonomy in HERA includes CBRN risk alongside pandemic pathogens (National People's Congress of the People's Republic of China, 2020; Preparing Europe for Future Health Threats and Crises, 2022). In reality, however, the biosecurity agendas of the three cases are far more influenced by such domestic issues as dual use of biotechnology, genomic data, and reliance on supply chains, than by classical bioterrorism scenarios, as biotechnology becomes an economic and strategic asset rather than a concern over proliferation.

8. Geopolitical and Global Health Governance Implications

Securitisation of biology has important consequences for international scientific collaboration and global health governance. First and foremost, the split of biosecurity policy between an exclusion-first approach in Washington and a state-led approach in Beijing risks to split the international biotechnology value chain between the two regions. The BIOSECURE Act could also create an environment where established partnerships with Chinese biotech companies could be broken, thereby shifting production to other locations like Ireland and India and driving up costs and the rate of new therapeutic development (Substack, 2024). In fact, such fragmentation is completely at odds with the norm of collaboration and open data sharing that pandemic preparedness experts say is crucial for rapid outbreak detection and response.

These relationships directly intersect with the precarious gains in global health governance at the multilateral level. The WHO Pandemic Agreement, the first legally binding international agreement on pandemic prevention, preparedness and response since the 2005 International Health

Regulations (World Health Organization), was adopted by the World Health Assembly in May 2025 after over 3 years of negotiation. The Agreement also establishes a Pathogen Access and Benefit-Sharing (PABS) arrangement to provide equitable access to vaccines, diagnostics, and therapeutics (Georgetown Journal of International Affairs, 2025) that result from pathogen access and benefit-sharing. However, the negotiation process itself revealed the very tensions this paper has identified: The treaty was adopted in the midst of "geopolitical fragmentation and rising nationalist sentiment," and there are key aspects of implementation which remain unresolved, especially regarding the PABS annex (International Peace Institute Global Observatory, 2025).

The comparative pattern identified in this paper helps explain why such fragmentation persists. If the United States approaches biosecurity chiefly as an instrument of competition with China, if China approaches it as an extension of Party-led comprehensive security, and if the European Union approaches it as a project of collective institution-building oriented toward strategic autonomy, then the underlying incentives of the three most consequential actors in global health governance point in different directions rather than toward a shared multilateral architecture. The experience of COVID-19 vaccine nationalism — in which high-income countries and regions, including the EU, secured advance-purchase agreements covering several doses per capita for their own populations while low- and middle-income countries fell far behind — illustrates how securitized, state-centric conceptions of biosecurity can generate outcomes at odds with the equity goals nominally embedded in instruments such as the Pandemic Agreement (McMahon, 2025).

The securitization of biosecurity, however, does not come without its advantages to the world's health governance. Security framing has mobilised resources, political attention and the capacity of institutions, as evidenced through the indicative budget of EUR 5 billion that the European Research Area (ERA) has allocated to security research for the upcoming seven-year period (2022–2027) (Public Health, European Commission, 2022; The White House Office of Science and Technology Policy, 2022). Rather

than abandoning security framing, however, the challenge for policy makers and scholars is to manage the trade-offs it involves: keeping the urgency and the resourcing that security framing provides while avoiding the zero-sum exclusions that are the Achilles' heel of cooperative science and equitable access needed for effective pandemic response.

9. Policy Implications

There are a number of policy implications in the comparative findings. First, major powers should safeguard vital collaboration in fields such as genomics, pathogen sharing, vaccines, and other scientific and public-health research from broader geopolitical competition. Restrictions on scientific cooperation should be avoided in response to national-security concerns over dual use research and should be addressed through targeted safeguards. Secondly, the implementation of the WHO Pandemic Agreement and its PAB system could offer a workable option for managing national biosecurity interests with international cooperation. Third, the need for increased coordination between governments, international organizations, scientific institutions and biotechnology companies to establish common standards for biological risk management. Last but not least, the preparedness of middle powers and developing countries needs to be enhanced by reinforcing regional and South-South cooperation, and lessen their reliance on the biosecurity policies of major powers.

10. Conclusion

This study shows that biosecurity has increasingly become an important dimension of national security in the United States, China, and the European Union, although each has developed a different approach. The U.S. focuses on strategic competition and supply-chain security, China includes biosecurity in its national-security strategy, and the EU places a greater emphasis on collective resilience, institutional coordination and strategic autonomy. These differences would serve as underscoring to the central theme of securitization theory—that the nature of biological risks is not only material, but also political in the sense that it is determined and handled by political choices.

The study also demonstrates that a more

securitized approach to biosecurity can contribute to national biosecurity preparedness and institutional capacity, but too great a focus on national control may have negative consequences for scientific cooperation and global health governance. Effective security is not possible with a national approach as pandemics and biological risks do not respect borders. The central question is thus how to achieve a balance between national biosecurity and continued international

collaboration. In order to respond to future biological risks, a more robust multilateral approach that is grounded in national preparedness, scientific openness, equitable cooperation, and effective international coordination are needed.

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