Testimony of Jaime M. Yassif, Ph.D.

Senior Fellow, Global Biological Policy and Programs, Nuclear Threat Initiative

Before the U.S. House Foreign Affairs
Subcommittee on Asia, the Pacific, Central Asia, and Nonproliferation.
Hearing on "Biosecurity for the Future: Strengthening Deterrence and Detection"
Wednesday, December 08, 2021

Chairman Bera, Ranking Member Chabot, and other members of the Subcommittee, thank you for the opportunity to join today's hearing to share my perspective on **Biosecurity for the Future**. My name is Dr. Jaime Yassif. I am a Senior Fellow for Global Biological Policy and Programs at the Nuclear Threat Initiative, which is a nonprofit, nonpartisan global security organization focused on reducing nuclear and biological threats imperiling humanity.

Over the past 21 months, the world has contended with the devastating impacts that a biological event can have on human health, economies, political stability, and security. The SARS-CoV-2 virus has infected more than 265 million people, killed more than five million, and caused trillions of dollars in economic losses. COVID-19 has revealed that national governments and the international community are woefully unprepared to respond to pandemics—underscoring our shared vulnerability to future catastrophic biological threats that could meet or exceed the severe consequences of the current pandemic.

To offer meaningful protection against global biological risks, the world needs a layered defense, comprised of effective measures for prevention, detection, and response. While we address all three of these critically important aspects in our work at NTI, I will focus my testimony today primarily on actions that national leaders and the international community should take with a view to *preventing* catastrophic biological events. Specifically, I will focus on three priority initiatives that NTI has been working to advance, which we view as critically important. NTI is working to:

I. Prevent the deliberate abuse or accidental misuse of bioscience and biotechnology by strengthening international biosecurity norms and developing innovative, practical tools to reduce risks throughout the research and development life cycle.

II. Develop a new Joint Assessment Mechanism to strengthen UN-system capabilities to investigate high-consequence biological events of unknown origin. The ability to rapidly discern the source of emerging pandemics is critical to mitigating their effects in real time and protecting against future risks—and it could help deter development and use of biological weapons.

III. Advocate for establishing a catalytic financing mechanism to fund biosecurity and pandemic preparedness capacity building in countries around the world. Sustainably financed systems for early detection and robust response can stop outbreaks at the

source before they evolve into global pandemics and can help deter would-be perpetrators of bioweapons attacks.

Reducing Emerging Biological Risks Associated with Rapid Technology Advances

Bioscience and biotechnology advances are vital for fighting disease, protecting the environment, and promoting economic development—and they hold incredible promise. A prime example is the ability to read, write, and edit DNA and RNA—the underlying blueprint for all life on earth. These developments are part of a broader bioscience revolution, which also is accelerating design-build-test cycles for engineering biology. This includes increasingly sophisticated technologies for automation of high-throughput bioscience experiments, coupled with continued advances in AI-based approaches to this work.[1] Bioscience is truly the revolution of the 21st century, and it holds incredible promise. However, these innovations can pose unique challenges—increasing the risks of accidental misuse or deliberate abuse with potentially catastrophic consequences.

These underlying risks are not new, but they have been exacerbated by the current pandemic, which has led to the proliferation of research into the SARS-CoV-2 virus, as well as its variants and other pathogens with pandemic potential—and new labs are being built around the world to house this work. While this research can have significant value in strengthening public health and pandemic-response capabilities, some of it poses dual-use risks. Moreover, in the wake of COVID-19, malicious actors may now recognize and act on the extraordinary disruptive potential of highly transmissible pathogens and other biological agents and use them to deliberately cause harm. This threat becomes increasingly pressing as the technical barriers to manipulating biological organisms continue to fall.

This has several implications for biosecurity and biological risks. First, these bioscience and biotechnology advances make it easier for a wider group of individuals to engineer novel pathogens or synthesize them from scratch. This could make it easier for a non-state actor to conduct a bioweapons attack with a sophisticated and deadly pathogen. Second, these advances could increase the risks of a laboratory accident with potentially catastrophic global consequences. There is a well-documented baseline rate of laboratory accidents, and these risks are exacerbated by research that involves modifying pathogens in ways that could lead to the creation of a more dangerous agent. Accidents associated with this type of research have the potential for significant and severe impacts—with broad implications for human, animal, and environmental health, as well as global safety, security and economic well-being.

To address these risks, we must safeguard the legitimate global bioscience research and development enterprise against laboratory accidents or exploitation and deliberate misuse by malicious actors.

---

[1] Yiren Lu, "The Gene-Synthesis Revolution," *New York Times*, November 24, 2021.
< https://www.nytimes.com/2021/11/24/magazine/gene-synthesis.html >

Governments are key to safeguarding the life sciences, but they have struggled to keep pace with rapid technology advances. The 2021 Global Health Security Index—a project led by NTI in partnership with the Johns Hopkins Center for Health Security—will be released this morning, and it contains important data on the challenges countries have faced with national-level oversight of dual-use bioscience research.

International governance of dual-use bioscience research also is weak. There is no existing international entity—including the World Health Organization and the Biological Weapons Convention—dedicated as its primary mission to strengthening biosecurity and bioscience governance and reducing emerging biological risks associated with technology advances. This global governance gap leaves us all vulnerable.

To address this gap, NTI is working with international partners to develop the International Biosecurity and Biosafety Initiative for Science (IBBIS). We envision that this new organization will work collaboratively to strengthen global biosecurity norms and develop innovative tools to uphold them. The underlying goal will be to safeguard science and reduce the risk of catastrophic events that could result from deliberate abuse or accidental misuse of bioscience and biotechnology.[2] [3]

In advancing this important initiative, we recognize that there is no single silver bullet for fully eliminating risks associated with dual-use bioscience research. To effectively guard against these risks, the world needs a layered defense—encompassing multiple interventions throughout the bioscience and biotechnology research and development life cycle: from funding, through execution, and on to publication or commercialization. In pursuit of this goal, IBBIS will develop practical, innovative tools that can concretely reduce risks at these different intervention points.

IBBIS will have a broadly defined mission so that it can take a comprehensive approach to this challenge. It will begin with a narrow focus on improving DNA synthesis screening practices internationally, with the flexibility to expand its remit over time. Such screening is critically important for preventing the building blocks of dangerous pathogens from falling into the hands of malicious actors. And yet, it is not legally required in any country—and only an estimated 80% of the global market share of DNA synthesis orders is screened on a voluntary basis. To drive this number closer to 100% and to improve screening practices around the world, NTI has been working with the World Economic Forum and an international consortium of experts to develop

[2] "NTI | bio Convenes Stakeholders to Strengthen Global Biosecurity Architecture and Prevent Biological Risks," *NTI News,* September 18, 2020. < https://www.nti.org/news/nti-bio-convenes-stakeholders-strengthen-global-biosecurity-architecture-and-prevent-biological-risks/>

[3] "NTI | bio Convenes Experts to Establish Global Entity Dedicated to Reducing Biotechnology Risks," *NTI News*, May 25, 2021. < https://www.nti.org/news/nti-bio-convenes-experts-establish-global-entity-dedicated-reducing-biotechnology-risks/ >

an international Common Mechanism for DNA synthesis screening.[4] We envision that IBBIS will take responsibility for overseeing and managing this work. This is a useful starting point for IBBIS because it is clearly defined, impactful from a risk reduction perspective, and achievable.

NTI is working with the World Economic Forum and other key international partners to continue shaping the vision for IBBIS and to build international support for this initiative. We aspire to launch this new independent organization in 2022, and we are working energetically toward this goal.

IBBIS has the potential to significantly reduce catastrophic biological risks to the U.S. and to populations around the world. However, the success of this initiative will depend on diverse international support across regions and across multiple sectors. We encourage Congress, and specifically members of this Subcommittee, to support the goals of this initiative and help us build a broad coalition of global support for this entity and its critical mission.

Investigating High-Consequence Biological Events of Unknown Origin

Effective prevention of catastrophic biological risks also should encompass work to shape the intentions of powerful actors, who might otherwise seek to develop or use biological weapons to meet strategic or tactical objectives. An effective deterrence strategy rests in part on the capability of the international community to demonstrate to would-be developers or users of biological weapons that there is a reliable system for attribution of and accountability for such actions.

To do so, it will be important to bolster the capabilities of the United Nations' system to investigate pandemic origins—whether naturally emerging, accidental or deliberate. This includes strengthening and investing significantly more resources in existing capabilities, such as the United Nations Secretary-General's Mechanism, which has the authority to investigate alleged deliberate bioweapons use.

The international community must also fill gaps. There is a gap in international capabilities to investigate the source of biological events of unknown origin, which falls at the "seam" between existing mechanisms—including the outbreak investigation capabilities of the World Health Organization and the United Nations Secretary-General's Mechanism. The ability to rapidly discern the source of emerging pandemics is critical to mitigating their effects in real time and protecting against future risks, and UN investigative capabilities must be strengthened for this purpose.

[4] "NTI and WEF Convene Second Annual Meeting of DNA Synthesis Screening Technical Consortium," *NTI News,* May 7, 2021. < https://www.nti.org/news/nti-and-wef-convene-second-annual-meeting-dna-synthesis-screening-technical-consortium/ >

To meet this need, NTI is pursuing the establishment of a new Joint Assessment Mechanism for investigating high-consequence biological events of unknown origin. We originally recommended creating such a mechanism in the 2020 report, "Preventing Global Catastrophic Biological Risks," which is based on lessons learned from a senior-level tabletop exercise hosted in partnership with the Munich Security Conference (MSC).[5] To advance this goal, NTI convened a diverse group of international experts in July of this year to continue to explore this concept and solicit feedback from a wide range of international stakeholders.[6] NTI is continuing to refine the Joint Assessment Mechanism concept by working with global experts to address key policy, institutional, technical, and operational considerations.

We envision that the Joint Assessment Mechanism would take an approach that is rapid, transparent, evidence based, and legitimate in the eyes of the international community. We also believe that this should be a 21st century mechanism, taking advantage of new tools, methods and technologies—such as bioinformatics, data science, and AI—to build a capability suited to today's threat environment.

Establishing this mechanism and ensuring its effectiveness will require a broad coalition of international support. I hope Congress and this Subcommittee will support the establishment of this type of multilateral joint assessment mechanism—which will be important for mitigating pandemic effects in real time and for deterring future bioweapons development and use.

Health System Financing

Building strong systems for early detection and robust response is critical for stopping outbreaks from evolving into global pandemics. Importantly, having such capabilities in place can also help deter malicious actors from developing or using biological weapons. However, none of this can happen without resources. Failure to invest now risks a return to the same cycles of panic and neglect that led the world to be woefully unprepared for COVID-19.

As a national and global security priority, the U.S. Government needs to lead the way by dedicating substantially more resources to building the global systems required to effectively detect and respond to infectious disease outbreaks before they become global threats. That being said, we cannot do this alone. Countries around the world must also invest in their own pandemic preparedness capabilities.

---

[5] Beth Cameron, Jaime Yassif, Jacob Jordan and Jacob Eckles, "Preventing Global Catastrophic Biological Risks: Lessons and Recommendations from a Tabletop Exercise held at the 2020 Munich Security Conference," September 29, 2020. < https://www.nti.org/analysis/articles/preventing-global-catastrophic-biological-risks/ >

[6] "NTI | bio Workshop Advances Efforts to Strengthen International Capabilities to Investigate High-Consequence Biological Events of Unknown Origin," *NTI News*, August 6, 2021. < https://www.nti.org/news/nti-bio-workshop-advances-efforts-to-strengthen-international-capabilities-to-investigate-high-consequence-biological-events-of-unknown-origin/ >

As documented by the 2021 edition of the Global Health Security Index, most countries have not made dedicated financial investments in epidemic and pandemic preparedness. As a leading expert in the field framed this challenge at the joint NTI-MSC tabletop exercise conducted earlier this year, when it comes to financing pandemic preparedness, "we have been trying to fight a tsunami with a teaspoon."[7]

The current short-sighted approach to pandemic preparedness financing is counterintuitive because it is, in fact, highly cost effective to invest in pandemic preparedness capabilities. I do not need to remind you that COVID-19 has led to trillions in economic losses and extensive damage to national and global economies. And yet, the international community can effectively guard against these risks with a global investment on the order of one to several hundred billion dollars. To achieve and sustain this level of investment, we need to redesign our collective approach to financing.

That's why NTI is working with partners to advocate for a new, catalytic multilateral financing mechanism for pandemic preparedness in countries around the world[8]. Our vision is that this funding mechanism should incentivize national governments to invest in their own preparedness over the long term. The mechanism should be managed within a country's national budget to increase accountability, incentivize domestic resource mobilization, and promote a sustainable way to shift accounting lines away from donor balance sheets to national budgets. This mechanism should also be driven by countries and address their respective pandemic preparedness needs and gaps. Funds disbursed should prioritize preparedness activities, strengthening long-term national-level capacity and ensuring that preparedness remains a political and budget priority.

The U.S. has already signaled leadership in this area by championing the establishment of a new multilateral financing mechanism for pandemic preparedness at the Global COVID-19 Summit. Now, it must follow-through with significant funding to set the bar for other countries and partners and challenge them to step up and contribute as well. The United States should contribute at least $2 billion in seed funding to stand up this fund and work with partners—across governments, international institutions, the private sector, and civil society—to garner contributions and mobilize at least $10 billion annually. This $10 billion is the bare minimum required; other estimates point to much higher funding-level requirements. Even at higher levels, such funding would constitute a tiny fraction of the potentially catastrophic costs of inaction.

---

[7] Jaime M. Yassif, Kevin P. O'Prey, Christopher R. Isaac, "Strengthening Global Systems to Prevent and Respond to High-Consequence Biological Threats: Results from the 2021 Tabletop Exercise Conducted in Partnership with the Munich Security Conference," November 23, 2021. < https://www.nti.org/analysis/articles/strengthening-global-systems-to-prevent-and-respond-to-high-consequence-biological-threats/ >

[8] Amanda Glassman, Carolyn Reynolds, Courtney Carson, Margaret Hamburg, Hayley Severance, Jessica Bell, Jacob Eckles, "A New Multilateral Financing Mechanism for Global Health Security and Pandemic Preparedness," August 2021 < https://pandemicactionnetwork.org/wp-content/uploads/2021/08/A-New-Multilateral-Financing-Mechanism-for-Global-Health-Security-and-Pandemic-Preparedness.pdf>

Conclusion

COVID-19 has served as a warning shot, highlighting and making real to citizens around the world our shared vulnerability to global pandemics. While national and global leaders are understandably focused on the current crisis, they cannot afford to neglect essential work to prevent and respond to future high-consequence biological events—which could match the impact of the current pandemic or cause damage that is much more severe.

We encourage Congress and this committee to take action on three key issues:

I. Support, domestically and internationally, the launch and sustainment of the International Biosecurity and Biosafety Initiative for Science, toward its critical mission of safeguarding science and reducing the risk of catastrophic events that could result from deliberate abuse or accidental misuse of bioscience and biotechnology.

II. Urge colleagues in the international community to support the establishment of a new Joint Assessment Mechanism for investigating high-consequence biological events of unknown origin.

III. Champion the establishment of a new multilateral financing mechanism for pandemic preparedness, along with the provision of significant seed funding for this mechanism—which will be critical for strengthening rapid detection and response systems globally, and for deterring bioweapons development and use.

Chairman Bera, Ranking Member Chabot, and other members of the subcommittee, thank you for inviting me to testify today. I look forward to answering your questions.
