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Subcommittee on Asia, the Pacific, Central Asia, and Nonproliferation

Biosecurity for the Future: Strengthening Deterrence and Detection
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Chairman Bera, Ranking Member Chabot, and Members of the Committee, I am honored to appear before you today.

First, I would like to thank the Committee for hosting this hearing on what I believe is one of the most consequential issues for the United States and the international community in the coming years: biological threats, and how the nation can aggressively pursue solutions in this area.

Second, I would like to begin my testimony by also thanking you for including *deterrence* in the subject of today's hearing.

I have focused on countering biological threats for the bulk of my career. In the 1990s I worked with the Department of Defense Nunn-Lugar Cooperative Threat Reduction Program, and saw first hand the massive scale of the Soviet Union's offensive biological weapons complex. One facility we completely dismantled, at the request of First President of Kazakhstan Nursultan Nazarbayev, was capable of producing 300 tons of anthrax agent during a mobilization period of about eight months. Another laboratory in Koltsovo, Russia, perfected viral weapons to cause horrific diseases like smallpox, Marburg, and Ebola.

My experiences also include decades of working hand in hand with nations around the world who share U.S. ambitions for countering such threats. As we will hear in depth from my colleagues testifying alongside me today, biological weapons threats are increasing due to several factors, including advanced North Korean and Russian offensive programs, China's huge investments in dual-use biotechnologies, and a revolution in biotechnology that is making it easier and cheaper for even small groups or individuals to misuse biology.

Today, the United States is on the cusp of game-changing shifts in addressing biological threats. This has to begin with giving deterrence a central role.

Current U.S. strategy focuses on "risk management" for addressing biological threats. Our nation's strategy to date has been strong, but as we've witnessed all too terribly, it has been insufficiently bold.

In terms of defense strategy, the current U.S. approach relies heavily on the threat of our nation using nuclear weapons to retaliate if another nation conducts a strategic biological weapons attack. A

second emphasis of current U.S. strategy is to focus on developing capabilities that would allow U.S. military personnel to continue operating if they are attacked with biological weapons.

We owe those who risk their lives for the nation better than this. Furthermore, deterrence by threat of nuclear retaliation may not be seen as credible by those who we wish to deter, and this is one reason I believe candidate Biden rightly proposed making the sole purpose of nuclear weapons to deter nuclear attacks. Most importantly, a far superior strategy for deterring biological attacks is now more achievable than ever before, thanks to decades of biodefense investments and innovation.

As my Council on Strategic Risks colleagues and I have written in recent months, the United States should now pursue a concerted strategy based on two interrelated goals. The first is *preventing future outbreaks from ever again reaching pandemic scale*. This goal is more achievable than ever, though it will take leadership and sustained investments in biodefense, the U.S. bioeconomy, and international partnerships. Luckily, the nation appears to be moving in this direction now, with support from policymakers across party lines.

The second focuses on deliberate biological threats, which I strongly believe are growing. I and my colleagues at the Council on Strategic Risks believe that the United States *should lead the world in making biological weapons the first category of weapons of mass destruction to be effectively eliminated or rendered obsolete*.

Deterrence is at the heart of this approach. Specifically, we have proposed a U.S. strategy of *deterrence by denial* regarding deliberate biological threats.¹ This type of deterrence strategy would focus on ultimately denying an attacker success in their aims regarding biological weapons, such as causing mass casualties, mass confusion, and erosion of operational capabilities.

Deterrence by denial is a common goal and practice for defense forces. While it is not yet a written strategy for the United States regarding biological weapons threats, the U.S. Department of Defense, and many of our partners around the world, have actually embraced this approach for years. Yet there is a crucial difference today: When I was a key leader at DoD, this was our aim, but it was seen as a decadal transition. We knew the nation had to work hard to push technologies and methods in the right direction--and in many cases, we did.

Today, U.S. innovation and that conducted by others around the world have created a new paradigm. We now have the technologies and tools needed to make deterrence by denial regarding deliberate biological threats--and pandemic prevention--a reality.

Our task today is to deploy such advanced technologies effectively, and integrate them via a systems approach to addressing the full range of biological threats.

What this looks like is not altogether new. However, the preparation must be much more robust than it has been, accelerated faster than ever, and deployed at a broader scale than in the past. We need fast and precise pathogen early warning. We need these systems to produce robust data that

¹ Christine Parthemore and Andy Weber, "[A Deterrence by Denial Strategy for Addressing Biological Weapons](#)," *War on the Rocks*, September 23, 2021.

can be used for rapidly characterizing pathogens and tailoring diagnostics and countermeasures---vaccines and medical treatments---to help stop them. And we need increasingly fine-tuned plans for putting these capacities to use, quickly and effectively, against every emerging pathogen that raises concerns that it could devastate the nation and the world.

Next Steps for the Nation

Some of the suggested topics for this hearing included technology and tools, bio threats from a defense perspective, and leveraging and bolstering treaties and multinational collaboration.

My testimony today, which I am honored to share, will weave among these themes and show just how interconnected such efforts need to be for effective pandemic prevention and strong deterrence.

Modern technology and tools are central to the strategy I described. The good news is that the international community is in the early stages of advancing and deploying better technologies than ever before for halting biological threats before they cause mass casualties.

At the Department of Defense in the decades in which I helped oversee and drive development of such technologies, we had several aims. One was for new biodefense technologies to be as pathogen-agnostic as possible. As we were concerned about engineered biological weapons from other nations---given that the Soviet Union had been working in this direction---we needed technologies that went beyond testing for and detecting one specific pathogen at a time, or working against a static list of threat agents.

Other goals were to have diverse tools for diverse settings. For biodefense, we need diagnostics, testing equipment, the ability to deliver countermeasures to affected people, and data systems and connectivity that can withstand a wide range of field settings---not just be useful in a modern, climate-controlled laboratory.

Perhaps most importantly, we needed speed. For some biological weapons threats, if you are not prepared or do not respond quickly, fatalities can increase to catastrophic levels. Even for some infectious disease threats that are slower to cause mass casualties, they can still sow chaos and confusion, and lack of trust in governments, in ways that could provide advantages to attackers.

Real-time and effective early warning for biological threats has therefore long been a cornerstone of U.S. strategy. With tools based on genomic sequencing, CRISPR-based technologies, and advances in machine learning and AI contributions to threat analysis, we can now truly move to pathogen early warning that is timely enough to halt emerging biological threats before they cause mass death.²

I expect that my colleagues at this table with deep experiences in science and technology will likely cover this in greater depth, so I will focus on opportunities related to how the United States can best

² Natasha E. Bajema, William Beaver, and Christine Parthemore, [Toward a Global Pathogen Early Warning System: Building on the Landscape of Biosurveillance Today](#), Council on Strategic Risks, 2021.

advance such early warning work, alongside ever-more rapid medical countermeasure development and other necessary aspects of both biological threat deterrence and pandemic prevention.

To begin, there is increasing consensus that the United States should work with partners across the world in creating a global pathogen early warning system. This could be one of the most important tools at our disposal. Achieving it will be complex, though doable.

First, we need a surge for advancing and deploying tools with the highest utility for addressing *novel and wide-ranging* disease threats, including those that may be deliberately introduced. The United States is at the forefront of next generation sequencing, metagenomics, cutting-edge environmental sensing, wearable and point of need technologies, and other relevant tools that will help to achieve early warning for infectious disease threats.

They also hold the potential for revolutionizing our ability to determine whether specific disease threats occurred naturally or were introduced deliberately.

As such, U.S. plans for the coming years should prioritize targeted deployment of tools that can help to detect and characterize the preponderance of pathogen threats, including those like the novel SARS-CoV-2 virus that the world had not encountered before 2019, as well as engineered pathogens. These include widely-deployed next generation sequencing and metagenomic tools. In the coming years, this will likely extend to diagnostic tools as well, including CRISPR-based diagnostics and at-home, point of person tests that can be affordably and consistently deployed to help catch new disease threats in targeted populations.

Earlier in my career, we made great strides in this direction by fostering the development of tools to detect and diagnose several disease threats together---not just one at a time. Today, the technologies exist to do so for several hundred pathogens at a time, and even *all* biological organisms present in a targeted sample.

Starting immediately, we need to surge existing and historically-strong U.S. programs to help advance such early warning tools. One of the top opportunities stems from the Biological Threat Reduction Program (BTRP) at the Department of Defense. This program, which I helped create, has long been used for advancing biosurveillance and biosecurity with about forty key partners around the world. This paid off heavily. Several U.S. allies and partners have been leaders in detecting and monitoring COVID-19, and in many cases specific U.S. defense partnerships were the genesis of the capabilities that led to this outcome. I deeply appreciate that this year the House of Representatives, on a bipartisan basis, restored the severe and inexplicable Pentagon cuts to the vital BTRP program. Unfortunately, the Senate has thus far failed to act.

Now, the United States must surge resources for moving ever more-advanced early warning technologies to key U.S. labs and bases, and for sharing them with allied and partner nations around the world.

Similar and complementary efforts can extend to bolstering treaties, international collaboration, and data-sharing. Advanced machine learning and AI systems, cutting-edge environmental monitoring

tools, and next-generation genomic sequencing can all help advance the international community's toolkit for understanding the sources of new biological events as they occur. They can also be used for countries seeking to collaborate in demonstrating compliance with treaty commitments regarding the peaceful uses of biological technologies.

We should also explore new international efforts to enhance biosecurity and biosafety to increase transparency and monitoring of high biocontainment laboratories and to curtail risky pandemic prevention research. Last year Kazakhstan President Tokayev made one such bold proposal to the United Nations General Assembly in calling for the creation of an International Biosafety Agency.

This kind of technology-forward diplomatic and defense cooperation surge would mirror decades of cooperation with allies and partners, and serve to advance mutual security measures.

The people of every nation benefit from halting outbreaks before they become pandemics, and every nation benefits from high confidence that their adversaries will not attack them with biological weapons. Nearly 100 years after these tenets were first enshrined in international law, it is time for the United States to retake a leadership position in advancing them again.

The national strategic approach I am proposing---deterrence by denial of effects of biological weapons and international cooperation to prevent pandemics---needs to be an all hands on deck strategy for the United States.

In the immediate term, it will be critical to bring back to health and then expand U.S. Department of Defense programs that have been inflicted by budget cuts and under-utilization in recent years. Topping this list is the Pentagon's Chemical and Biological Defense Program, or CBDP. Despite a strong track record of performance and extensive national capacities, in recent years department leaders have slashed CBDP's biological defense budget---even during a pandemic---and restricted its ability to respond to COVID-19 early in the pandemic in ways that may have cost the lives of Americans.

This stems in part from the department taking an overly-restrictive definition of its mission regarding biological defense. CBDP's current focus centers on U.S. forces continuing to operate in an environment in which biological or chemical weapons are used. This is important---but it is not a strategy.

The CBDP's mission should be expanded to include deterrence specifically. This step alone would allow the nation to bring the program's full, vast capabilities to bear for all emerging and potentially catastrophic biological risks.

Indeed, I am heartened that in launching the first ever Pentagon biodefense posture review last month, Secretary of Defense Lloyd Austin commanded that "the Department of Defense will prioritize biodefense across the full spectrum of biological threats, from naturally occurring to accidental and deliberate biological incidents." He further called on the Department to "act boldly to continue the fight against COVID-19 while we also prepare for future biological threats."

Another important step will be to fully bring the Department of Energy's National Laboratories to the table. The National Labs have significant, and in many cases world-unique, capacities for addressing biological threats. My colleagues and I have proposed several steps to fully leverage the invaluable national assets resident in the Labs. They center on making the National Labs a key actor in engineering biology, with adjustments in program authorities and funding to allow this shift. We also propose a Biosecurity Reserve Corps by which talented scientists and technologists in the country can serve limited stints in public service over a committed term, and by which they would be pre-cleared and credentialed to work alongside public sector counterparts to help surge in quashing emerging biological threats.

Of course, the Department of Health and Human Services will continue to be central. Its leadership in Operation Warp Speed and its ongoing successor, in full partnership with the Department of Defense, showcases what should be the new minimum baseline for rapid development of medical countermeasures and diagnostic tools. New and proposed programs, like RADx and ARPA-H, should help to continue maximizing the innovation in both the public and private sectors to advance national interests and promote a strong bio-industrial base. Likewise, past U.S. legislation tilting toward an all-hazards approach to biological preparedness and responses has proven prescient, including the creation of the Biomedical Advanced Research and Development Authority, or BARDA, to speed the development of new biodefense tools in our national and global arsenals.

Investing Now for the Future

As I've emphasized, we have many of the technologies and tools needed to achieve this vision. The U.S. government also has in place most of the programs and mechanisms that will be required. Yet they must be resourced well and coordinated, and they must permeate U.S. national strategy and investments.

To enact a national strategy to take biological weapons off the table as a mass destruction threat, and to prevent future infectious disease threats from growing to pandemic scale, I and my colleagues recommend an investment plan that we call *10 plus 10 over 10*.

This entails investments of \$10 billion per year for ten years for deterring and addressing biological weapons threats, plus \$10 billion per year for ten years for global health security and direct pandemic prevention initiatives.

While this may sound like a huge sum, it is far more affordable than insufficient action. The COVID-19 pandemic alone cost an estimated \$16 trillion to the United States in under two years, in addition to the human toll and detriments to national security which are not well quantified. U.S. department leaders have had a difficult time even calculating the costs to U.S. national security. The 10 plus 10 over 10 plan also represents a small fraction of U.S. government and Defense Department spending overall. I encourage everyone to explore the details of this plan that we provide in our forthcoming "Handbook" for deterring biological weapons and preventing future pandemics that the Council on Strategic Risks will release later this month.³

³ "A Handbook for Ending Catastrophic Biological Risks: How the United States Can Deter Biological Weapons and Prevent Future Pandemics." A product of the Janne E. Nolan Center on Strategic Weapons, an institute of the Council

Conclusion

The United States has made significant progress in addressing biological threats over the past several decades. The COVID-19 pandemic was a wake-up call that though we have come far, we have much more to do, and fast. The good news is that this work is within our reach if we gather the political will to set a bold strategy for the United States, and pursue it in force alongside our partners around the world.