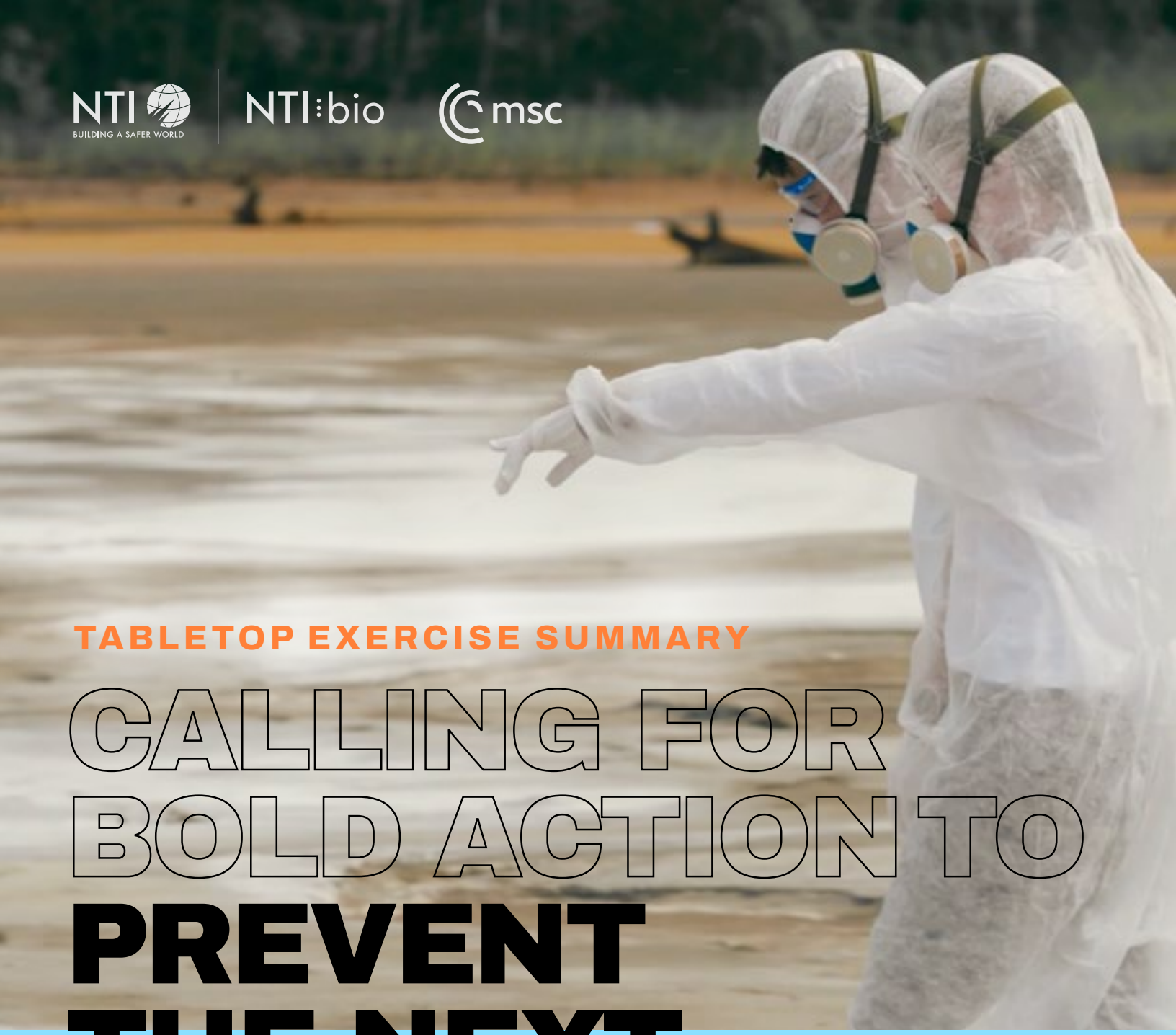

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TABLETOP EXERCISE SUMMARY

CALLING FOR BOLD ACTION TO PREVENT THE NEXT BIOLOGICAL CATASTROPHE

Jaime Yassif, Hayley Severance, Christopher Isaac

NTI and the Munich Security Conference (MSC) convened 22 senior leaders from the public health, biotechnology, international security, and philanthropy sectors for a February 2022 tabletop exercise to identify gaps in international capabilities to prevent and respond to high-consequence biological events and develop solutions to address those gaps.

The exercise was the fourth in a series of collaborations between NTI and MSC. It was built around a fictional scenario involving an outbreak that escalates into a global pandemic and brought together senior experts to examine where the international biosecurity architecture is falling short and explore opportunities to improve capabilities to prevent catastrophic human-caused pandemics.

The NTI-MSC tabletop exercise discussions generated a wide range of valuable insights and several key findings. Most importantly, exercise participants agreed that, despite some improvements following the global response to COVID-19, the international system of pandemic prevention, detection, and response is woefully inadequate to address current and anticipated future biological threats. The world is not prepared for the next pandemic, and bold action is urgently needed to prevent the next biological catastrophe.

What is a tabletop exercise?

A tabletop exercise is a scenario-based, facilitated discussion used to stimulate dialogue among practitioners and experts and to reveal critical gaps. Such exercises often produce valuable insights and generate ideas about effective approaches to solving difficult problems. They are widely used to prepare for worst-case scenarios.

Fictional Scenario Summary

The exercise scenario begins with an outbreak of Akhmeta virus among cattle in the fictional country of Andoriban. Although the outbreak begins in the nation's livestock, spillover into the human population causes a local epidemic, which eventually escalates into a global pandemic. Complications with the response, questions about the accuracy of data, and inadequate biothreat intelligence initially obscure the fact that the pandemic originated from a state-sponsored agricultural attack by Andoriban's adversary, Manria. Manria's ongoing cyber-interference to avoid attribution and accountability hampers the pandemic response, resulting in 2.2 billion cases of Akhmeta virus and 120 million deaths over 20 months. The exercise scenario was based on an epidemiological model developed in partnership with Gryphon Scientific.

FINDINGS

WHERE ARE WE FALLING SHORT?

The following findings were distilled from discussions among exercise participants and correspond with the four phases of the exercise scenario—outbreak, global spread, cyberattack, and intelligence failure.

FINDING 1

The current system for assessing biological events of unknown origin is inadequate.

Despite modest improvements since the COVID-19 pandemic, the systems and tools in place today to assess biological events of unknown origin are challenged by politics, underinvestment, and a lack of trust.

FINDING 2

Failure to coordinate national and global responses leads to devastating human and economic losses, especially among vulnerable populations.

Preparing for and responding to future pandemics requires innovative approaches that match capabilities with needs, and we need to build relationships before a crisis happens. Equity must underpin future response efforts, and, to that end, the international community needs to prioritize intellectual property waivers, quality control of goods and services, and community-level capacity building efforts in low- and middle-income countries.

FINDING 3

Cybersecurity risks within bioscience research infrastructure and outbreak response systems are increasing.

These include the potential for theft of intellectual property, tampering with data and samples, ransomware, disinformation, and disruption of vaccine manufacturing. Improved resilience will require building in cybersecurity from the bottom-up.

FINDING 4

Biothreat intelligence collection and analysis capabilities are dangerously neglected.

There is a growing need for biothreat intelligence as the barriers to developing biological weapons fall and the range of potential malicious actors expands. New ways to analyze data from social media, trade, published research, and genetic sequences can help us detect potential biothreats before an event occurs.

RECOMMENDATIONS

WHAT CAN WE DO ABOUT IT?

To address the key findings that emerged from the exercise, NTI recommends the following. These recommendations do not necessarily reflect the views of exercise participants.

RECOMMENDATION 1

The UN Secretary-General should establish a new Joint Assessment Mechanism to discern the source of outbreaks of unknown origin.

–The mandate of the Joint Assessment Mechanism should be to gather the facts about the source of a biological event when there is uncertainty about its origin.

–It should have a standing capability to collect and analyze baseline data. When triggered, it can launch an assessment quickly.

–There should be clear, transparent, and evidence-based criteria for determining when and how to use the mechanism and off-ramps to transfer authority to the World Health Organization or UN Secretary-General's Mechanism, depending on whether an outbreak is found to be naturally occurring or human-caused.

RECOMMENDATION 2

The UN should create a Response Coordination Unit to prepare for and coordinate complex responses to high-consequence biological events.

The Response Coordination Unit should:

–Be a permanent fixture within the UN system to ensure an equitable, integrated response capacity to address the public health, economic, and other cascading effects of a high-consequence biological event.

–Convene key stakeholders across sectors to analyze past response efforts to better understand supply chain issues and develop risk-based models to predict future bottlenecks.

–Put systems in place to allocate scarce resources, including serving a matchmaking function to match capacities with needs.

RECOMMENDATION 3

Governments, industry, and the scientific community should identify the highest priority cyber-biosecurity vulnerabilities and develop practical solutions.

–Experts in cybersecurity, biotechnology, and public health should conduct a comprehensive analysis to identify the most pressing cybersecurity risks and recommend technical and policy solutions.

–Areas to explore include bio-manufacturing systems, biosurveillance and genetic sequence databases, high-containment lab infrastructure, and automated systems in bioscience research labs.

–Analysis should address the complicating effects of misinformation and disinformation and avoid introducing information hazards.

–Technical and policy solutions for cyber-biosecurity should incorporate expertise from the energy, telecommunications, and financial sectors.

RECOMMENDATION 4

National governments should invest in stronger biothreat intelligence capabilities.

–Countries with available resources should prioritize investing in biothreat intelligence, including on-the-ground and open-source intelligence.

–Government and civil society should develop a clearer understanding of the role of biothreat intelligence in preventing deliberate biological events.

–Governments should develop more effective ways to share actionable intelligence within the UN system.

–Civil society should develop open-source intelligence tools and methods for biothreat assessment.

PARTICIPANTS

Titles reflect their position at the time of the event.

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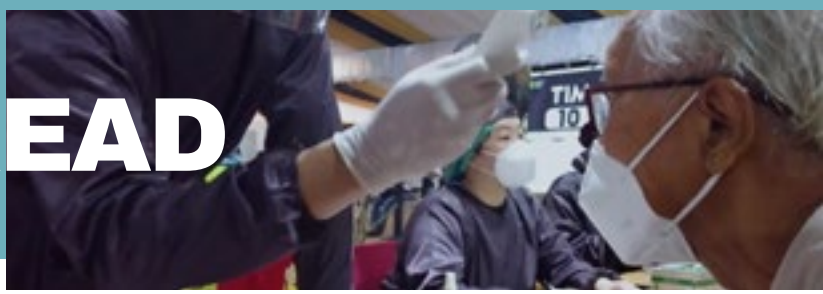
FICTIONAL SCENARIO DETAILS

The 2022 NTI-MSC tabletop exercise scenario centers on the fictional country of Andoriban and an outbreak of Akhmeta virus in the cattle. The following summarizes the "moves" in the scenario, which plays out over 20 months and results in 2.2 billion cases of Akhmeta virus and 120 million deaths.

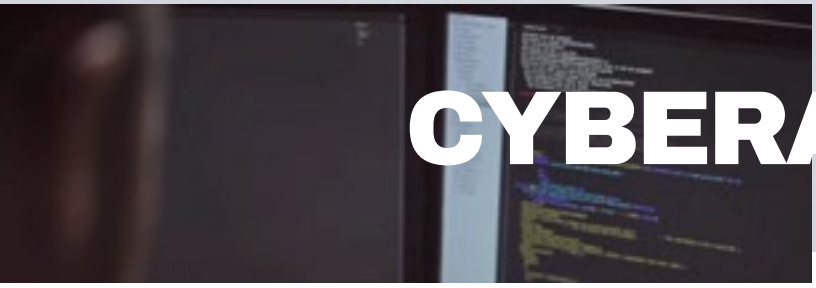
OUTBREAK

MOVE 1 (June 5, 2022) When local Andoriban health authorities detect an outbreak of Akhmeta virus, a third of the country's cattle are culled to control the virus. But it spills over to humans, causing more than two dozen fatalities. Despite the best efforts of scientists, the government, and the international community, the response is uncoordinated, and it's difficult to determine the virus's origins and key features.

SPREAD



MOVE 2 (September 18, 2022 and April 3, 2023) The World Health Organization declares the Akhmeta outbreak a public health emergency of international concern, with cases reported in Brazil, Germany, India, South Africa, the United Kingdom, and the United States. Waning efficacy of antiviral treatments and slow vaccine development complicate the international response. The world also faces challenges from disrupted supply chains, PPE and healthcare staffing shortages, strained infrastructure, and looming food scarcity.



CYBERATTACK

MOVE 3 (June 30, 2023) An Andoriban investigation team unearths prior cyber-intrusions by a hacker group associated with Manria, Andoriban's longtime adversary. Manria's Ministry of Defense had repeatedly infiltrated and manipulated key biosurveillance databases to cover up its involvement in the attack, undermining trust in the response, hampering vaccine development, and ultimately contributing to the spread of the pandemic.

INTELLIGENCE FAILURES

MOVE 4 (February 24, 2024) A UN High-Level Study Group tasked with developing recommendations to prevent future human-caused pandemics releases a report blaming intelligence failures for allowing a nascent bioweapons program in Manria to go undetected. The study group found that international biosecurity and biothreat intelligence capabilities suffer from underinvestment and a lack of support. "We've been flying blind, and populations around the world are now paying the price," said (fictional) study group chair Charles Stevens.

ABOUT THE AUTHORS

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Dr. Jaime Yassif serves as NTI Vice President for Global Biological Policy and Programs, where she oversees the organization's work to reduce global catastrophic biological risks, strengthen biosecurity and pandemic preparedness, and drive progress in advancing global health security. Yassif previously served as a Program Officer at Open Philanthropy, where she led the Biosecurity and Pandemic Preparedness initiative, recommending and managing approximately $40 million in biosecurity grants, which rebuilt the field and supported work in several key areas. Prior to this, Yassif served as a Science and Technology Policy Advisor at the U.S. Department of Defense and worked on the Global Health Security Agenda at the U.S. Department of Health and Human Services. She holds a Biophysics Ph.D. from University of California, Berkeley; a master's degree in Science and Security from the King's College London War Studies Department; and a bachelor's degree in Biology from Swarthmore College.

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Mr. Christopher Isaac is a Program Officer for Global Biological Policy and Programs at NTI. Isaac has been involved with synthetic biology through the Internationally Genetically Engineered Machine (iGEM) Competition since the start of his scientific career and brings with him a mixture of skills in policy, biochemistry, and programming. Isaac holds a B.Sc. in Biological Sciences with a minor in Philosophy and a M.Sc in Biochemistry (Bioinformatics) from the University of Lethbridge. He is an alumnus of the Emerging Leaders in Biosecurity Fellowship at the Johns Hopkins Center for Health Security and is a member of the iGEM Safety and Security Committee.

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Design: Kym Abrams Design

ABOUT THE NUCLEAR THREAT INITIATIVE The Nuclear Threat Initiative is a nonprofit, nonpartisan global security organization focused on reducing nuclear and biological threats imperiling humanity.

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