

#### **Center for Health Security**

Annual Report 2019

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#### ACKNOWLEDGMENTS

The Johns Hopkins Center for Health Security would like to acknowledge the work of its scholars, analysts, and staff during 2019. Without their contributions, the Center would not have met the challenges of the year that followed. Director of Communications Margaret Miller wrote this report with the support of Anita Cicero and Tom Inglesby. Jackie Fox and Kathleen Fox edited and SDYM, Inc. designed the report.

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The Johns Hopkins Center for Health Security works to protect people's health from epidemics and disasters and ensure that communities are resilient to major challenges.

## MISSION



### LETTER FROM THE DIRECTORS

### Dear Friends,

This publication, our 2019 Annual Report, was delayed by months, having been waylaid by the unprecedented and devastating spread of SARS CoV-2. In many ways, 2019 seems like years ago.

In 2019, the Johns Hopkins Center for Health Security conducted a large tabletop exercise called "Event 201" for government, public health, and economic leaders, which simulated a novel coronavirus pandemic. Now, we are living one.

**In 2019**, we wrote a commissioned report for the Global Preparedness Monitoring Board to address the state of readiness for a high-impact respiratory pathogen pandemic. Today, we are seeing firsthand the significant public health, economic, social, and political consequences that such a pandemic causes.

In 2019, along with partners, we released the Global Health Security Index, the first comprehensive assessment and benchmarking of health security and related capabilities across 195 countries. The central conclusion of the Index was that no country was prepared to respond to a major health emergency. Today, the United States and many other highly resourced countries are underscoring that conclusion and demonstrating that leadership, clear and consistent public communications, and evidence-based response measures are critical to successfully combating a fast-moving and persistent pandemic.

In 2019, we were proud to be designated an official World Health Organization (WHO) Collaborating Centre for Global Health Security and to serve on the WHO Technical Advisory Group that addresses the interface between health and security. As we have seen in past health emergencies, as well as during the COVID-19 pandemic, WHO leadership and work in this area are crucial in saving lives around the world. The number of lives lost and suffering from this pandemic which is still climbing as of this writing—is staggering. The long-term health consequences for COVID survivors are unknown but potentially quite serious for some portion of the population. On top of this, livelihoods have been disrupted and economies devastated. Tragically, in the United States, COVID-19 has taken an disproportionately high toll on minorities. And many lower- and well-resourced countries are struggling to respond. Time will tell how long it takes for our communities to recover. Clearly, there is still much to be done to improve national and international policies, programs, and practices related to the early detection and response to save lives from the consequences of large-scale pandemics and other biological threats. This is our Center's central purpose and mission.

We pursue this mission in part by seeking to learn from best practices and varied approaches used by other countries and regions. **In 2019**, we convened our 2 longstanding Track 1.5 biosecurity dialogues: (1) the bilateral dialogue between participants from the United States and India, and (2) the South East Asian biosecurity dialogue with longtime members from Indonesia, Malaysia, the Philippines, Singapore, Thailand, and the United States. During these multiday meetings, members do the hard work of analyzing and sharing biosecurity challenges and potential strategies to reduce biological threats. Now more than ever, we need to look around the globe to learn from partners. In 2019, our Center also undertook several initiatives aimed at supporting innovation while mitigating potential global catastrophic biological risk associated with advanced life science and technologies. With Tianjin University's Centre for Biosafety Research and Strategy, we gathered government and scientific experts from China and the United States to examine potential governance approaches that would encourage innovation while reducing risks in the rapidly expanding field of synthetic biology. In a related but separate initiative, our Center conducted research and gathered experts to consider how best to strengthen the screening of gene synthesis orders in the United States and worldwide to reduce risks associated with the creation of synthetic viruses. We also convened industry and government stakeholders to identify new strategies for national policy to strengthen the US bioeconomy. The suite of health security issues raised by advanced research and technologies will only continue to grow, and our Center is committed to finding ways of reducing risks in this area.

**Our work in 2019**, and in the years leading up to it, prepared our Center to react quickly when the COVID-19 pandemic hit, and we are proud of what our team has been able to contribute to the response to this terrible national and international crisis. Even now, at the end of 2020, our work and advocacy during this pandemic is far from over.

But we also have our eye on the future, because we know there are more high-consequence biological threats on the horizon that the country and the world need to work to prevent and prepare for.

We are thankful to the Open Philanthropy Project and our other government and philanthropic funders for making this work possible.

Thank you for your support,

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Tom Inglesby, MD Director

Anita Cicero, JD Deputy Director



Our experts are closely following and analyzing updates on the pandemic. To learn more about the Johns Hopkins Center for Health Security COVID-19 response, visit: centerforhealthsecurity.org/ covid-19



### Our Approach

- CONDUCT RESEARCH AND ANALYSIS ON MAJOR DOMESTIC AND INTERNATIONAL HEALTH SECURITY ISSUES
- ENGAGE WITH RESEARCHERS, THE POLICYMAKING COMMUNITY, AND THE PRIVATE SECTOR TO MAKE PROGRESS IN THE FIELD
- CONVENE EXPERT WORKING GROUPS, CONGRESSIONAL SEMINARS, SCIENTIFIC MEETINGS, CONFERENCES, AND TABLETOP EXERCISES TO STIMULATE NEW THINKING AND PROVOKE ACTION
- EDUCATE A RISING GENERATION OF SCHOLARS, PRACTITIONERS, AND POLICYMAKERS

### **PRIORITY AREAS**

Deliberate Biological Threats Emerging Infectious Diseases and Epidemics Global Health Security Medical and Public Health Preparedness and Response Opportunities and Risks in the Life Sciences

### COMBINED EXPERTISE

Anthropology Biological nonproliferation Biosurveillance Biotechnology Critical care medicine Disease modeling Disaster response Economics Emergency medicine Epidemiology Global health Healthcare preparedness Immunology Infectious diseases Internal medicine International relations Laboratory science Law Mass casualty response Public health Risk assessment Risk communication

### By the Numbers













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### Sponsors and Collaborators

Open Philanthropy Project World Health Organization Johns Hopkins Applied Physics Laboratory **Rockefeller** Foundation Office of the Assistant Secretary for Preparedness and Response, Department of Health and Human Services US Centers for Disease Control and Prevention US Department of Defense US Department of Homeland Security, Science and Technology Directorate CRDF Global United Nations Nuclear Threat Initiative National Science Foundation Effective Giving Founders Pledge





### **OPEN PHILANTHROPY PROJECT AWARDS** \$19 MILLION TO THE JOHNS HOPKINS CENTER FOR HEALTH SECURITY

In October 2019, the Johns Hopkins Center for Health Security was awarded a 3-year, \$19.1 million follow-on grant from the Open Philanthropy Project to support the Center's work on strengthening health security and public health preparedness, preventing and preparing for the most serious global biological risks, and educating a future generation of health security experts.



### WHO DESIGNATES JOHNS HOPKINS CENTER FOR HEALTH SECURITY AS A WHO COLLABORATING CENTRE

The Johns Hopkins Center for Health Security was designated as a Collaborating Centre for Global Health Security by WHO and the Pan American Health Organization (PAHO) in October 2019.

Collaborating Centres are institutions designated by the WHO Director-General as part of an international network to carry out activities and research to support WHO programs. The practice of using national institutions to facilitate the work of WHO dates to the Second World Health Assembly in 1949, which recognized that "research in the field of health is best advanced by assisting, coordinating and making use of the activities of existing institutions."

The Johns Hopkins Center for Health Security is the second WHO Collaborating Centre for Global Health Security and the first in the PAHO region.

### PROJECTS

Based on requests from government leaders, health agencies, and health security experts, we implement projects that provide independent research to identify potential threats and develop evidence-based policy advice on potential ways to avoid or solve global health security risks.

In 2019, Center experts worked on these efforts:

- Extending Global Capacity
- Assessing Mass Vaccination Technologies
- Beating Pandemics by Ensuring Vaccination Capabilities at the Last Mile
- Boosting NATO Resilience to Biological Threats
- Communicating about Global Catastrophic Biological Risk Events in an Environment of Misinformation
- Continuity of Community Functions and the Role of Survivors in a Global Catastrophic Biological Risk
- Developing a Health Systems Resilience Checklist and Implementation Guide in Bangladesh
- Maximizing the US Bioeconomy for Economic Growth and National Security
- · Collaborating with Tianjin Center for Biosafety Research & Strategy on Future Governance Options for Synthetic Biology
- Modernize Outbreak Science to Address Global Catastrophic Biological Risks
- Outbreak Observatory
- Policy Options for Gene Synthesis

Read more about our projects here: centerforhealthsecurity.org/our-work/Center-projects



### OVERVIEW 2019

• A Strategic Look at Existing Medical Countermeasure Manufacturing Capacity and Exploring Distributive Approaches to

• Public Health Impacts of Extended Power Interruptions: Scenario Scoping, Public Health Responses, and Health Priorities

## EVENT 201: A GLOBAL PANDEMIC EXERCISE

**THE SCENARIO** On October 18, 2019, in New York City, a pandemic tabletop exercise called Event 201 was conducted to think through the effects of and potential response to a hypothetical pandemic scenario. The event was designed by the Johns Hopkins Center for Health Security and hosted by the Center, the World Economic Forum, and the Bill & Melinda Gates Foundation.

The hypothetical contagion discussed was a novel coronavirus transmitted from pigs to people that was as transmissible as flu but more lethal, which led to a severe pandemic that caused great illness and loss of life and triggered major cascading economic and societal consequences.

The scenario opens with a disease in pig farmers in Brazil that spreads slowly at first. When it hits the low-income, densely packed neighborhoods of some of the megacities in South America, the epidemic explodes as it spreads efficiently from person to person. The pathogen and the disease it causes were modeled largely on SARS, but the pathogen is more transmissible in the community setting by people with mild symptoms. It is exported by air travel to other countries. Although at first some countries can control it, it continues to spread and be reintroduced, and eventually no country can maintain control.

As the scenario continues, the number of cases increases exponentially, doubling every week. As the cases and deaths accumulate, the economic and societal consequences become increasingly severe.

The Event 201 story ends at the 18-month point, with 65 million deaths and before an effective vaccine can be fully distributed.

Event 201 brought together 15 global business, public health, and government leaders to illustrate realistic policy problems that must be addressed under pressure during a plausible pandemic. As events escalated quickly in the fictional scenario, the leaders identified and underscored that global public–private cooperation was crucial in mitigating the economic and societal impacts of severe pandemics.

Avril Haines

George Gao



### **THE PARTICIPANTS**

#### Latova Abbott

Risk Management & Global Senior Director Occupational Health Services Marriott International

### Sofia Borges

Senior Vice President United Nations Foundation

#### **Brad Connett**

President, U.S. Medical Group Henry Schein, Inc.

#### **Chris Elias**

President, Global Development division Bill & Melinda Gates Foundation

#### **Tim Evans**

Former Senior Director of Health World Bank Group

#### George Gao

Director-General Chinese Center for Disease Control and Prevention

#### **Avril Haines**

Former Deputy Director, Central Intelligence Agency Former Deputy National Security Advisor

#### **Jane Halton**

Board member, ANZ Bank Former Secretary of Finance Former Secretary of Health, Australia

#### Matthew Harrington

Global Chief Operations Officer Edelman

#### Martin Knuchel

Head of Crisis, Emergency and **Business Continuity Management** Lufthansa Group Airlines

#### **Eduardo Martinez** President

The UPS Foundation

### Stephen Redd

Deputy Director Public Health Service and Implementation Science US Centers for Disease Control and Prevention

#### Hasti Taghi

Vice President & Executive Advisor NBCUniversal Media

#### **Adrian Thomas**

Vice President, Global Public Health Johnson & Johnson

#### Lavan Thiru

Chief Representative Monetary Authority of Singapore "Without a question, epidemic risk has become a global strategic been in a situation where we have had to respond to so many health normal. I don't expect the frequency of these epidemics to reduce."

#### ~ Mike Ryan, MD

Executive Director, WHO Health

#### "When the rubber hits the road, if we don't have well established standalone coordination mechanisms that bring the right players to get together to make decisions on how best to respond across a sector, then we will not achieve the collective efficiency that I think many of us would hope."

~Tim Evans, DPhil Former Senior Director of Health, World Bank Group

Avril Haines

#### "In addition to challenging health systems, pandemics can cause severe cascading economic and societal consequences. Neither governments nor private industries alone can adequately respond to a severe pandemic; they must work together."

~Tom Inglesby, MD Director, Johns Hopkins Center for Health Security

"We all know that by spending money on preparedness now, we can save money later. And the fact that we don't have the mechanisms in place that allow us to more effectively address a crisis in the moment is critically

~Avril Haines, JD Former Deputy Director, Central Intelligence Agency Former Deputy National

### RECOMMENDATIONS

On January 17, 2020, in a joint call to action following Event 201, the Johns Hopkins Center for Health Security, the World Economic Forum, and the Bill & Melinda Gates Foundation released 7 recommended actions that should occur before the next severe pandemic occurs:

- 1. Governments, international organizations, and businesses should plan for how essential corporate capabilities will be utilized.
- to maintain travel and trade during the crisis.
- 4. Governments should provide more resources and support for the development and surge manufacturing of vaccines, therapeutics, and diagnostics that will be needed.
- 5. Global business should recognize the economic burden of pandemics and advocate for stronger preparedness programs.
- misinformation and disinformation.







2. Industry, national governments, and international organizations should work together to enhance internationally held stockpiles of medical countermeasures to enable rapid and equitable distribution.

3. Countries, international organizations, and global transportation companies should work together

6. International organizations should prioritize reducing economic impacts of epidemics and pandemics.

7. Governments and the private sector should assign a greater priority to developing methods to combat



## INAUGURAL GLOBAL HEALTH SECURITY INDEX FINDS NO COUNTRY IS PREPARED FOR EPIDEMICS OR PANDEMICS

In partnership with the Nuclear Threat Initiative and the Economist Intelligence Unit, the Johns Hopkins Center for Health Security developed the 2019 Global Health Security Index (GHS Index) to assess a country's technical, financial, socioeconomic, and political capabilities to prevent, detect, and rapidly respond to epidemic threats with international implications, whether naturally occurring, deliberate, or accidental.

The inaugural GHS Index, released on October 24, 2019, is the first comprehensive assessment of global health security capabilities in 195 countries; it found severe weaknesses in countries' abilities to prevent, detect, and respond to significant disease outbreaks. The average overall 2019 GHS Index score is slightly over 40 out of a possible score of 100. Among the 60 highest-income countries assessed, the average score is 51.9.

"The GHS Index finds that no country is fully prepared for naturally occurring, intentional, or accidental infectious disease outbreaks," said Jennifer Nuzzo, DrPH, associate professor at the Johns Hopkins Bloomberg School of Public Health and senior scholar at the Johns Hopkins Center for Health Security. "Knowing that there is work to do, countries can use the index to identify gaps, build preparedness and best practices, and track progress over time."

The GHS Index, developed with guidance from an international panel of experts from 13 countries, assessed countries across 6 categories, 34 indicators, and 140 questions, using only open-source information and data from international organizations.

The Index team found that:

- of pathogens.
- Only 19% of countries receive top marks (scoring a 66.7 out of 100 or higher) in the category assessing early detection and reporting of epidemics of potential international concern.
- Fewer than 5% of countries score in the highest tier in rapid response to and mitigation of spread of an epidemic.
- Having a sufficient and robust health sector to treat the sick and protect health workers was the lowest-scoring category, with an average score of 26.4 out of 100.

At a time when risks are magnified by a rapidly changing and interconnected world and rapid technology advances make it easier to create and engineer pathogens, knowing the risks is clearly not enough. Political will is needed to protect people from the consequence of epidemics, to take action to save lives, and to build a safer and more secure world.



"After an Ebola epidemic devastated West Africa in 2014 [-2016], many countries took steps to boost their preparedness. But even as the risk of such outbreaks increases, no country-the United States included-is fully prepared to respond to a deliberate or accidental threat with the potential to wipe out humanity, according to a report assessing the efforts of 195 countries," wrote Lena Sun in the Washington Post.

• Fewer than 7% of countries score in the highest tier in the category assessing the prevention of the emergence or release

## THE STATE OF READINESS FOR A HIGH-IMPACT **RESPIRATORY PATHOGEN PANDEMIC**

The Johns Hopkins Center for Health Security was commissioned by the Global Preparedness Monitoring Board to assess the state of readiness for a "high-impact respiratory pathogen pandemic"—that is, a pathogen with the potential for widespread transmission and high observed mortality. When a high-impact respiratory pathogen emerges, either naturally or as the result of accidental or deliberate release, it has significant public health, economic, social, and political consequences.

"Novel high-impact respiratory pathogens have a combination of qualities that contribute to their potential to initiate a pandemic," wrote Center authors in the report, Preparedness for a High-Impact Respiratory Pathogen Pandemic, released in September 2019. "The combined possibilities of short incubation periods and asymptomatic spread can result in very small windows for interrupting transmission, making such an outbreak difficult to contain."

The team analyzed dozens of high-level reviews of global preparedness, assessed hundreds of recommendations developed from these reviews, and conducted interviews with international experts in pandemic preparedness and response.

Their findings detail the current capabilities and gaps that hamper efforts to respond to a high-impact respiratory pathogen. The authors found that strengthening preparedness for a high-impact respiratory pathogen pandemic is crucial: countries must build up their national core public health capacities and national and global surveillance capacities must be improved to rapidly respond to threats and improve the overall management of epidemic response.



**Preparedness for a High-Impact Respiratory Pathogen Pandemic** 

September 2019



## MOVING BEYOND THE ONE BUG, **ONE DRUG APPROACH**

 ${f I}$  o date, the pharmaceutical response to emerging infectious diseases and bioterrorism has been characterized by a "one bug, one drug" approach, where specific medical countermeasures-effective vaccines and therapeutics-are developed, manufactured, and deployed. However, over the past several years, platform technologies have been developed that could make it possible for multiple vaccines to be more rapidly produced from a single system.

To draw attention to the potential of these technologies, the Center conducted a project to elucidate the promise and challenges of vaccine platform technologies, with special attention to how they could speed development of vaccines for global catastrophic biologic risks (GCBRs) and emerging infectious disease outbreaks.

Through an extensive literature review, interviews with experts, and a technical workshop, the Center project team, in a report released in April 2019 titled Vaccine Platforms: State of the Field and Looming Challenges, made several recommendations:

- Increase the availability of both platform and nonplatform vaccine technologies.
- I trials earlier than with traditional candidates.
- to various targets, and biological delivery.

"As pandemic preparedness matures, the integration of nascent vaccine platform technologies into emerging infectious disease medical countermeasure development has the potential to have a significant impact on human resilience to both GCBR-level and other scales of epidemic threats," stated the report authors.



• Prioritize platform vaccine technology based on the ability to develop a vaccine candidate very rapidly and commence Phase

· Promote mRNA-based vaccine techniques that appear particularly promising in terms of ease of manufacture, adaptability

• Incentivize platform vaccine technologies for emerging infectious disease medical countermeasures with dedicated funding.



## SENATE TESTIMONY ON BIOLOGICAL THREATS TO US NATIONAL SECURITY

The growing US national security threat of biological events that can emerge from nature, deliberate attack, or accidental release is an urgent priority. Several trends make naturally emerging epidemics and pandemics more likely: the large numbers of people who live close to animals and previously wild ecosystems, the increase of populations in megacities, globalization, climate change, and a growing global resistance to antimicrobials that we have relied on. Additionally, there is continued global dispersion of biotechnology, which increases capacities of deliberate threats.

In November 2019, the US Senate Armed Services Committee's Subcommittee on Emerging Threats and Capabilities invited Center Director Tom Inglesby to testify on emerging threats. During the hearing, Inglesby discussed the growing threat of biological events, reviewed current US government efforts in this arena, and presented recommendations to improve the government's response to and preparedness for major biological events. He called on the US government, and in particular the Department of Defense, to continue to invest in and prepare for biological threats, particularly for high-consequence, even catastrophic, biological events.



## GENE SYNTHESIS GOVERNANCE MEETING

The Johns Hopkins Center for Health Security hosted a meeting on April 9, in Washington, DC, to discuss the 2010 US Department of Health and Human Services (HHS) guidelines for providers of double-stranded synthetic DNA. Invited speakers and audience members discussed how security and policy issues surrounding gene synthesis have changed since 2010 and what steps that HHS and other stakeholders can take to increase biosecurity for gene synthesis and related technologies.

## INDIA-US STRATEGIC DIALOGUE ON BIOSECURITY

n February 2019, the Johns Hopkins Center for Health Security, in collaboration with the DBT-UNESCO Regional Centre for Biotechnology, an autonomous institute of the Department of Biotechnology, Ministry of Science and Technology, Government of India, hosted the sixth dialogue on biosecurity in Hyderabad, India. The meeting brought together senior experts and leaders from India and the United States to increase knowledge of prevention and response efforts for natural, deliberate, and accidental biological threats in both countries.

Research and development are profoundly important to India and the United States for biotechnological advancement, but recent events, including the use of CRISPR, have raised many questions about how best to govern the growing landscape of biotechnology. Participants called for more regulatory frameworks to keep up with the rapidly expanding field of biotechnology.

The dialogue examined the current and emerging biosecurity concerns the 2 countries face. Participants noted that the changing dynamics occurring across the world, particularly in the Middle East, North Korea, and the South China Sea, could lead to increased political tensions and instability. Continued engagement between India and the United States, including through dialogues such as the India–US Biosecurity Dialogue, is crucial to strengthening relationships and helping to address growing threats.



Events and Engagement



## BIOSAFETY AND BIOSECURITY IN THE ERA OF Synthetic Biology: Perspectives from China and the United States

On July 26, the Johns Hopkins Center for Health Security and the Tianjin University Centre for Biosafety Research and Strategy cohosted an event that brought together leading experts and emerging leaders from China and the United States to discuss the ways that synthetic biology can alter the social and economic frameworks of modern humanity.

As leaders in synthetic biology, China and the United States have both the opportunity and the responsibility to be trailblazers in promoting responsible conduct in research.

Biotechnology has the potential to have a positive impact on international economies, sustainability, human health, and security. However, the current international governance structure for biological sciences is ill-equipped to manage risks from emerging biological technologies while still promoting beneficial research and development. Meeting participants considered advances in synthetic biology and discussed new ideas for policy and science tools that could help mitigate risks inherent in these new technologies while also ensuring that they reach their potential.

## STRATEGIC MULTILATERAL DIALOGUE ON BIOSECURITY

 ${f T}$  he Johns Hopkins Center for Health Security cohosted in Thailand the 2019 meeting of the Strategic Multilateral Dialogue on Biosecurity with the Thailand Ministry of Public Health Department of Disease Control. Beginning on April 29, the 3-day meeting brought together current and former senior government officials, policymakers, and other biosecurity experts from Indonesia, Malaysia, the Philippines, Singapore, Thailand, and the United States. Participants discussed the current national biosecurity priorities in each country, emerging biological threats in the region, and the evolving regional and global geopolitical situation and its potential implications for biosecurity in Southeast Asia and the United States.

This dialogue addresses the broad scope of biosecurity threats in Southeast Asia and the United States, including naturally occurring infectious diseases, particularly novel and emerging or reemerging pathogens with pandemic potential; the deliberate or accidental misuse of biological materials; misinformation during public health emergencies; and rapidly advancing biotechnology, including dual-use research and capabilities. The participants have developed trusted relationships over 5 years of dialogue meetings. The Philippines and Thailand became full dialogue participants at this year's meeting.

## MAXIMIZING OPPORTUNITIES FOR ECONOMIC GROWTH OF THE US BIOECONOMY

On July 16, the Johns Hopkins Center for Health Security, together with Ginkgo Bioworks, convened a meeting in Washington, DC, to solicit stakeholder input on specific ways that national policy can strengthen the US bioeconomy.

The United States has one of the world's most competitive bioeconomy markets and is a leader in biological innovation and education. However, recent advances in biological technologies are catalyzing global investment, spurring innovation, and increasing international competitiveness. As the growth or neglect of the US bioeconomy affects national security, it is critical for the United States to actively develop new mechanisms that leverage advantages in biotechnology for its benefit in the face of greater peer competition.

Participants, including members of government, academia, and industry, considered the benefits to the United States if its bioeconomy were to be expanded; examined the current health of the US bioeconomy; discussed existing US government programs, policies, and initiatives related to the bioeconomy; and identified priorities for strengthening the US bioeconomy.

The growth of the bioeconomy should be a priority for the United States, to take advantage of the benefits that biotechnology will bring across a variety of sectors and for continued national security.





## Collaboration with WHO on Addressing Risks Related to Advances in Science and Technology

With advances in molecular biology and related fields, new research and technologies are creating great benefits to economies, health care, and society. Exciting progress is under way in the fields of nucleic acid sequencing, gene synthesis, novel ecological solutions, big data, and artificial intelligence. But with these advances comes the potential for harm by nefarious actors. WHO has worked over the past few years to address the growing interface between health and security, and our Center is engaged with WHO in forecasting the potential science and technology landscape, predicting the developments that will pose the greatest security risks, and identifying governance options that countries could employ to mitigate risks while enjoying the advantages of life science developments. Center experts have served on the WHO Health Security Interface Technical Advisory Group, chaired the Dual Use Research of Concern Working Group for that technical advisory group, and authored a WHO-commissioned paper that provides a landscape technology review of dual-use research of concern. Center experts were also invited to present this technology landscape analysis to the WHO Strategic Technical Advisory Group on Infectious Hazards and provide recommendations for future science and technology governance options. The Center, as a WHO Collaborating Center, remains actively engaged with WHO in navigating how best to reduce the risk of GCBRs that could arise from misuse of science.

## GLOBAL FORUM AT THE BIOLOGICAL AND TOXIN WEAPONS CONVENTION MEETING OF STATES PARTIES

In December 2019, the Johns Hopkins Center for Health Security partnered with the United Nations Office of Disarmament Affairs to convene the second annual Global Forum on the Prevention of Advanced Biological Threats, coinciding with the 2019 Meeting of States Parties to the Biological and Toxin Weapons Convention (BWC) in Geneva, Switzerland. The Johns Hopkins Center for Health Security's Global Forum is an annual event in which BWC delegations and scientists can exchange the latest information and views on the leading edge of biotechnology. The forum informed States Parties' delegations of cutting-edge biological capabilities, including the ability to engineer pathogens or more complex organisms and to build awareness of and support for international bioweapons nonproliferation norms among the scientific community. As sources of risk, advanced biology, engineered pathogens and other organisms, and accidental biological threats, are of great concern to international biological nonproliferation regimes such as the BWC. Advanced biology also can lead to potential solutions to deter and prevent the deliberate and accidental misuse of biology.

During the Global Forum, experts discussed the current and future biological capabilities that are of concern to the BWC, either because they could potentially be misused or because they could provide benefit to the BWC and strengthen bioweapons nonproliferation norms.



## EMERGING LEADERS IN BIOSECURITY FELLOWSHIP

The Emerging Leaders in Biosecurity Fellowship is an opportunity for talented career professionals and graduate students to deepen their expertise, expand their professional networks, and build leadership skills through a series of sponsored events coordinated by the Johns Hopkins Center for Health Security. This highly competitive part-time program has more than 180 alumni from a wide variety of organizations in government, the private sector, and academia. Together, they represent the foundation of the next generation of leaders in the biosecurity community.

The 2019 fellows attended 2 multiday workshops, 1 in Washington, DC and 1 in Geneva, Switzerland, and a research symposium to share their research interests and findings. Through these events, the fellows had access to some of the top minds in domestic and global health security from the US government, academia, industry, and WHO, among many others.



#### OUTREACH

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## HEALTH SECURITY

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HEALTH SECURITY PROVIDES RESEARCH AND POLICY DISCUSSIONS ON A WIDE RANGE OF ISSUES RELEVANT TO THE FIELD. IT EXPLORES THE ISSUES POSED BY DISEASE OUTBREAKS AND EPIDEMICS; NATURAL DISASTERS; BIOLOGICAL, CHEMICAL, AND NUCLEAR ACCIDENTS OR DELIBERATE THREATS; FOODBORNE OUTBREAKS; AND OTHER HEALTH EMERGENCIES.

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#### OUTREACH



Media quoted Center staff or referenced the Center's work more than 500 times in 2019. The Center appeared in stories by NPR, the *New York Times*, the *Washington Post*, the *Los Angeles* Times, CNN, Vox, STAT, the Financial Times, and Forbes, among many others.

In July 2019, after WHO announced an emergency declaration for the Ebola outbreak in the Democratic Republic of Congo (DRC), Director Tom Inglesby, MD, spoke to Vox, "it is an unambiguous global statement that the situation is dire." It communicates "to high-income countries and donors that WHO needs much more help and that there are real dangers of the outbreak spreading further."

As measles cases spiked across the world, Senior Scholar Amesh Adalja, MD, spoke to NPR about how worried the public should be. He explained, "The vaccine hesitancy movement has really reached this [new] level in certain countries—the United States, European countries, even in the Philippineswhere we now are having difficult-to-control measles outbreaks occur, because the level of immunity has fallen."

# **OP-EDS**

Senior scholars wrote 8 op-eds in leading media outlets.

In their February 2019 op-ed in the Washington Post, Tom Inglesby, director of the Johns Hopkins Center for Health Security, and Marc Lipsitch, director of the Center for Communicable Disease Dynamics at the Harvard T. H. Chan School of Public Health, called for more transparency after US officials quietly reversed a moratorium on experiments to enhance some of the world's most lethal viruses by making them transmissible by air. "This lack of transparency is unacceptable. Making decisions to approve potentially dangerous research in secret betrays the government's responsibility to inform and involve the public when approving endeavors, whether scientific or otherwise, that could put health and lives at risk," they wrote.

They call for public discussion and debate about the risks and benefits of these kinds of experiments. "At stake here is the credibility of science, which depends on public support to continue. Science is a powerful driver of human health, wellbeing and prosperity, and nearly all of it can be done without putting populations at risk. If governments want to fund exceptionally risky science, they should do so openly and in a way that promotes public awareness and engagement."

"Although the DRC has successfully contained Ebola outbreaks before, this one is happening in a part of the country with limited infrastructure and active and dangerous militias whose actions threaten responders and have led to interruptions in disease-containment efforts," wrote Center Director Tom Inglesby, MD, and Senior Scholar Jennifer Nuzzo, DrPH, in their May op-ed in STAT outlining 3 urgent steps needed to prevent Ebola from spinning out of control in the DRC. "Leaders should start planning with the assumption that Ebola could get much worse quickly in the DRC. If they do, maybe together they can help the DRC, WHO, and partner organizations change the direction of this outbreak."



Clinicians' Biosecurity News, an email newsletter sent to more than 3,000 subscribers, is written and edited by Dr. Amesh Adalja and Dr. Eric Toner. It provides updates on new developments in a range of clinical research and practice areas that intersect with biosecurity and health security.

Health Security Headlines is a daily email digest of news and developments in health security sent to more than 3,600 subscribers. Senior Analyst Matt Watson edits the newsletter.

Preparedness Pulsepoints is a weekly email update on US government action in readiness and response. The newsletter is edited by Managing Senior Analyst Diane Meyer, RN, MPH, and has more than 2,600 subscribers.



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- Larry Canner/Johns Hopkins Center for Health Security, pages 3, 18, 21, 25
- Nick Klein/Johns Hopkins Center for Health Security, pages 8-11
- Greg Gibson/Nuclear Threat Initiative, pages 12-13

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