

Center for Health Security

Southeast Asia Strategic Multilateral Biosecurity Dialogue

with Participation from Indonesia, Malaysia, the Philippines,
Singapore, Thailand, and the United States

Meeting Report from the
2024 Dialogue Session

April 16-18, 2024

Singapore



JOHNS HOPKINS
BLOOMBERG SCHOOL
of PUBLIC HEALTH

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Acknowledgments

The authors would like to thank Andrea Lapp for her tireless efforts in coordinating the meeting and travel logistics and Alyson Browett, Julia Cizek, Cagla Giray, and Prarthana Vasudevan for editing, design, and publication support.

This publication results from a strategic dialogue meeting supported by the Defense Threat Reduction Agency, US Department of Defense. The views expressed in written materials and/or made by speakers, moderators, and presenters do not necessarily reflect the official policies of the US Department of Defense, nor does mention of trade names, commercial practices, or organizations imply endorsement by the US government.

Suggested citation: Shearer MP, Wakefield B, Cicero A, Inglesby T. *Southeast Asia Strategic Multilateral Biosecurity Dialogue, with Participation from Indonesia, Malaysia, the Philippines, Singapore, Thailand, and the United States: Meeting Report from the 2024 Dialogue Session*. Baltimore, MD: Johns Hopkins Center for Health Security; 2024.

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Executive Summary

The 2024 meeting of the Southeast Asia Strategic Multilateral Biosecurity Dialogue was held in Singapore, with participants from Indonesia, Malaysia, the Philippines, Singapore, Thailand, and the United States. The dialogue is conducted at the Track 1.5 level, with current and former government officials—participating in their personal capacity—and civil society experts collaborating to identify priority threats and gaps, share experiences and lessons, and propose opportunities to strengthen national and regional resilience against natural, accidental, and deliberate biological threats. The participants represented diverse fields under the broad umbrella of health security, including public health and medicine, biology and biotechnology, emergency preparedness and response, defense and national security, foreign affairs and international relations, and medical countermeasures (MCM) research and development. All discussions were conducted on a not-for-attribution basis in order to promote frank and open discussion.

Even as countries around the world continue to combat COVID-19 and rebound from the historic impacts experienced in the early years of the pandemic, the 2024 Southeast Asia dialogue pushed participants to look forward, beyond the COVID-19 pandemic, to build on key lessons and strengthen the policies, programs, and capacities necessary to combat future biosecurity threats. Participants were challenged with 6 dialogue sessions that covered a broad scope of topics with implications for national, regional, and global biosecurity: an overview of national and regional biothreats and biosecurity priorities; the road to resilience against future threats; the convergence of biology and emerging technologies, including artificial intelligence (AI); MCM research, development, production, and acquisition; laboratory biosafety and biosecurity, particularly for high-consequence research; and the role of militaries and defense agencies in biosecurity planning and operations. Participants also received briefings from Dr. Kazunobu Kojima (WHO Biorisks and Health Security Protection Unit) on the forthcoming 2nd edition of WHO's laboratory biorisk management guidance and from Dr. Marc Ho on Singapore's efforts to establish its new Communicable Diseases Agency (CDA).

In addition to the targeted discussions and briefings, the dialogue organized a site visit to Singapore's National Centre for Infectious Diseases (NCID). During this visit, participants received briefings from senior NCID officials, including NCID Director Dr. Vernon Lee—a former dialogue participant—and engaged in discussions on the center's design and operational principles, clinical and research capacities, coordination with the health system and other government agencies, and role during the COVID-19 response. Dialogue participants also toured NCID's high-level isolation unit (HLIU), providing an opportunity to view firsthand Singapore's premier treatment facility for high-consequence infectious diseases. This opportunity illustrated the cutting edge of

clinical and research facilities and capabilities in Singapore, which enables participants to advocate for similar facilities in their home countries.

For the past decade, this dialogue has built and strengthened a network of senior government officials and other experts, dedicated to establishing resilience against the broad scope of biosecurity risks affecting this critical region. Participants continue to share experiences and lessons—and perhaps more importantly, critical gaps in national and regional preparedness and response capacities—and to identify opportunities to collaborate and take concrete steps forward at the national and regional levels, to combat natural, accidental, and deliberate biological threats.

Introduction

The Johns Hopkins Center for Health Security hosted the ninth in-person [Southeast Asia Strategic Multilateral Biosecurity Dialogue](#) meeting in Singapore from April 16-18, 2024. The dialogue began in 2014 as a bilateral partnership between Singapore and the United States, but since 2017 it has included stakeholders from Indonesia, Malaysia, the Philippines, Singapore, Thailand, and the United States. Participants represented a broad range of relevant fields, including public health and medicine, biology and biotechnology, emergency preparedness and response, defense and national security, foreign affairs and international relations, and medical countermeasures (MCM) research and development. Over the past decade, the Southeast Asia Biosecurity Dialogue has enabled participants to explore national biosecurity landscapes, understand relevant policies and frameworks, identify gaps in prevention and preparedness, share best practices across a broad range of biosecurity programs and activities, and strengthen partnerships across the region. The overall aim of this effort is to help mitigate the full spectrum of biological threats and establish a robust network of experts to address current, emerging, and future biological threats in Southeast Asia and around the world.

The dialogue is conducted on a Track 1.5 basis, with a mix of current and former government officials and civil society experts—participating in their personal capacity—including from nongovernmental organizations (NGOs) and academic institutions. All discussions under the dialogue are conducted on a not-for-attribution basis, which allows for frank and open participation and contributes to a richer discussion on existing capabilities, gaps, operations, policies, challenges, and lessons from each country. Additionally, participants have further opportunities to collaborate and share their experiences on the margins of the meeting, including during meals and coffee breaks.

The 2024 meeting included 6 dialogue sessions, presentations on the WHO's forthcoming revision to its laboratory biorisk management guidance and Singapore's Communicable Diseases Agency (CDA), a site visit to the Singapore National Centre for Infectious Diseases (NCID), the launch event for the [Asia Centre for Health Security](#) (Asia CHS), and a final roundtable discussion on valuable insights from the meeting and proposals for future collaborations between dialogue participants. The participants discussed a broad scope of biosecurity challenges with impacts at the national, regional, and global levels, including efforts to shift attention from the COVID-19 pandemic to future threats; the convergence of biology with emerging technologies, such as artificial intelligence (AI); MCM research, development, production, and procurement; laboratory biorisk management; and strengthening collaboration between health and defense agencies. This meeting report summarizes key insights drawn from across

these discussions and activities. The meeting agenda and participant list can be found in the appendices of this report.

Dialogue Session One: Biothreat Overview & National Biosecurity Priorities

While much of the 2023 dialogue discussion—as well as the virtual sessions held in 2021—focused heavily on the COVID-19 pandemic, the opening conversation this year focused attention on a broader range of biosecurity concerns in the region. Some participants cited serious endemic communicable disease threats among their priorities, including HIV/AIDS, tuberculosis, dengue, and malaria. Several participants also emphasized the role of climate change on the increasing prevalence of vector-borne diseases, in Southeast Asia, the Americas, and elsewhere, noting the introduction and expansion of Zika, dengue, and other mosquito-borne diseases to new regions in recent years. Climate change also factors into other health priorities, such as the risk of disease spillover events, food security, and economic stability, underscoring the importance of a One Health approach to biosecurity. Several participants highlighted emerging infectious diseases, including highly pathogenic avian influenza (HPAI) and mpox, as a priority, particularly in the context of recent epidemics in new regions, including the United States. Additionally, vaccine-preventable diseases in some countries are surging, including measles and pertussis, likely owing to disruptions to routine childhood immunizations during the COVID-19 pandemic.

These more traditional biosecurity priorities, including emerging infectious diseases and pandemic preparedness, are returning to the forefront for the participating Southeast Asian countries. There is certainly awareness of and attention on deliberate and accidental threats, but naturally occurring outbreaks and epidemics represent more pressing daily risks in the region, and available resources are generally allocated to those threats. One participant commented that many countries modeled their COVID-19 responses on their strategies used during the 2003 SARS epidemic; however, they noted that countries lack a similar model for accidental or deliberate events, acknowledging that these require additional attention in the region to establish sufficient resilience.

As has been the case throughout the course of the dialogue, disease surveillance capacity remains a high priority for many participants. They discussed continued challenges sharing and integrating various surveillance data streams—most notably, across borders—in an effort to generate a more complete epidemiological picture at the national or regional level or to more rapidly identify emerging outbreaks and epidemics. One participant explicitly commented that “reporting starts and ends at our borders,” reflecting the ongoing struggle to collaborate internationally in disease

surveillance. Despite cross-border and regional data-sharing programs discussed in previous dialogue meetings—such as the [Mekong Basin Disease Surveillance](#) network, the ASEAN [Mitigation of Biological Threats Programme](#), and the [ASEAN Centre for Public Health Emergencies and Emerging Diseases](#) (ACPHEED)—numerous barriers remain to effective regional collaboration on biosurveillance activities.

Even as countries look ahead to future threats, however, COVID-19 was not far from the front of mind for many participants, especially as their respective governments and organizations seek to apply lessons from their pandemic experiences and take concrete and meaningful steps toward strengthened resilience against a broad scope of biological threats. Several high-profile challenges during the pandemic response were addressed multiple times during this session, including national access to MCMs, particularly vaccines; health system capacity, including challenges associated with personnel shortages; and multisectoral collaboration, with an emphasis on the links between health and national security or defense stakeholders. The participating countries are still grappling with their inability to gain timely access to COVID-19 vaccines, as countries like the United States, United Kingdom, and those in the European Union acquired the available COVID-19 vaccine supply in the early phases of manufacturing and distribution. Several participants described early discussions or planning in their governments to establish domestic vaccine research, development, and production capacities, in an effort to establish self-sufficiency for future health emergencies and ensure equitable access to MCMs. Questions remain, however, regarding the financial and technical sustainability of these efforts, in the absence of significant demand during periods between health emergencies. In one example, Thailand is investing US\$200 million in its [National Vaccine Institute](#), with the goal of establishing domestic mRNA vaccine manufacturing capacity. Additionally, participants noted that healthcare workforces in many countries have not recovered from the pandemic response, including both frontline nurses and specialists.

Oversight and regulation of biological capabilities and research is another ongoing challenge, and multiple participants highlighted these as risks that merit more attention from national governments and other stakeholders. These risks manifest in a variety of forms, including the proliferation of high-containment virological laboratories during the COVID-19 response, the continued democratization of advanced biotechnology, the convergence of biology with advanced computing (eg, AI, machine learning), and even the availability of desktop gene synthesis units. There seemed to be considerable interest among dialogue participants in leveraging these tools, especially AI, to facilitate advancements in biological research, including for MCM development, but it is not clear to what extent this is currently taking place in Southeast Asia. Regardless, governments in every country are struggling to keep pace with these new capabilities and effectively regulate emerging tools to mitigate the associated risks.

Beyond direct health threats, geopolitical changes and events in the region have potential impact on national and regional biosecurity risks, readiness, and resilience. For example, civil unrest and active conflict in Myanmar is resulting in mass migration into neighboring countries, including Thailand, which poses risk for importation of vaccine-preventable diseases into a vulnerable population and places additional stress on Thailand's universal health coverage system. New national leadership in several countries has resulted in shifting national priorities, renewed or waning interest in ongoing endeavors, or delayed implementation of key national policies. Notably, all 5 Southeast Asian countries have elected a new President or Prime Minister over the past 2 years. For example, the Philippines is attempting to establish a national virological institute, which is a priority for its new President. Additionally, uncertainty around the upcoming US presidential election raised questions regarding the future of American priorities and engagement in Southeast Asia and international institutions (eg, WHO), as well as on the global stage.

Dialogue Session Two: The Road to Resilience Against Future Threats

This second discussion on building resilience was a logical follow-on to the opening discussion on national and regional priorities, and participants shifted their focus toward the activities, capacities, policies, and programs necessary to build on lessons from the COVID-19 pandemic and mitigate emerging and future biosecurity risks. Participants were eager to maintain momentum on preparedness and response to biological threats in the wake of the pandemic response, in order to build sustainable capacities, but attention and political will is already waning, as countries prioritize more immediate needs. Several themes and capacities persisted throughout this session, including the importance of health system capacity and the associated human resources and infrastructure, vaccine security and self-sufficiency, sustainable financing, and emerging technologies. One point of emphasis was the term “resilience” itself. Specifically, several participants discussed the crucial difference between recovering to the original state of readiness versus rebounding to a new, improved state. They emphasized that it is easy to fall into the trap of feeling like we have returned to a sense of normalcy after the COVID-19 pandemic; however, that degree of preparedness was clearly not sufficient.

National experiences during the COVID-19 response brought to light myriad shortcomings in preparedness and response capacity, for pandemics as well as more routine health threats. Specifically, participants identified national laboratory capacity, healthcare workforce, and surveillance and reporting systems as in need of serious upgrades. While these are relatively concrete areas for improvement, other challenges are more complex, such as breaking down silos, including between government

agencies, across various levels of government, and between government and civil society partners, such as nongovernmental organizations, academic institutions, and private sector business and industry. These divisions hindered the sharing of information and resources, collaboration on relevant policies and operations, and effective communication during the COVID-19 response. Existing national-level policies, programs, frameworks, and strategies already outline government agencies' respective roles, responsibilities, and authorities and direct collaboration with relevant stakeholders and partners, but the COVID-19 response illustrated countless barriers to translating these directives into practice. Participants from every country identified examples of conflict between various entities during the COVID-19 response, illustrating one participant's perception that "everybody wants coordination, but nobody wants to be coordinated." Participants also described efforts to establish and revise national policies, legislation, and frameworks to reform these relationships, but they acknowledged that these efforts will likely face similar practical implementation challenges.

As in previous dialogue meetings, participants discussed a range of emerging technologies and capabilities that promise to revolutionize critical health security processes, including research, development, and manufacturing of novel MCMs. The historically short timeline for bringing COVID-19 vaccines to market evinced the potential magnitude of these advancements. Additionally, the rapid proliferation of advanced computing capabilities, such as AI, has provided an early glimpse of their potential impact on biology. Participants are eager to leverage these new tools, but they remain wary of the risks, particularly in the context of lowering barriers to high-risk research and associated accidental or deliberate biological threats. Governments are still struggling to understand these benefits and risks, and the speed of advancement far outpaces the legislation, regulation, and oversight needed to protect against misuse. Participants certainly recognize the potential benefits and risks, and they called for proactive attention by national governments to put appropriate measures in place to mitigate the risk of accidental misuse and nefarious activity. They also discussed the use of new conceptual approaches to challenges like MCM or diagnostic development—including platform technologies, prototype pathogens, and pathogen-agnostic diagnostics—with the goal of increasing research and development efficiency and shortening the time from novel pathogen detection to the availability of effective tests, treatments, and vaccines. Participants hoped these approaches could facilitate national or regional vaccine manufacturing capacity by enabling production lines to remain in use for routine demand but maintain the ability to rapidly convert them to emergent needs, as needed.

Participants discussed the response to ongoing [HPAI outbreaks among US cattle](#)—and similar events in their home countries—to illustrate ongoing limitations in health

security policy and practice, especially in the One Health context. Several participants highlighted how events like the US HPAI outbreaks have provided new perspectives on One Health. Traditionally, One Health is described as the inherent linkages between human, animal, plant, and environmental health, often in the context of the ultimate effects on human health (eg, via spillover events or food security). The COVID-19 pandemic illustrated the downstream economic, social, and political effects of epidemics, reaching far beyond the direct impact on human health; however, the US HPAI outbreaks seem to take this a step further, by threatening these same kinds of effects, but with few human infections. In fact, these effects in the absence of significant human infection led one participant to remark that the HPAI situation has “shaken [their] notion of One Health.” The associated financial impact on dairy farmers, including through the requirement to discard contaminated milk, has disincentivized participation in testing of their animals and workers, and hence, harmed surveillance. Dairy farm workers, many of whom are undocumented immigrants, face additional barriers to accessing testing and healthcare services, which may be masking the true scale of zoonotic transmission. These challenges have hindered response activities necessary to monitor and contain transmission, which could exacerbate the situation and downstream financial impacts on consumers. This is similar to previous experiences in Southeast Asia, including with Nipah virus outbreaks and the recent African swine fever epidemic. In these situations, culling millions of pigs ultimately contained transmission, but a lack of financial compensation by governments has impeded routine surveillance activities to identify future outbreaks. Uncontrolled transmission, especially for influenza viruses, provides further opportunity for mutation, which could potentially lead to the evolution of viruses capable of sustained human-to-human transmission.

Guest Presentation: Establishing Singapore’s Communicable Diseases Agency

Marc HO, Head of Transition, Communicable Diseases Agency Planning Office, Ministry of Health, Singapore

Inspired by lessons from its COVID-19 response—as well as decades of preparedness and response efforts for a variety of emerging infectious diseases, including SARS in 2003—Singapore is establishing the [Communicable Diseases Agency](#) (CDA), an analogue to national centers for disease control in the US and other countries. As the Head of Transition for the CDA, Dr. Marc Ho provided firsthand insight into the conception and planning for CDA, as well as ongoing efforts to stand up the organization and its future role within Singapore’s government.

Singapore's CDA is founded on 3 key principles: establishing and expanding public health expertise and capacity; integrating command, control, and coordination functions across government agencies; and rapidly activating surge capacity during health emergencies. In terms of specific functions, the CDA will coordinate national activities to strengthen epidemic preparedness and response; support and conduct research; provide clinical care, including to ensure continuity of operations; conduct training and education to support a sustainable health workforce; and facilitate collaboration, including between relevant sectors and across borders. Dr. Ho described the CDA's goal as providing "end-to-end" functionality, spanning policy, guidance, and operations. The CDA is principally supported by 3 government agencies: the Ministry of Health, which will deal with policy issues, as well as disease surveillance, analytics, and intelligence, including horizon scanning; the National Centre for Infectious Diseases (NCID), which will focus on laboratory services (including Singapore's national reference laboratory), research, and training; and the Health Promotion Board, which will cover the national immunization registry and public education. Notably, many CDA personnel will jointly hold positions in these—and other—institutions. Beyond the health sector, the CDA will coordinate with other relevant government agencies, including for defense and national security. Importantly, in the context of CDA's research portfolio, Singapore aims to strike a balance between research *conducted* by CDA and research *supported* by CDA, in order to leverage the tremendous technical expertise that exists among Singapore's academic institutions and private sector businesses and industries. Singapore's CDA effort is currently in an interim phase, as the government works through the necessary legislative and regulatory processes, and CDA leadership is in the process of building the organizational structures, workforce, and facilities to support CDA's various missions. Singapore aims to make the CDA fully operational by 2025.

Participants engaged with Dr. Ho on various aspects of the planning and future operations for Singapore's CDA, often trying to understand the CDA's purpose and goals in the context of their own national disease control agencies and programs. One participant recalled that Singapore's vision for CDA's role is similar to the 3 pillars of its national approach to the COVID-19 response, specifically health system capacity, good governance, and social capital. Several participants were interested in whether Singapore's CDA would remain limited to communicable diseases, as suggested by its name, or whether it would expand to include other health conditions and risks, as the US CDC has done over its more than 75 years of service. These discussions emphasized both the benefits and challenges of an expanded scope of responsibility. Other participants focused on the relationship between CDA and NCID, especially for clinical care and laboratory services, and anticipated challenges of integrating policy, research, and operations under one agency.

Dialogue Session Three: The Convergence of Biology & Emerging Technologies

The convergence of biology and emerging technologies remains a priority issue globally, setting the stage for both improved resilience and increased biological risk in Southeast Asia and around the world. Participants discussed the importance of balancing the risks and benefits provided by the convergence of biology and emerging technologies, particularly the impact of AI. While leveraging AI can produce excellent results and make more efficient use of available resources, concerns remain over regulation and the implications for biosafety and biosecurity. Part of the discussion focused on how novel technologies could enable non-state actors, including “lone wolves,” to pursue the malicious use of biological agents and the associated need to improve resilience against deliberate threats in Southeast Asia. Participants also agreed, however, that the risks posed by emerging technologies should not be overemphasized, lest protective measures unnecessarily hinder progress. For example, while AI can lower existing technical barriers or accelerate work in the biotechnology space, AI tools do not eliminate the need for specialized expertise or advanced technical work. These tools will certainly continue to advance, and it is crucial that we assess and characterize both current and future capabilities to proactively identify and implement appropriate risk mitigation measures without disproportionate barriers to the use of biology for peaceful purposes.

In some cases, the COVID-19 experience led to the rapid development of diagnostic platforms, which has enabled countries to enhance their capacity to screen for a wider range of biological agents. In Singapore, advanced computing and AI is beginning to be used for biological risk assessment, as the country shifts toward a more proactive approach to scanning for new and emerging threats. The University of the Philippines has established a genomics-focused multidisciplinary research unit known as the [Philippine Genome Center](#). This Center was used during the COVID-19 pandemic to test and identify different variants of the SARS-CoV-2 virus. Since then, it has further developed its medical diagnostic capabilities to incorporate various types of sequencing, as well as functioning as a biobank for pathogen specimens from the Philippines and elsewhere. More broadly, the university also assists the government of the Philippines in the application of AI technology. The Philippines recognized that it lags behind many others in terms of AI readiness, including other dialogue countries, which led the government to establish an advisory committee to help address this gap. The University of the Philippines developed its own AI guidance, and university experts are now coordinating with officials across multiple ministries to help the government effectively and responsibly harness the benefits of these emerging tools.

Synthetic biology was another focus of conversation in this session. The National Research Foundation in Singapore has focused investments into advancing synthetic biology through the [Singapore Consortium for Synthetic Biology](#), which includes both academic and industry partners working on this area. Participants discussed the important role industry can play in advancing medical applications of this technology and emphasized the beneficial impacts of associated advanced technologies.

While participants were keen to highlight the importance of positive applications of advanced and emerging technologies, the discussion also focused on the need for appropriate regulation. Participants emphasized that regulations will always lag behind technological developments. These technologies are evolving faster than we can assess the risks, so regulators must stay dynamic in their approach. Participants also noted that while legislation is important, regulation is only as effective as its implementation and enforcement. Governance exists on a spectrum, and to effectively mitigate risks, governments must consider the full spectrum of options available to them. This includes not only legislation, but also practical “guardrails” or “speedbumps” to disincentivize or hinder malpractice, opportunities to call attention to potentially dangerous work, and voluntary practices or standards to promote the responsible conduct of research. One participant suggested the idea of a regional plan of action that countries could adopt at a national level.

Participants discussed several national-level activities, policies, and frameworks to govern the use of emerging technologies. The United States is moving forward with updated policies in this space and is reviewing how US-funded research is regulated, particularly studies involving enhanced pandemic potential pathogens (ePPP) or other high-consequence work. This includes assessing the necessary checks and balances and ensuring that the appropriate research is being funded both domestically and internationally. Examples of progress from the US include the [presidential executive order on AI](#) (October 2023), which is the driving force behind the [AI Safety Institute](#), and coordination with industry partners to assess the landscape and develop frameworks on gene synthesis screening. In Singapore, the [Genetic Modification Advisory Committee](#) has developed guidance on the use of genetically modified organisms and is actively collaborating with the scientific community to encourage and support implementation. These documents have been modified several times in partnership with the regulatory community as the related technologies have matured. One participant praised this model for allowing the use of these technologies in parallel with processes to develop and update associated regulatory frameworks.

Participants also discussed the role of international and regional organizations in addressing the promise and risks associated with rapid advancements in biology. This included the work of the WHO Science Division in producing the [Global Guidance](#)

[Framework on the Responsible use of the Life Sciences](#) and the importance of linking and aligning policies and programs implemented at the national level to those in other countries, as well as broader international efforts. Several participants, however, called attention to the challenges of enforcing international regulations or standards at the national level, while acknowledging the value of leveraging regional technical expertise and guidance when possible. One participant suggested that a single, overarching regional biosafety and biosecurity regulation framework might be useful, although implementation is likely not practical. One participant noted that only 2 out of 10 ASEAN Member States have a comprehensive national framework on biosafety and biosecurity, so additional attention is certainly needed at the national level in Southeast Asia. ASEAN intends to issue recommendations for this in the near future, which could help raise awareness and attention on these issues and provide technical guidance for developing national-level measures.

Dialogue Session Four: Medical Countermeasures Development, Production Capacity & Stockpiling Strategies

The development of novel MCMs—as well as the ability to rapidly produce, procure, stockpile, and distribute MCMs—is a crucial part of health emergency preparedness and response planning. The COVID-19 response highlighted this challenge in many countries, in Southeast Asia and worldwide, and this issue has been at the forefront of many international discussions, including ongoing negotiations around a prospective pandemic agreement. Participants were concerned by the risk of “vaccine nationalism” and “vaccine diplomacy,” particularly alongside inequitable access to various MCMs during the pandemic response, as well as personal protective equipment (PPE) and other supplies. Some participants noted that, in the absence of formal international agreements on these issues, access and inequity will remain a problem, as countries are forced to compete for a limited supply of products, resulting in vaccination coverage gaps that place vulnerable populations at even higher risk. As participants discussed challenges in accessing COVID-19 vaccines, one participant posited that China took this opportunity to present itself as a more responsible actor than the United States—and reinforce its international standing—by taking a lead role in supplying vaccines for low- and middle-income countries.

The question of international access and equity was understandably a priority during this session, and participants lamented that the international community had not learned valuable lessons from previous experiences, such as the 2009 H1N1 pandemic. The COVID-19 pandemic again illustrated major disparities in global vaccine access. As governments look to the future, in hopes of uniting around international standards and commitments in pandemic preparedness, some participants argued that the proposed text of the pandemic agreement is drafted to benefit higher-resource countries over

low- and middle-income countries, particularly in the context of pathogen access and benefits sharing, which factors directly into issues around access to MCMs derived from these specimens. In the absence of reliable and equitable international frameworks, participants discussed national self-sufficiency as an important component in solving this issue, but it is certainly not the only—or necessarily the most effective or efficient—way of solving this issue. The participants also thoroughly discussed opportunities for regional cooperation, and many expressed interest in Southeast Asian countries speaking collectively to maximize their leverage on these issues, whether through pooled investments in MCM development or expanded purchasing power for end products. Importantly, this cooperation would hinge on honest and open conversations between governments on highly sensitive issues, which would necessitate a high degree of trust. Participants referenced the Pan American Health Organization’s (PAHO) [Revolving Fund for Access to Vaccines](#) as an exemplar of effective regional collaboration. For 40 years, the PAHO fund has enabled participating countries to negotiate vaccine procurement agreements with more strength than if they were to do so bilaterally.

Stockpiles are one tool to mitigate the need for national or regional production capacity—and the resources required to maintain surge capacity during routine periods between emergencies. At the regional level, ASEAN is currently investigating options to reestablish a [Regional Reserve of Medical Supplies for Public Health Emergencies](#) (RRMS). Stockpiles certainly require resources to establish and maintain, and participants discussed opportunities to frame these costs in a positive light to illustrate their long-term value. One option is to discuss these stockpiles as an investment or insurance policy, including to emphasize the economic benefits of preparedness. Additionally, stockpiled supplies can be rotated into existing supply chains, which mitigates the cost of disposing and replacing expired products. Some participants also identified reinsurance programs as a mechanism to distribute financial risks and effects more broadly across the region. There are potential lessons to be learned from how other sectors manage risks, including through traditional insurance policies and mechanisms. Participants acknowledged that these are more challenging conversations in resource-limited environments, but it is important to think creatively about how to establish sustainable preparedness capacity, especially for vaccines and other MCMs.

Participants also noted the significant risks posed by the emergence of an unknown pathogen, or [Disease X](#), for which effective MCMs are unlikely to be available. In these cases, the response will initially need to rely on nonpharmaceutical interventions (NPIs) as novel medical countermeasures are developed, if they can be developed at all. NPIs can be relatively low-cost and effective options, and associated plans and resources for their use should not be neglected or discounted in favor of reliance on MCMs.

Site Visit: Singapore National Centre for Infectious Diseases

On the afternoon of the second day, the dialogue participants visited Singapore's [National Centre for Infectious Diseases](#) (NCID), which provides national-level capacity for clinical care, high-level patient isolation, advanced laboratory diagnostics, and other critical epidemic response services. Inspired by Singapore's experience with SARS in 2003, NCID is a specially designed 330-bed facility—capable of nearly doubling that capacity to combat larger epidemics—that houses Singapore's premier infectious disease treatment center, reference laboratory, and research and training programs, as well as national offices for HIV/AIDS, tuberculosis, and antimicrobial resistance programs. During the visit, participants received a briefing on NCID's history, construction, facilities and capabilities, and operational roles in epidemic responses—including during the COVID-19 pandemic—from Executive Director Dr. Vernon Lee and Clinical Director Dr. Shawn Vasoo. Participants were also treated to a tour of NCID's bespoke high-level isolation unit (HLIU), hosted by Dr. Poh Lian Lim, which illustrated the advanced clinical and laboratory capabilities available to support highly infectious or high-consequence infectious disease patients, as well as the state-of-the-art engineering controls and infection control practices in place to protect clinical staff and the public. Notably, the ongoing participation of Dr. Lim and Dr. Vasoo in the Southeast Asia dialogue, as well as Dr. Lee's prior participation, demonstrates the strength of the dialogue's expert network in Singapore.

Participants from across the dialogue countries emphasized how informative and valuable they found the NCID presentations and tour, as they considered what similar facilities or capacities might look like in their own countries. In the absence of established standards for facilities like NCID and the dearth of such facilities worldwide, these interactions provided a rare opportunity for international experts to gain insight into their design and operation and to expand firsthand appreciation of the kinds of tools and capabilities they can bring to bear in combatting future epidemics, including at the national, regional, and global levels. The presentations and tour inspired spirited queries and discussion on the benefits, limitations, challenges, experiences, and lessons from Singapore's efforts to establish and maintain this national and regional resource, and these conversations persisted throughout the participants' remaining time together.

Guest Presentation: WHO Laboratory Biosecurity Guidance, 2nd Edition

Kazunobu KOJIMA, Biorisks & Health Security Protection Unit, WHO

Dr. Kazunobu Kojima opened the session on laboratory biosafety and biosecurity with a description of WHO's recent efforts to bolster laboratory biorisk management. His

remarks touched on a variety of policy and technical guidance activities under WHO, and he focused on putting these efforts in the context of ongoing work to finalize the 2nd edition of *WHO's Biorisk Management: Laboratory Biosecurity Guidance* document. Notably, the original iteration of this guidance document stemmed from a World Health Assembly (WHA) resolution in 2005, following a series of laboratory-acquired SARS (now SARS-CoV-1) infections that prompted concern that a laboratory accident could spark another epidemic, and demand for a revision was prompted by questions regarding the origins of SARS-CoV-2. While WHO has assessed the natural emergence of the virus to be the most likely scenario, it has not ruled out the possibility of a laboratory-associated release. Since the onset of the COVID-19 pandemic, a number of WHO member states have called for harmonization of biosafety and biosecurity standards at the global level, and efforts led by a geographically, economically, and politically diverse group of member states have aimed to develop an effective and sustainable set of guidance that can be implemented in a variety of environments.

The new edition of the biorisk management guidance is designed to complement the existing *WHO Laboratory Biosafety Manual, 4th Edition*—largely addressing biosecurity, instead of biosafety—and it furthers WHO's efforts to promote a risk-based approach to determining appropriate protective measures. Dr. Kojima emphasized that the pathogen itself is not the sole factor in determining research risks, and the work being done must be considered as well. He provided an illustration of this approach using examples from the COVID-19 pandemic, with varying levels of biosafety and biosecurity protections appropriate for different activities, all involving the SARS-CoV-2 virus:

- At-home rapid diagnostic tests are performed outside a laboratory environment, essentially “BSL-Zero.”
- Point-of-care testing equipment provides the equivalent of BSL-1 safeguards.
- Traditional RT-PCR testing is typically conducted in a BSL-2 laboratory.
- Isolation of SARS-CoV-2 variants of concern would be performed in a BSL-3 laboratory.
- High-consequence research on SARS-CoV-2 would be performed in a maximum-containment BSL-4 setting.

The updated guidance also takes a new approach to terminology, focusing on “high-consequence research.” Previously, terms like “dual-use research” were used broadly to describe higher-risk research activities; however, “dual-use” focuses explicitly on potential applications, and therefore, the associated intent. In contrast, “high-consequence” takes a broader approach to risk, encapsulating the risks of both deliberate and accidental misuse and helping to more closely align biosafety and biosecurity under the umbrella of “biorisk management.” The forthcoming updated guidance takes a hybrid approach to risk assessment, including a risk-based

component, based on the activities being undertaken (as illustrated in the above example), in combination with a list-based approach, based on pathogens and toxins that pose higher risk for deliberate misuse. The 2nd edition of the biorisk management guidance outlines a 2-tier system for regulation and oversight of biological research, including national-level policies, programs, and legislation as well as institutional biosafety committees (IBCs). National-level programs do not have the capacity to review and manage studies from institutions nationwide; however, in this model, IBCs can provide more direct and active oversight of specific research studies and programs, while operating under national-level directives.

Participants were interested in learning more about WHO's perspective on how to close the gap between these kinds of guidance documents, particularly those issued at the international level, and actual practice, as well as considerations for ensuring biosafety and biosecurity for laboratories affected by external threats, such as civil unrest, active conflict, and natural disasters. Dr. Kojima acknowledged the challenge of implementation, particularly as some countries place low priority on laboratory biosafety issues. He emphasized that the WHA resolution and the updated document help raise awareness of the importance of these activities and standards and that the guidance is intended for use in a variety of settings, helping member states identify protective measures that fit within their existing systems. He also noted that external threats like those listed above are included in the revision; however, implementation will be critical to establishing effective risk mitigation measures in advance of these types of events or threats.

Dialogue Session Five: Laboratory Biosafety & Biosecurity

The discussion on WHO's forthcoming biorisk management update flowed directly into a broader discussion on laboratory biosafety and biosecurity challenges and priorities in Southeast Asia. In addition to continued debate on the right approach to biorisk management, the participants addressed these issues from a few different perspectives, including laboratory capacity, sustainability, and the application of One Health to biorisk management.

Participants discussed a variety of approaches to risk assessment and biorisk management, particularly in the context of high-consequence research. Several participants called attention to inherent limitations and connotations associated with the prevailing language used to discuss and characterize various types of advanced biological research. Terms such as “dual-use research of concern” (DURC) or “gain of function” are widely used to classify potentially risky research, but these terms do not necessarily reflect the associated purpose or techniques used nor the relative degree of risk associated with that work. In fact, several participants remarked that these terms

can be used deliberately to invoke a sense of fear, distrust, or concern (ie, the “C” in DURC) in biological research. Additionally, the broad use of these terms to represent very different types of research means that efforts to establish common risk mitigation measures do not account for the specific types of risk involved in any given study.

As discussed previously, a risk-based approach is critical to ensuring that the processes, engineering controls, and other risk mitigation measures align with the risks, and implementing excessive restrictions or protective measures can hinder progress without providing meaningful additional layers of protection. Multiple participants built on comments from the previous discussion about the importance of translating policy into practice. Education and training—both initial and ongoing—are core components of establishing and reinforcing effective biosafety and biosecurity practices. Engineering controls, equipment, and facilities are certainly important, but as illustrated in recent biosafety incidents around the world—including involving anthrax and smallpox in the United States—the human factor is crucial to the success of biorisk management programs and practices. One participant also noted that students are performing advanced research at a younger age, so initiating these training and education efforts for secondary school students—or even younger—can provide a strong foundation for their future studies.

The desire to expand national and regional—as well as global—laboratory capacity faces many challenges, perhaps none bigger than resource limitations. Participants discussed multiple examples of governments prioritizing the construction of new laboratories in response to past health emergencies—including SARS in 2003, the West Africa Ebola epidemic, and the COVID-19 pandemic—and the struggles they faced to maintain those facilities, equipment, and training programs over time. These facilities and capacities require ongoing investment, which can be difficult even for well-resourced governments to maintain in the long term. The WHO’s principal role in this area is providing guidance and technical support to enable member states to implement effective biorisk management programs, but these require funding as well.

Ultimately, national governments need to recognize biosafety and biosecurity risks as a priority and commit to taking appropriate action to mitigate them. Considering the possibility—even if it is a small chance—that the COVID-19 pandemic originated from a laboratory accident, updating biosafety and biosecurity practices *should be* a priority worldwide. It is also critical to identify sources of financial and other support to enable governments—particularly in low- and middle-income countries—to develop and maintain national legislation, policies, and programs to, again, translate that guidance into practice. Not all governments have the resources and capacities necessary to fully implement the WHO guidance, or to do so to the same standards of higher-income countries, but they should be able to adapt that guidance to their national contexts and

align those principles with the systems and resources they have available.

Much like other aspects of health security, biorisk management focuses on protecting human health, whether laboratory workers or the general public, but we must also remain vigilant of the One Health implications of this work. Several participants highlighted the need to strengthen laboratory biorisk practices and collaboration across the human and animal health sectors, including to align the associated laboratory biosafety and biosecurity standards. For example, Thailand's Joint External Evaluation (JEE) found discrepancies in the training and standards between human and animal health personnel, despite considerable overlap in their work on zoonotic pathogens. In response, the government took steps to integrate laboratory personnel in both cohorts into the same educational pipeline. And continuing the previous discussions on HPAI, African swine fever, and Nipah, participants noted that economic risk should be considered in discussions of laboratory biorisk management, even for research on pathogens that do not directly infect humans.

Multiple participants described prior and ongoing efforts in their countries that aligned closely with the WHO biorisk management principles discussed by Dr. Kojima. For example, Singapore and Thailand utilize tiered biorisk management systems that mirror the 2-tiered WHO model. Additionally, a participant from Thailand described findings from the country's first Joint External Evaluation (JEE) that identified the need to unify national-level biosafety and biosecurity guidance and practices across sectors, which aligns with the principles underpinning WHO's efforts to develop the biorisk management revision.

Dialogue Session Six: Ministry of Defense Approaches to Biosecurity & Priorities in Southeast Asia

The security side of biosecurity has long been a concern for Ministries of Defense, but there is a growing awareness that the defense sector possesses capabilities and capacities to support other aspects of biosecurity threats and an interest in expanding its role in that regard. Governments around the world looked to their militaries during the COVID-19 pandemic to support a variety of response activities, and as the focus shifts to preparing for the next threat, governments are looking for opportunities to strengthen connections and streamline coordination between health and defense agencies. Multiple participants emphasized command and control, logistical support, and operational personnel as key military assets that can be leveraged to support health security preparedness and response activities. They also noted that military information-gathering and intelligence capacity could also provide critical insight for health agencies, particularly in identifying emerging events and for horizon scanning purposes. The discussion emphasized the importance of strengthening these

connections, as health security does not fall squarely under any one sector or agency.

Participants described several examples of health-military collaboration and integration from their national perspectives. In Malaysia, health and defense ministries actively collaborate on monitoring scientific advancements, and the Malaysian Ministry of Defense is involved in discussions regarding the future establishment of a national infectious diseases institute. And while state governments are responsible for managing preparedness and response to biological events in Malaysia, the National Security Council can activate a nationwide military response for events and threats that extend across state borders. Crucially, military involvement is often viewed as a last resort in Malaysia, as the public perceives this as a failure of the government to address the problem through more conventional means. Integrating the military requires considerable political will, and doing so in the later stages of an emergency can pose additional challenges in collaborating with other government agencies and rapidly scaling up response capacity.

In contrast, Singapore's military is a more integrated part of government efforts, so its involvement in health issues is not viewed as a last resort. The SARS response in 2003 was the Singapore Armed Forces' first foray into biosecurity, and since that time, Singapore has viewed health security as an increasingly important role for the military. This provides a peacetime function for the military, which helps justify defense investments in the absence of conflict. One participant indicated that Singapore's military embraces its supporting role on health-related issues, which mitigates cross-sectoral conflict. In Indonesia, biosecurity, biosafety, and biodefense are being integrated into military training and education programs, including as part of the Republic of Indonesia Defense University's military medicine program. The Philippines' Ministry of Defense is engaged in some degree of civilian healthcare, through services provided to servicemembers' families. Notably, the leadership for the Philippines' national COVID-19 task force were all former members of the military, and its national Health Security Council features the Secretary of National Defense as co-Chair, alongside the Secretary of Health as Chair. Additionally, the Philippines utilized military assets throughout its COVID-19 response, including deploying clinicians and other personnel nationwide to provide operational support.

Efforts to further integrate health and defense are occurring at the regional level as well, particularly through ASEAN, with several examples of successes and barriers. ASEAN has multiple fora in which health-defense collaboration generally occurs, including the ASEAN Center for Military Medicine (ACMM), ASEAN Defense Ministers Meeting Plus (ADMM+), and ASEAN Military Medicine Conference (AMMC); however, the regional group faces challenges facilitating collaboration between the health and defense clusters more broadly. One participant shared an example of substantial barriers to

issuing invitations for defense cluster officials to participate in a health cluster event to illustrate the silos that continue to exist between these sectors within ASEAN, despite increased attention on streamlining collaboration. To break down these silos, there is a new plan to strengthen coordination between the defense cluster’s chemical, biological, radiological, and nuclear (CBRN) unit and the health cluster’s Emergency Operations Center (EOC) Network, but the timeline is currently set for 1-2 years. Other regional efforts include the Indo-Pacific Security Alliance, developed by Australia, which will be introduced and debated later in 2024.

Conclusion

Since the Southeast Asia Strategic Multilateral Biosecurity Dialogue was established in 2014—as a bilateral effort between Singapore and the United States—it has established a robust, multisectoral network of senior government officials and other world-class experts dedicated to strengthening national and regional resilience against the broad scope of natural, accidental, and deliberate biological risks. Southeast Asia sits at the nexus of countless biosecurity threats, including a dynamic human-animal-environmental interface, highly mobile populations, the rapid proliferation of high-containment laboratory capacity, and a bustling biotechnology economy. Traditional communicable disease threats—such as HIV/AIDS, tuberculosis, dengue, and malaria—remain high priorities in Southeast Asia. At the same time, the region is struggling to effectively leverage emerging and future technologies, particularly as biology converges with other technical fields, such as AI, while mitigating the associated risks.

Over the course of 9 in-person dialogue meetings, participants have developed strong, trusted cross-border relationships, which allows them to share their experiences and lessons from past and ongoing preparedness and response activities—and perhaps more importantly, critical gaps in national and regional capacities. Through these relationships, participants are continually on the lookout for opportunities to collaborate outside the meeting room, in order to take concrete steps forward at both the national and regional levels.

Appendix A. Meeting Agenda

Day 1 • 16 April 2024

9:00 – 9:20 Welcome & Meeting Goals

Tom INGLESBY, Director, Johns Hopkins Center for Health Security, USA
Anita CICERO, Deputy Director, Johns Hopkins Center for Health Security, USA

9:20 – 9:30 Opening Remarks

Andrew HOLLANDS, Indo-Pacific Division Chief, Biological Threat Reduction Program, Defense Threat Reduction Agency, US Department of Defense

9:30 – 10:30 Participant Introductions

Each participant will introduce herself/himself, including their current position and organization, the principal focus of their work, and the biosecurity challenge they are most concerned about.

Please limit introductions to 90 seconds each.

For this dialogue, we define “biosecurity” as the policies, programs, and actions taken to prevent, prepare for, and respond to biological threats, whether they are natural, accidental, or deliberate.

10:30 – 11:00 Coffee & Tea Break

11:00 – 12:30 Dialogue Session One: Biothreat Overview & National Biosecurity Priorities

In this level-setting dialogue session, a representative from each country will kick off the discussion with relevant, high-level updates from their country or the region. Potential topics include:

- What are the most concerning biological threats in your country right now, including natural, accidental, and deliberate? What emerging or future risks and threats are the highest priority?
- What is your country’s risk assessment process for biological threats?
- What are the major efforts your country is making to address these priority threats? How is your country allocating resources to combat these threats?
- What has changed since the 2023 dialogue meeting?

Opening remarks (3-5 minutes each), followed by group discussion.

Opening Remarks: KWA Chong Guan, CHONG Chee Kheong, Irma MAKALINAO, Chandresh HARJIVAN, Tikki PANGESTU, Suwit WIBULPOLPRASERT

12:30 – 1:30 Lunch at The Kitchen Table

1:45 – 3:00 Dialogue Session Two: The Road to Resilience Against Future Threats

As COVID-19 shifts toward an endemic state, governments and communities around the world are already looking ahead to the next threat. Another pandemic will emerge at some unknown point in the future, so it is critical to establish appropriate programs, capacities, and policies today to develop and maintain resilience against future pandemics and other threats.

- What are your government's or organization's priorities in terms of building future pandemic resilience? What activities are currently underway to address gaps identified during the COVID-19 pandemic?
- How have your country's surveillance and early detection strategies changed since the COVID-19 pandemic?
- In addition to national-level solutions, what is being done at the regional level to improve collaboration on pandemic preparedness and response?
- Beyond pandemics, what is your government or organization prioritizing in terms of developing biosecurity or health security capacity for other health threats?
- Are there examples from past dialogue sessions of activities, programs, capacities, or policies that you have found useful to your country in building resilience to these threats?

Opening remarks (3-5 minutes each), followed by group discussion.

Opening Remarks: Tanarak PLIPAT, Ratna SITOMPUL, Julie FISCHER,
Jose EMBANG

3:00 – 3:30 Coffee & Tea Break

3:30 – 4:15 Presentation: Establishing Singapore's Communicable Diseases Agency

*Marc HO, Head of Transition, Communicable Diseases Agency Planning Office,
Ministry of Health, Singapore*

Presentation, followed by Q&A.

4:15 Day 1 Adjourns

6:00 Dinner at W Lawn

Day 2 • 17 April 2024

9:00 – 10:30 **Dialogue Session Three: The Convergence of Biology & Emerging Technologies**

Rapid and revolutionary advancements in biology are colliding with rapid and revolutionary advancements in other technical fields, including computing, which compounds the magnitude and scope of their impact. Rapid progress in biotechnology is making advanced tools and capabilities, such as gene synthesis, cheaper and more widely available. One area for potential growth is microbial forensics, which could provide critical tools, processes, and standards for investigating the origins of outbreaks or epidemics, including those suspected of being deliberate.

Emerging technologies in the field of advanced computing, such as machine learning and artificial intelligence (AI), are enabling scientists to unlock novel capabilities across the broad scope of biology, including potential breakthroughs in diagnostics, disease risk screening, and vaccine and therapeutic development. And as biology becomes more reliant on computing capabilities, governments, organizations, and researchers are increasingly looking to cybersecurity to protect facilities and data against nefarious actors.

But like other biology and biotechnology tools, these amazing new capabilities come with risks, such as an improved ability by non-experts or malicious actors to modify and synthesize novel pathogens. In the absence of international treaties or other global agreements, national governments are responsible for implementing oversight and regulatory systems to mitigate the risk of misuse, which has resulted in an inconsistent patchwork of policies and programs.

- What is the current state of cutting-edge biotechnology in your country, including the convergence of biology and advanced computing?
- What are the most promising trends and projected national benefits in this area?
- How is your government or organization working to leverage these capabilities and mitigate the associated risks, including accidental and deliberate misuse?
- Is your government requiring the use of tools such as gene synthesis screening or cybersecurity to ensure the appropriate use of biological data, pathogens, and capabilities?

- Are there regional efforts—including through ASEAN—to improve biosafety/biosecurity for emerging biotechnologies?

Opening remarks (3-5 minutes each), followed by group discussion.

Opening Remarks: Sazaly ABU BAKAR, Amin SOEBANDRIO, May ONG, Novia KUSWARA, Natalie DEGRAAF

10:30 – 11:00 Coffee & Tea Break

11:00 – 12:30 Dialogue Session Four: Medical Countermeasures Development, Production Capacity & Stockpiling Strategies

The COVID-19 pandemic illustrated the critical importance of rapidly scaling up development and production capacity for novel medical countermeasures (MCMs). During the pandemic, only a small handful of countries or regions were able to establish production capacity to meet domestic needs, while the rest of the world essentially had to wait until those countries fulfilled their own demand before being able to access vaccines and other drugs. In the absence of formal international agreements, countries may have to fend for themselves in a future pandemic.

- What efforts are ongoing or planned—nationally or regionally—to establish MCM research and development programs or production capacity?
- Are there formal agreements in place—or planned—to coordinate and allocate limited supply of vaccines or other MCMs during future health emergencies?
- What other steps can the Southeast Asia region take to accelerate the development, regulatory authorization, and availability of novel vaccines or other MCMs in a future health emergency?
- Is your country working to establish or expand stockpiles for vaccines and other MCMs to combat specific disease threats? Are there coordinated efforts to establish regional stockpiles?
- What are your views of the ongoing negotiations to establish a new international pandemic agreement?

Opening remarks (3-5 minutes each), followed by group discussion.

Opening Remarks: Wisit TANGKEANGSIRISIN, Cyrell VALENTIN, Mely CABALLERO-ANTHONY, Gerald PARKER

12:30 – 1:30 Lunch at The Kitchen Table

1:45 – 4:30 **Site Visit: Singapore National Centre for Infectious Diseases (NCID)**

NCID Presentations

NCID Overview, Formation of the Communicable Disease Agency &
NCID Outbreak Management

Vernon LEE, Executive Director, NCID

Shawn VASOO, Clinical Director, NCID

NCID Tours

High-Level Isolation Unit & NCID Gallery

Poh Lian LIM, Director, High-Level Isolation Unit, NCID

5:00 – 9:00 **Launch Event for the Asia Centre for Health Security (Asia CHS)**

One Farrer Hotel, Level 6, Wisteria & Camellia Villa. Hosted by Asia CHS.

Day 3 • 18 April 2024

9:00 – 9:30 **Presentation: WHO Laboratory Biosecurity Guidance, 2nd Edition**

Kazunobu KOJIMA, Biorisks & Health Security Protection Unit, WHO

As biological technologies and capabilities continue to expand rapidly around the world, governments are struggling to keep pace with regulation and oversight of high-consequence research. Technical guidance exists—such as the WHO Laboratory Biosecurity Guidance, which is expected to be updated soon with a 2nd edition—to support national governments in these efforts, but governments around the world face many barriers to establishing and implementing appropriate risk mitigation frameworks to address associated accidental and deliberate risks.

Presentation, followed by Q&A.

9:30 – 10:30 **Dialogue Session Five: Laboratory Biosafety & Biosecurity**

As countries seek to leverage rapid advances in biology, for both health and economic purposes, many are establishing new laboratory capacity, including for potentially high-consequence research. Many new priority categories of research—such as dual-use research of concern (DURC) or enhanced potential pandemic pathogens (ePPP)—can be conducted in a variety of laboratory settings, including high-containment facilities (eg, BSL-3, BSL-4) or lower levels of containment. The COVID-19 pandemic put laboratory biosafety and biosecurity under the microscope, as a result of rapidly expanding high-containment laboratory capacity in countries around the world, intense speculation regarding the origin of the SARS-CoV-2 virus, and a broader awareness of the potential impact of biological threats.

- What is your country's strategy for investing in new laboratory capacity? What threats will this new capacity address?
- What biosafety/biosecurity guidance or regulatory systems does your country have in place to mitigate the risk of high-consequence research, such as DURC or ePPP?
- Does your country have personnel reliability policies or programs to address insider threats, particularly for high-consequence research?
- Are particular ministries (eg, MOH, MOD) or agencies in your country addressing the governance of advanced life sciences research to reduce risks around DURC?
- What guidance or support does your organization or government need from WHO, in order to leverage high-consequence research for legitimate purposes while mitigating associated risks of misuse?

Opening remarks (3-5 min each), followed by group discussion.

Opening Remarks: Gladys TAN, Rachel LEVINSON, Soawapak HINJOY

10:30 – 11:00 Coffee & Tea Break

11:00 – 12:15 Dialogue Session Six: Ministry of Defense Approaches to Biosecurity & Priorities in Southeast Asia

Ministries of Defense (MODs) are not historically responsible for health issues in many countries; however, public health emergencies can lead to national security threats. MODs have important roles to play in responding to large-scale outbreaks and other biological events, particularly those with national security implications. The security sector's involvement, however, is complicated by the diversity of government agencies that have some degree of responsibility and authority for various issues at the intersection of health and security.

- What is your MOD's role in preparedness and response for natural, accidental, and deliberate biological threats, including in conducting biosurveillance? Is there dedicated and sufficient funding for these endeavors?
- How well does your MOD coordinate with other relevant government agencies involved in the prevention, detection, response, and recovery related to biological events?
- What is the extent of regional or international cooperation between militaries on biosecurity threats, including to share biosurveillance data?
- Is your MOD monitoring advances in the life sciences that could be deliberately misused to create biological weapons?

Opening remarks (3-5 minutes each), followed by group discussion.

Opening Remarks: Arshil bin MOIDEEN, Wei Ting LEE, Daniel TJEN

12:15 – 12:45 Roundtable Discussion & Final Thoughts

This closing discussion invites participants to convey valuable takeaways or insights from this meeting. It also encourages them to consider and propose future work this dialogue group can do together, both in the dialogue meetings and other collaborations between meetings.

- What key insights stood out to you from this year's dialogue session? Are there examples of new programs or policies presented here that might make sense in your country?

- What topics, threats, capabilities, or priority themes should be included in future dialogue meetings?
- What opportunities do you see for this group in terms of collaborating outside of dialogue meetings?

12:45

Dialogue Adjourns

Lunch available at The Kitchen Table

Appendix B. Meeting Attendees

Badrul Hisham ABDUL SAMAD, MBBS

Consultant Public Health Physician
Faculty of Medicine and Defence Health
National Defence University of Malaysia
Malaysia

Sazaly ABU BAKAR, PhD

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Infectious Diseases Research and Education
Center and WHO Collaborating Center for
Arbovirus Reference and Research
University of Malaya
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ASEAN Mitigation of Biological Threats
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Anita CICERO, JD

Deputy Director
Johns Hopkins Center for Health Security
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Natalie DeGRAAF, MS, MPH

Director for Biodefense and Biological
Weapons Nonproliferation
Health Security and Biodefense
National Security Council
The White House
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MG Jose EMBANG, Jr., Ret.

Commissioner
Philippine Racing Commission
Former Chief, Bureau of Fire Protection
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Julie FISCHER, PhD

Technical Director, Global Health
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Yahdiana HARAHAHAP, PhD

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Chan HARJIVAN, PharmD, MPH, MBA

Special Assistant to the President
and Associate Director for Domestic
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Executive Office of the President
The White House
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Ministry of Public Health
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Marc HO, MD, MPH

Group Director, Policy and Systems and
Interim Head of Transition, Communicable
Diseases Agency Planning Office
Ministry of Health
Singapore

Andrew HOLLANDS,
Indo-Pacific Division Chief
Biological Threat Reduction Program (BTRP)
Cooperative Threat Reduction (CTR)
Directorate
Defense Threat Reduction Agency (DTRA)
Department of Defense
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Tom INGLESBY, MD
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Novia KUSWARA, MD
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Poh Lian LIM, MD, MPH
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High-Level Isolation Unit (HLIU)
National Centre for Infectious Diseases
Senior Consultant Ministry of Health
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Attaya LIMWATTANAYINGYONG, MD, MSc
Senior Researcher
International Health Policy Program
Ministry of Public Health
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**Irma MAKALINAO, MD, MA, FPPS, FP-
SCOT**
Professor and Graduate Program Advisor,
Pharmacology and Toxicology
Coordinator, CBRN Health Security
College of Medicine
University of the Philippines- Manila
Philippines

**Brig. Gen. Modh Arshil MOIDEEN, MD,
DrPH, MPH**
Head, Innovation Team
Malaysian Armed Forces Health Service
Malaysia

ONG Bee Leng May
Director for Chemical, Biological,
Radiological Nuclear and Explosives
(CBRNE)
CBRNE Centre of Expertise
Home Team Science and Technology Agency
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Tikki PANGESTU, PhD
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Yong Loo Lin School of Medicine
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Associate Dean for Global One Health
College of Veterinary Medicine & Biomedical
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Tanarak PLIPAT, MD, PhD

Inspector General
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Expert, Medical Education Field
Ministry of Education and Culture-Research
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Amin SOEBANDRIO, PhD

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Suwit WIBULPOLPRASERT, MD

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Former Deputy Director General
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Ministry of Defence
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GUEST SPEAKER

Kazunobu KOJIMA, MD, PhD

Head, Emerging Technologies
Research Prioritisation and Support
Research for Health Department
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Head of the Secretariat
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OBSERVERS

Emma BREHANY

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