



APP3 Statement on the Importance of Biosafety and Biosecurity in the Age of Artificial Intelligence and Emerging Technologies

GHSA Action Package Prevent-3 on Biosafety and Biosecurity, Emerging Biological Risks Working Group

The Global Health Security Agenda (GHSA) Action Package Prevent-3 (APP3) on Biosafety and Biosecurity recognizes that upholding robust biosafety and biosecurity systems and practices is a critical capability to prevent, detect, and respond to existing, emerging, and reemerging threats regardless of origin, whether natural, accidental, or deliberate.

In recent years, synthetic biology, artificial intelligence (AI), and other emerging technologies have led to tremendous progress in the rapid development of medical countermeasures and disease surveillance. This holds promise for supporting economic development and countering climate change. Some advantages of emerging technologies and AI were evidenced during the SARS-CoV-2 pandemic. Synthetic biology helped enable the rapid design and production of some COVID-19 vaccines based on the SARS-CoV-2 genome sequence. Time-consuming laboratory experiments are replaced by computational tools such as AI for rapid and iterative design and testing cycles. Genome-editing tools such as CRISPR now enable scientists to edit or create desired genetic changes in an organism. Machine learning is being used to predict the effect of these changes. In recent years, scientists engineered the entire genome of *E. coli* bacteria with synthetic DNA as a “living factory” of novel therapeutics and synthetic organisms that could enable “living therapeutics” in which engineered human or microbial cells treat or cure diseases directly in a patient before degrading at a predetermined time. However, there are concerns among the scientific community that individuals with ill intent could exploit synthetic biotechnologies to put public health, agriculture, plants, animals, and animal or plant products at risk. As such, some measures have already been taken to reduce the risks to global health posed by synthetic biotechnology.

As advances in AI and emerging technologies continue to increase worldwide quickly, there are growing concerns that AI tools and other emerging technologies could act synergistically with synthetic biotechnologies to cause significant harm. The APP3 believes it is imperative to understand further and mitigate the biological risks of AI and emerging biotechnologies, reduce the risk of technology misuse, and protect economic and global health security. Efforts to raise awareness within the GHSA community, cultivate responsible scientific work, strengthen biosecurity controls, and mitigate biological risks associated with new technologies globally are critical.

To foster scientific progress while protecting health security through international collaboration, the APP3 recognizes the importance of the following and seeks to:

1. Support implementation of the World Health Organization (WHO) [Global guidance framework for the responsible use of the life sciences](#), which calls on leaders and other stakeholders to mitigate biorisks and safely govern dual-use research, which has a clear benefit but can be misused to harm humans, other animals, agriculture and the environment. The APP3 also commends WHO for releasing new guidance on the [AI ethics and governance of large multi-modal models](#) (LMMs). The guidance outlines more than 40 recommendations for governments, technology companies, and the medical community to consider and ensure the appropriate use of LMMs to promote and protect the health of populations. Also, support the [Tianjin Biosecurity Guidelines for Codes for Scientists](#), which includes a set of 10 guiding principles and standards of conduct designed to promote responsible science practice and strengthen biosecurity governance at national and institutional levels. The aim of the guidelines is to prevent misuse of bioscience research without hindering beneficial outcomes, in accordance with the articles and norms of the Biological and Toxin Weapons Convention (BWC), and in the advancement of progress towards achieving the United Nations (UN) Sustainable Development Goals.
2. Reiterate [the call made by APP3 members](#) during the pandemic for countries to develop standardized screening guidance that details how, where, and under what conditions pathogens (or components thereof) can be safely and securely synthesized to support accelerated research on medical countermeasures and detection tools while preventing illicit practices and misuse. The APP3 commends the recent publication of the U.S. Department of Health and Human Services' [Screening Framework Guidance for Providers and Users of Synthetic Nucleic Acids](#) that sets forth recommended baseline standards for the gene and genome synthesis industry (providers) and manufacturers of benchtop nucleic acid synthesis devices. It describes responsibilities for all parties within the commercial ecosystem, including not only providers and manufacturers, but also their customers (i.e., institutions, users, and third-party vendors). The APP3 also commends the U.S. Executive Order on the Safe, Secure, and Trustworthy Development and Use of AI and encourages international nucleic acid providers to ensure that they achieve and maintain compliance with the framework that will ensure they are able to sell synthetic nucleic acids to U.S. government-funded life sciences researchers.
3. Support urgent action on the part of governments, industry, the scientific community, and civil society to safeguard AI-bio capabilities and development through the implementation of the following recommendations in the NTI report on [The Convergence of Artificial Intelligence and the Life Sciences](#) as well as reports from other organizations:
 - Establish an international “AI-Bio Forum” to develop AI model guardrails that reduce biological risks;
 - Develop a radically new, more agile approach to national governance of AI-bio capabilities;
 - Implement promising AI model guardrails at scale;
 - Pursue an ambitious research agenda to explore additional AI guardrail options;

- Strengthen biosecurity controls at the interface between digital design tools and physical biological systems;
 - Use AI tools to build next-generation pandemic preparedness and response capabilities.
4. Actively encourage multisectoral engagement and collaboration to consider and address the diverse array of challenges posed by AI and Emerging Technologies, including through and with the Biological and Toxin Weapons Convention (BTWC), the World Organization for Animal Health (WOAH), INTERPOL, the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, and the (BWC).
 5. Promote other international community efforts to address both the benefits and risks that AI and Emerging Technologies might pose and foster continued constructive engagement among diverse stakeholders around the world (i.e., participation in multi-stakeholder discussions, global forums, and summits). APP3 applauds the high-level [Advisory Board on AI](#) that was formed in October 2023 to undertake the analysis and advance recommendations for the international governance of AI. APP3 also mentions those member countries and organizations who attended the recent AI Safety Summit in the United Kingdom in November 2023 and developed the [Bletchley Declaration](#), welcoming international efforts to examine and address the potential impact of AI systems and identify AI safety risks of concerns. Continued engagement with governments, the private sector, civil society, and research and technical communities is vital to reducing biosecurity risks that arise at the intersection of AI and the life sciences.

The Action Package Prevent-3 (APP3) Biosafety & Biosecurity is a collection of experts and leaders from countries and nongovernmental organizations that seek to advance global biosafety and biosecurity capacity under the auspices of the Global Health Security Agenda (GHSA), in support of various international instruments including the International Health Regulations, the Biological Weapons Convention, and United Nations Security Council Resolution 1540. The APP3 will continue to facilitate effective integration of multisectoral and multi-stakeholder work in achieving sustainable and measurable results toward common targets for biosafety and biosecurity both during the current COVID-19 pandemic and into the future. The GHSA serves as a catalyst for attaining a world safe and secure from global infectious disease threats and seeks to elevate global health security as a national and international leader-level priority. The GHSA is a collaborative multi-sectoral initiative, bringing together nearly 70 countries representing nearly six billion people, regional and international organizations, and non-governmental and private sector partners to build and strengthen health security capacity. The GHSA seeks to: Prevent and reduce the likelihood of outbreaks – natural, accidental, or intentional; Detect threats early to save lives; Respond rapidly and effectively using multi-sectoral international coordination and communication.