Center for Health Security

Summary of Expert Insights for the US Department of Defense Biodefense Posture Review Meeting

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Introduction

On April 8, 2022, the Johns Hopkins Center for Health Security at the Bloomberg School of Public Health convened a virtual, not-for-attribution meeting to solicit expert input on the US Department of Defense's (DoD) first Biodefense Posture Review (BPR). US Secretary of Defense Lloyd J. Austin III called for a comprehensive BPR in a November 2021 memo concerning the DoD's biodefense vision. In the memo, Secretary Austin points out the critical roles DoD played in the COVID-19 response, both within the Department and as part of the broader whole-of-government response. After-action reviews of these vital contributions highlighted areas for improvement in DoD's preparedness and response. Therefore, Secretary Austin directed a whole-of-department review to efficiently and robustly assess the DoD's capabilities and modernize its strategies for biodefense.

To gain insight from experts outside of the DoD, the Johns Hopkins Center for Health Security convened experts from various fields to provide comments on key areas related to biodefense. The aims of the meeting were to consider the United States' biodefense posture regarding preventing, detecting, preparing for, responding to, and recovering from all types of biological incidents, including deliberate, natural, and accidental threats. Emphasis was placed on modernizing the DoD approach as well as collaboration with expertise outside of government, including academia and industry.

The meeting provided an opportunity to share insights about the current DoD biodefense posture with DoD officials who attended the meeting and who are leading the Department's BPR. The meeting featured participation from members of government, academia, and industry, including subject matter experts from a range of disciplines and sectors: public health, health care, emergency management, defense, life sciences, veterinary science, agriculture, biotechnology, and the pharmaceutical industry. A list of meeting participants is included in Appendix A. During the meeting, participants shared resources that may be considered by drafters of the BPR, which are included in Appendix B.

During the meeting, a variety of participants discussed two recurring recommendations:

1. The DoD, and the nation, would benefit from organizational realignment so that one person or office is responsible for biodefense policy across the DoD. This would help the Department to plan, build resources, and engage experts. Current efforts that shift responsibilities depending upon the nature of the health security crisis—for example if it is deliberate or natural, outside the contiguous US (OCONUS) or domestic—inhibit coherent planning.

2. Disinformation is a threat in all aspects of the biodefense posture, ranging from operational restrictions to reputational impacts on the United States. The DoD should routinely consider how its statements and actions can both enable and counter disinformation and take steps to minimize impact. Also, DoD should consider using its communications abilities to dissuade other nations from developing biological weapons.

The meeting was supported by the Open Philanthropy Project. The Johns Hopkins Center for Health Security did not attempt to reach expert consensus on the topics discussed. This document is a synthesis of insights presented by one or more experts during the meeting.

Preventing Bioincidents

Bioincidents can be intentional, accidental, or naturally occurring, and different measures are required to decrease the risks associated with each type of incident. Discussion focused on ways in which the DoD can reduce the risks of any type of bioincident occurring.

Laboratory-based research with pathogens will continue worldwide and is an essential activity for DoD priorities, including conducting disease surveillance, advancing medical countermeasure development, and engaging with and supporting international partners. To reduce the potential risk of laboratory accidents, the DoD should lead and develop, publicize, and promote laboratory biosecurity and biosafety standards to be used by DoD and other laboratories around the world. These standards could be developed in a variety of ways. The DoD should consider funding applied biosafety research to provide clarity on what biosafety measures should be implemented in DoD-controlled and non-DoD laboratories. Additionally, the DoD should more frequently use red teaming—a security exercise where a group assumes the role of a nefarious actor and attempts to compromise existing security infrastructure to identify vulnerabilities—to enable an improved understanding of what biosecurity measures are effective in laboratories. The DoD could also be a leader in normalizing the sharing of information on "close calls" or near-misses, potentially in the form of root-cause analyses. Developing these programs for DoD laboratories could set a model for military and public health laboratories internationally, promoting standards that will improve the safety of biological sciences worldwide.

Advances in biotechnology—including the increasing convergence of biology with adjacent fields such as chemistry, neuroscience, artificial intelligence, and nanotechnology—have outpaced federal biosecurity policy, leading to security gaps. The DoD should review and update as necessary its existing biosecurity policies and

procedures and should promote best biosecurity practices through requirements within research contracts, including "biosecurity by design" requirements, as was done in the Defense Advanced Research Project Agency's Safe Genes program.[1] As a specific example of an effort to close such security gaps, the state legislature of California currently is considering requiring University of California research laboratories to purchase synthetic DNA only from companies that are members of the International Gene Synthesis Consortium (IGSC). The IGSC is a voluntary industry group that proactively addresses biosecurity concerns associated with DNA synthesis by screening synthetic DNA orders and the customers placing them. If the DoD were to require similar measures by its laboratories and contract awardees in the US and OCONUS, it would increase the biosecurity of the lab work, economically reward responsible companies, and make it more difficult for nefarious actors to acquire potentially harmful materials.

Detection and Informed Decisionmaking

Discussion within this session focused on how the DoD may improve its detection of and decisionmaking capabilities around biological incidents. Early detection is critical to limiting their impact and requires surveillance to observe and identify potential biological threats. Risk awareness at the strategic level also is required to inform decisionmaking through analysis and research.

A modernized biosurveillance network should include forward-deployed detection systems that are flexible and can be adapted to detect novel threats, which are not going to be present on known lists such as the Select Agent List or Australia Group Pathogens. One way to support flexibility and overcome more limiting list-based surveillance approaches is through next-generation sequencing (NGS), which DoD should increasingly leverage. NGS systems produce significantly more genomic data than prior systems. To fully leverage the value of NGS systems, investment in data analytics is necessary to keep pace. Efforts should be made now to collect data at scale in a way that supports to-be-determined analyses. Plans for sustained operation, including both cost and supply chain, would need to be developed because NGS requires specialized reagents and consumables (e.g., magnetic beads or nanopore flow cells). Biosurveillance systems should be designed to produce interpretable and actionable results by decisionmakers. The systems also should be integrated with methods of detecting clinical warning signs of emerging infectious diseases because clinical signals may be present prior to molecular signals. There are opportunities for increased industry participation here if there were system aggregators for synthetic biology or an advanced developer for synthetic biology within the DoD.

The DoD may establish this modernized capability as part of its international, infectious disease-focused biosurveillance system, Global Emerging Infections Surveillance (GEIS). Importantly, the DoD could avoid duplicating other efforts to improve public health surveillance data by integrating GEIS with international and national networks such as the Global Influenza Surveillance and Response System run by the World Health Organization. Trust and human relationships among international biosurveillance systems and networks are critical, and both track 1 (government to government) and track 2 (nongovernmental) relationships need to be developed and maintained.

The DoD could consider the role of the Intelligence Community (IC), with the understanding that DoD's needs and/or use of intelligence can influence IC funding priorities. Additional opportunities to gain intelligence may exist through accessing adversary systems and examining opensource literature.

Preparing for Bioincidents

Preparing to respond to bioincidents requires leveraging the science and technology base; ensuring public health and laboratory infrastructure; developing, updating, and exercising response capabilities; developing and effectively distributing and dispensing medical countermeasures; and preparing to collaborate across the DoD and the US government, as well as internationally, to support biodefense. Discussion within this session focused on how the DoD could better prepare for bioincidents.

Following the COVID-19 pandemic, the DoD should continue to set and communicate expectations as to DoD response capabilities and needs for sustainability. The DoD could improve its ability to quickly engage academia and industry when responding to a bioincident. Flexible contracts could be established pre-bioincident that would enable rapid transfer of financial resources and information if a bioincident were to occur. Additionally, the DoD could establish a "bioindustrial reserve corps," comprised of civilians from academia and industry. Such a reserve corps could be modelled on the system of military reservists who are civilians who receive regular training during peacetime but may be called upon in times of need. Other activities, such as tabletop exercises, should be conducted with bioincident-specific scenarios to improve readiness for such events.

The DoD should both foster and protect US biotechnology so that access to critical national security technologies can be assured. Access disruptions may occur due to global circumstances, such as the global shortage of personal protective equipment during the COVID-19 pandemic,[2] but localized disruptions also can result in shortages, such as those seen with saline solution in 2018.[3] The DoD should undertake an evaluation of the supply chains associated with materials and reagents needed for biodefense and establish strategic redundancies where they do not exist.

Responding to Bioincidents

When a bioincident occurs, rapid response may limit the impact. Responding will occur through information-sharing, networking, coordinated response operations, and investigations. Discussion within this session focused on how the DoD could better respond to a bioincident.

The DoD has broad capabilities relevant for response to a bioincident and should have an inventory of the capabilities of its different entities, with plans to match authority/responsibility with capabilities during a response. International, academic, and industrial engagement and collaboration, both analytically and operationally, are critical to successfully respond to bioincidents. Such relationships must be sustained long-term and regularly convened to be ready to respond quickly when needed. The DoD's superior logistic capabilities increase the likelihood that the Department will be called upon to act following a bioincident. It is imperative to have plans in place and to identify people who are responsible for initiating the response and communicating both within the US government and to the public about DoD's response actions. An example function that remains critically important is the distribution of medical countermeasures, including among the civilian population.

The global investigations of events of unknown origins rely on trust and should be apolitical; direct DoD participation in such investigations may be counterproductive toward developing information with broad trust. However, disinformation can block access of public health experts, especially at the beginning of a potential biological incident, and efforts should be taken to counter disinformation efforts. The DoD must be prepared to assess and tactfully communicate uncertainties, risk, and science relevant to the event.

Facilitating Recovery, Restoring Operations, and Gathering Lessons Learned After Bioincidents

Following the occurrence of a bioincident, recovery and restoration are necessary to move forward. There are opportunities to learn from the occurrence of and subsequent response to such incidents. Discussion in this session focused on how the DoD can best recover and restore operations following bioincidents.

Bioincident recovery efforts should occur in parallel to response. As decisions are made about response, decisionmakers must consider the longer-term recovery implications. A visible indication of progression toward recovery includes policy adjustments, such as the removal of requirements to wear face masks in public. However, without pre-established agreement on acceptable levels of risk, it is not possible to determine the appropriate time to remove or deploy community mitigation measures.

The gathering of lessons learned should occur throughout the biodefense paradigm and the DoD should establish the means to adjust its posture based on lessons learned. The DoD should evaluate previous after-action efforts to determine the review process and format that provide the most value.

Conclusion

This meeting was held by the Johns Hopkins Center for Health Security to solicit expert insights, summarized in this document, to inform the DoD's Biodefense Posture Review. The BPR is an important step toward modernizing the DoD's biodefense capabilities, unifying them across the DoD, and synchronizing them with the global efforts of the United States' allies and partners. These efforts by the DoD aim to reduce the chances of a biological incident occurring and lessen the impacts if one were to occur. Implementation of the recommendations of experts herein would realize meaningful reductions to the risks and impacts of bioincidents.

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3. Mazer-Amirshahi M, Fox ER. Saline Shortages—Many Causes, No Simple Solution. *N Engl J Med*. 2018;378(16):1472-1474. doi:10.1056/NEJMp1800347

Appendix A. Participants

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Appendix B. Suggested Resources

During the meeting, participants shared resources that may be considered by drafters of the BPR. These resources are as follows and not intended to be an exhaustive list.

On DNA synthesis security:

Nuclear Threat Initiative. Preventing the misuse of DNA synthesis technology. Updated May 23, 2022. Accessed April 20, 2022. https://www.nti.org/about/programs-projects/project/preventing-the-misuse-of-dna-synthesis-technology/

Nuclear Threat Initiative. International Biosafety and Biosecurity Initiative for Science (IBBIS). Updated June 1, 2022. Accessed April 20, 2022. https://www.nti.org/about/programs-projects/project/international-biosafety-and-biosecurity-initiative-for-science-ibbis/

On laboratory safety:

Rodgers J, Lentzos F, Koblentz GD, Ly M. How to make sure the labs researching the most dangerous pathogens are safe and secure. *Bulletin of the Atomic Scientists.* Published July 2, 2021. Accessed April 20, 2022. https://thebulletin.org/2021/07/how-to-make-sure-the-labs-researching-the-most-dangerous-pathogens-are-safe-and-secure/

On disinformation:

Sorrell E, Fischer J, Gronvall GK. Disarming Russia's bioweapons disinformation. *Think Global Health*. Published March 22, 2022. Accessed April 20, 2022. https://www.thinkglobalhealth.org/article/disarming-russias-bioweapons-disinformation

George Mason University Schar School of Policy and Government Biodefense Program. Combatting Disinformation. The Pandora Report. Published April 8, 2022. Accessed April 20, 2022. https://pandorareport.org/publications/combatting-disinformation/

On lessons learned:

Bernard K. Biodefense leadership and national security: Lessons from the Goldwater-Nichols reforms. *Think Global Health*. Published April 4, 2022. Accessed April 20, 2022. https://www.thinkglobalhealth.org/article/biodefense-leadership-and-national-security-lessons-goldwater-nichols-reforms

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In-Q-Tel. IQT Roundtable: Capabilities required for pandemic response – August 2021. Published August 2021. Accessed April 20, 2022. https://www.bnext.org/wp-content/uploads/2021/12/RT-FINAL-REPORT__09_18_21.pdf

On indoor air quality:

The White House. FACT SHEET: Biden administration launches effort to improve ventilation and reduce the spread of COVID-19 in buildings. Published March 17, 2022. Accessed April 20, 2022. https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/17/fact-sheet-biden-administration-launches-effort-to-improve-ventilation-and-reduce-the-spread-of-covid-19-in-buildings/

On coronaviruses:

The National Academies Press. Coronavirus Resources. Accessed April 20, 2022. https://nap.nationalacademies.org/collection/94/coronavirus-resources

Lim YB. Even as omicron infections trend down, long COVID remains a threat to the military. *Bulletin of the Atomic Scientists*. Published February 16, 2022. Accessed April 20, 2022. https://thebulletin.org/2022/02/even-as-omicron-infections-trend-down-long-covid-remains-a-threat-to-the-military/

On strategic visions:

National Academies of Sciences, Engineering, and Medicine. *A strategic vision for biological threat reduction: The US Department of Defense and beyond*. Washington, DC: The National Academies Press; 2020. Accessed April 20, 2022. https://doi.org/10.17226/25681

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