NBSB National Biodefense Science Board

Summary of the Proceedings of the National Biodefense Science Board

September 11, 2019

Washington, D.C.

ASPR
ASSISTANT SECRETARY FOR PREPAREDNESS AND RESPONSE

Contents

Call to Order and Introductory Remarks

The Department of Health and Human Services (HHS) Office of the Assistant Secretary for Preparedness and Response (ASPR) hosted the National Biodefense Science Board (NBSB or the "Board") at a public meeting on September 11, 2019, in Washington, DC. The purpose of this meeting was to provide the board members with an update on the Food and Drug Administration's (FDA) "Animal Rule" and ASPR's new requirements development process; and to consider recommendations developed by the Disaster Medicine Working Group (DMWG). As required by law, the general public were invited to attend the meeting through the Federal Register; they were able to attend in person or connect by phone and webinar. The designated federal official (DFO) instructed members of the public to email comments or questions to NBSB@hhs.gov or post them in the chat box for the webinar. A quorum of voting members were present during the roll call. None of the board members raised potential conflicts of interest related to the agenda for this meeting. There were also (at various times) *ex officio* representatives from other federal agencies. Appendix 1 of this report contains the roster of voting members and *ex officio* representatives who were present.

Welcome Remarks and Opening Discussion[1] with Dr. Robert Kadlec, HHS Assistant Secretary for Preparedness and Response

Created in 2006 at the same time as ASPR itself, the NBSB was intended to provide HHS with the best insight and advice on the toughest problems for preparedness in the United States. From Hurricane Katrina, which was part of the driving reason for the creation of ASPR, to Hurricane Dorian in September 2019, the Nation continues to face many "Category 5" threats across the entire spectrum. Given the unfortunate, historical significance of September 11, it is noteworthy for today's public meeting that the NBSB continues to be an important part of HHS and a key asset for ASPR to achieve and maintain readiness for public health and medical emergencies. Some of the issues confronting this department, this country, and our society today are truly extraordinary and never entirely envisioned when ASPR was created.

From climate change to new risks for bioterrorism, as well as the challenges presented by peer State competitors, State adversaries, and non-State enemies, we must examine how the world has changed since 9/11. Today we face challenges in the international supply of critical medications, described just yesterday by Anna Eshoo and Adam Schiff in the Washington Post; increased severity and frequency of weather-related events; threats from Ebola that are

[1] Remarks from all speakers and presenters, as well as the discussion among the board members, are summarized in this report, with a focus on information and observations relevant to the work of the NBSB. This document is not a transcript, though invited speakers were asked to review and approve their respective sections.

unprecedented; and emerging issues related to synthetic biology and the bioeconomy. Additionally, we continue to have challenges developing and sustaining new emergency medical countermeasures and new antibiotics in the commercial marketplace. We've had numerous successes, and are now challenged to sustain those over the long term in light of new risks and changing market forces.

Some of those challenges are also opportunities, which will require us to work together with many different partners. For example, the 21st Century National Disaster Medical System, which is the subject of an upcoming study at the National Academies of Science, will have to work more efficiently and effectively with the Department of Defense (DoD) and Veterans Health Affairs (VHA); and support greater preparedness in the civilian healthcare system. As the DoD and VHA health systems contract, we will continue to have significant challenges mounting a major medical surge with federal personnel. Non-federal healthcare providers, in general, need additional assistance to be reasonably competent in providing specialty care during public health emergency responses. The relaunch of the Public Health Emergency Medical Enterprise (PHEMCE) is another important opportunity to improve coordination between HHS and DoD.

The NBSB is an integral part of ASPR, charged with examining those issues and many others, discuss the details, and develop recommendations to continue the goal of becoming a healthier and more resilient Nation. There are many interesting problems and critical issues. The board members' expertise and efforts have never been more needed than they are today.

Dr. Virginia Caine commented on the challenges in Indiana with involving the local VHA facility in the state's Healthcare Coalition (HCC). Dr. Kadlec indicated that all Veteran's hospitals should be invited to participate in their local HCC and has recently discussed this with Dr. Richard Stone, the Executive in Charge of VHA, to ensure that such collaborations receive support throughout the country.

Dr. Gray Heppner commented on the potential for the federal government to promote more research and development on vaccine production systems that are much faster than currently possible. Dr. Kadlec recognized that our responses to "virus X" is an important issue and encouraged the Board to evaluate our current capabilities and make recommendations as needed.

Dr. Prabha Fernandes highlighted the growing challenges in manufacturing critical medications at home and abroad, including the development and supply of new and generic antibiotics to ensure that all infections globally are treated with the right medication at the right time. Dr. Kadlec noted that work is needed to improve the economic model to sustain those types of products in the future.

Disaster Medicine Training in Health Facilities

Beginning in June 2019, the DMWG, led by Dr. H. Dele Davies (University of Nebraska Medical Center), has examined the professional and personal challenges experienced by medical providers and other clinical staff in healthcare facilities during a major disaster (of any type) in which there could be large numbers of complex casualties for an extended period of time. The working group was asked to consider ways to improve educational and training mechanisms to enhance, sustain, and enable the ability and willingness of clinicians and other key health facility personnel to function as first responders during a major incident. They met numerous times in person and by phone between June 10 and September 10, 2019.

While existing guidelines for crisis standards of care, contingency health system operations, and disaster medicine practices were included in the review of relevant literature, the board members did not attempt to edit or comment on the suitability of that material. They instead focused on the availability and apparent effectiveness of clinically-based education and training programs and systems.

The working group developed a set of recommendations that they presented to a quorum of the NBSB during the public meeting on September 11, 2019, as required by the Federal Advisory Committee Act (FACA). The board members discussed and debated the recommendations; Dr. Davies compiled and edited changes to the text during scheduled breaks. **The NBSB voted on and unanimously approved the final version of the recommendations, the full details of which are published separately on the ASPR public website.**

The over-arching recommendations from the NBSB:

1. *Healthcare providers/clinicians need to receive specialized pre-event training to be better prepared to respond to disasters.*
2. *Stakeholders should participate in the development and implementation of training.*
3. *Practicing clinicians need more and higher quality incident-specific, just-in time guidance and training.*
4. *Community-based providers should also be prepared to serve as "first responders" during a protracted disaster while resuming and maintaining usual care functions.*
5. *Specialists related to disaster medicine fields are invaluable and should be promoted.*

Comments from the public are encouraged, and may be sent to NBSB@hhs.gov.

Informational Presentations and Related Discussion

Exploring Issues in Biodefense: Development and Use of Animal Models for the Approval of Medical Countermeasures - Elizabeth Leffel, PhD, MPH, President of Leffel Consulting Group, LLC, Co-Chair for the All Hazards Science Response Working Group.

A number of e*x officio* representatives also participated in the discussion including Andrea Powell, PhD, Counterterrorism and Emergency Coordination Staff at the FDA Center for Drug Evaluation and Research; and Jayanand Vasudevan, PhD, Science and Technology Manager, DoD Defense Threat Reduction Agency, Chemical and Biological Department, Vaccines and Therapeutics Division.

The FDA "Animal Rule," (21 CFR 314.600-650 for drugs; 21 CFR 601.90-95 for biologics; effective July 1, 2002) allows for the approval of drugs and licensure of biological products when human efficacy studies are not ethical or field trials are not feasible. When needed, the Animal Rule replaces phase two and phase three human clinical trials, requiring similarly careful study design and regulation. The Animal Rule does not change or eliminate the requirements for safe chemistry, manufacturing, or quality control. Good laboratory practices are critical for safety and quality, which can mean conducting development and experimentation with animal models in biosafety level 3 or level 4. To date, 14 medical countermeasure drugs have been approved using the Animal Rule. Animal model qualification is a crucial component of the research process that requires high quality natural history studies of a specific disease, animal, and route of administration to elucidate pathogenesis, serological markers (among others), and clinical signs that link the animal species, drug candidate, and route of administration to available human data for a specific population. Animal model qualification can also include information about past outbreaks caused by the pathogen. Importantly, researchers can conduct a significant amount of testing using *in vitro* systems that avoid the need to use live animals to evaluate mechanisms of action and toxicity of their candidate drugs and to narrow down the choices for an acceptable animal model. Animal models must be qualified by FDA before they are used for further research; and they may need to be revalidated for each drug formulation or method of administration. Researchers must identify markers for efficacy and drug side effects that represent human clinical endpoints (mechanisms of action, host factors, metabolism, absorption, distribution, excretion) and utilize or develop validated evaluation methods and bioassays to accurately measure the relevant animal endpoints. An important goal for coordination among entities that utilize animal models should be to reduce the overall cost and time required to develop validated models, which means using the fewest number of animals with biologically meaningful endpoints. Additionally, there is considerable work ongoing to reduce the need for animal models all together through the use of "biological computer chips" that emulate both human and animal systems.

Capabilities-based Requirements: A Framework to Secure Best Solutions - Chad M. Hrdina, MS, GC-WMD, EMT, Director, Division of Requirements, ASPR Office of Strategy, Policy, Planning, and Requirements

The Division of Requirements in ASPR's Office of Strategy, Policy, Planning, and Requirements, is using a new approach for capabilities-based requirements leveraging best practices from DoD. Overall, the Requirements Divisions' purpose is to guide implementation of the most cost-effective capabilities to address 21st century health security risks. The Federal Acquisition Regulation mandates the formal development of vetted requirements for acquisitions. After identifying a need and evaluating current capabilities, the ASPR requirements development process provides a unified and comprehensive approach to satisfying mission requirements that results in recommendations for building or enhancing existing functional response assets. Staff members in Requirements coordinate evaluation of existing gaps, development of solutions to resolve and mitigate gaps, and support timely allocation of resources to achieve a capability to accomplish mandates, missions, objectives, or tasks. The requirements framework has been integrated across HHS, streamlined for timely delivery, and incorporates validation and approvals. In the traditional process, prioritization of acquisitions is based on the likelihood and size of impacts from specific threats. In the new framework, challenges related to a type of hazards, such as earthquakes, infectious diseases, or radionuclear dispersion devices, are cross-tabulated with the functional assets that will need to be employed/deployed during a response. This method for identify gaps in medical care, patient transportation, medical logistics, or situational awareness (among others) results in isolating and magnifying the gaps that have impacts across multiple hazards. The resulting gaps in functional systems can then be prioritized based on the extent to which critical failures occur.

Appendix 1: Attendees at the NBSB Public Meeting on September 11, 2019

Voting Members

Prabhavathi Fernandes, PhD (retired)
NBSB Chairperson
Chapel Hill, NC

Carl Baum, MD., FAAP, FACMT
Professor of Pediatrics, Yale University School of Medicine
New Haven, CT

John Benitez, MD, MPH
Medical Director of Emergency Preparedness and Environmental Epidemiology, Tennessee Department of Health
Nashville, TN

Virginia A. Caine, MD
Health Director, Marion County Public Health Department & Associate Professor of Medicine, Indiana University School of Medicine
Indianapolis, IN

Mark Cicero, MD
Associate Professor in Pediatrics (Emergency Medicine) & Director of Pediatric Disaster Preparedness
Yale University School of Medicine
New Haven, CT

H. Dele Davies, MD, MSc, MHCM
Vice Chancellor for Academic Affairs & Dean for Graduate Studies, University of Nebraska Medical Center
Omaha, NE

Donald G. (Gray) Heppner, MD
Chief Medical Officer and Managing Partner, Crozet BioPharma Consulting, LLC
Crozet, VA

Noreen A. Hynes, MD, MPH
Director, Geographic Medicine Center in the Division of Infectious Diseases, Associate Professor at Johns Hopkins University School of Medicine & Associate Medical Director of Johns Hopkins Hospital Biocontainment Unit
Baltimore, MD

Elizabeth Leffel, PhD, MPH
President, Leffel Consulting Group, LLC
Berryville, VA

David Schonfeld, MD, FAAP
Professor of the Practice in the University of Southern California School of Social Work and Pediatrics & Director of the National Center for School Crisis and Bereavement
Los Angeles, CA

Joelle N. Simpson, MD, MPH
Medical Director for Emergency Preparedness, Children's National Health System & Program Director for Emergency Medical Services for Children - DC Program
Washington, DC

Catherine Slemp, MD, MPH
Commissioner and State Health Officer, West Virginia Department of Health and Human Resources, Bureau for Public Health
Milton, WV

Tammy Spain, PhD
CMC Project Manager, Paragon BioTeck, Inc.
Tampa, FL

Federal agency representatives (non-voting *ex officio*)

Brooke Courtney, JD, MPH
Senior Regulatory Counsel, Office of Counterterrorism and Emerging Threats
U.S. Food and Drug Administration
White Oak, MD

David (Chris) Hassel, PhD
Senior Science Advisory
Office of the Assistant Secretary for Preparedness and Response
Washington, DC

Marc Shepanek, PhD
Deputy Chief of Medicine of Extreme Environments & Research Assistant Professor at the Uniformed Services University School of Medicine
National Aeronautics and Space Administration
Washington, DC

Jayanand Vasudevan, PhD
Science and Technology Manager, Defense Threat Reduction Agency, Chemical and Biological Department, Vaccines and Therapeutics Division
Department of Defense (*pro temp*)
Lorton, VA

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LCDR Cliffon Smith, MPA
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Mariam Haris, MPP
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