UPMC CENTER FOR HEALTH SECURITY

ANNUAL REPORT 2015-2016

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Mission

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

This year we lost our close friend and Center founder, DA Henderson. DA's contributions to public health and the world are simply extraordinary, and we try to represent them in a small way on the last pages of this report. DA started this Center as an organization dedicated to strengthening national and international preparedness and response to infectious disease crises and other threats to public health. We continue that work in his honor and by keeping his wisdom squarely in mind.

The past year has again seen a constant march of major health security challenges, both nationally and around the world.Probably the most dominant and pressing new health security issue of the day is Zika virus disease. This unprecedented outbreak smoldered for months, not recognized for the damage it would inflict. The discovery that a mosquito-borne virus could cause birth defects shook the infectious disease and public health community, just as the West African Ebola outbreak was slowing. Zika has required new thinking across many disciplines in health security, including public health communications, vector control, vaccine development, diagnostic testing, virology, travel advisories, and the ever-present politicization of infectious diseases.

Part of the Zika vector control discussion has revolved around the use of genetically modified mosquitoes: an innovative but controversial approach to the problem. Originally designed to combat diseases such as dengue and chikungunya—the latter of which has now been locally transmitted in Texas and Florida—this technology has been caught up in larger societal debates about genetically modified organisms (GMOs), causing contentious public policy debates on top of technological ones.

GMO mosquitoes are related to a larger scientific and societal debate on gene drives. This year the National Academies issued a report and guidelines on the topic, articulating what they judged to be the most prudent use of this technology, which has not only dual-use concerns but also many others. It is synthetic biology that has made such technology breakthroughs as gene drives possible, quick, and scalable. The harnessing of CRISPR-Cas9 by biologists is arguably the biggest bioscientific discovery in many years, and it will usher in a revolution in the world of biotechnology. Managing this revolution in a manner that does not stifle innovation yet protects individuals from harm will be a major challenge for years to come.

In the world of bacteria, the problem of antibiotic resistance continues to deepen as increasingly alarming discoveries are made. The international and domestic discovery of the MCR-1 and MCR-2 plasmids that confer resistance to colistin—often the last-line antibiotic in severe infections—is the latest shoe to drop. It underscores the imperative to address resistance from multiple fronts: new antibiotics, new vaccines, antibiotic stewardship policies, better diagnostics, and nontraditional therapies.

All-hazards healthcare preparedness has also met serious challenges in the past year with responses to mass casualty events resulting from mass shootings and train derailments. Such events tested the ability of the healthcare sector to augment capacity to cope with surge in a no-notice situation.

Epidemics continue to show they respect no borders, as yellow fever spreads in Africa amid vaccine shortages; as seen in a rapidly moving MERS outbreak in South Korea; and as seen when bird flu emerges in farms across the planet. The unpredictability of serious infectious disease outbreaks demands a response that crosses disciplines and requires international participation. The Global Health Security Agenda, now 50 countries strong, is an admirable and important step in that direction.

Our Center for Health Security has worked hard this year to absorb these developments as they break; to analyze and propose effective and strategic approaches to prevention, preparedness, and response; and to work closely with policymakers and stakeholders to come to grips with these issues. There is policy, science, research, and analysis in our work, and we continue to drive toward practical, meaningful change. We thank our funders and partners listed to the right for the opportunity to conduct the projects described in this Annual Report, and we look forward to continuing to tackle some of the most important health security issues of our times. We hope that DA Henderson's lifelong commitment to improve the world will live on in all of us.

Thomas V. Inglesby, MD
CEO and Director

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Funders and Partners

US Centers for Disease Control and Prevention

US Food & Drug Administration

Defense Threat Reduction Agency, US DoD

Biomedical Advanced Research & Development Authority, HHS

Department of Homeland Security, Science & Technology Directorate

DHS National Biodefense Analysis and Countermeasures Center

US Naval Postgraduate School

Johns Hopkins University

Taiwan Ministry of Health

Sloan Foundation

Robert Wood Johnson Foundation

deBeaumont Foundation

UPMC

Digital Infuzion

Battelle

Strengthening Global Health Security

Assessing Global Health Security in Taiwan

UPMC Center for Health Security staff conducted an independent and thorough assessment of Taiwan's progress toward the "Protect, Detect, and Respond" goals of the Global Health Security Agenda (GHSA). The GHSA is an effort by nations, international organizations, and civil society to accelerate progress toward a world safe and secure from infectious disease threats. GHSA is intend to speed achievement of the core capacities required by the World Health Organizations (WHO) International Health Regulations (IHR), the World Organization of Animal Health's (OIE) Performance of Veterinary Services Pathway and other relevant global health security frameworks. A subset of countries that have signed on to the GHSA have agreed to submit to external assessments of their global health security capacities. In January 2016, WHO and GHSA countries developed the new IHR Joint External Evaluation tool (JEE) to conduct GHSA assessments. Using the JEE tool, the Center evaluated Taiwan's capacity to prevent, detect, and respond to a range of health security threats, such as human and zoonotic disease outbreaks, radiation and chemical emergencies, and food safety. In working with the Center, Taiwan will be among one of the first dozen countries to undergo a complete multi-sectoral GHSA assessment that is made public and will be one of the very first countries to the WHO IHR Joint External Evaluation Tool. In March 2016, Center staff traveled to Taiwan to meet with leaders at Taiwan's Center for Disease Control and various other government agencies to kick off the country's self- and external assessments. Center staff returned to Taiwan in June 2016 to conduct the rigorous external assessment. In October of 2016, the Center will host a symposium in Washington DC and will present the findings of its external assessment of Taiwan's capabilities under the GHSA. It will also dedicate an issue of its *Health Security* Journal to public health capabilities in Taiwan and GHSA. Among other articles, this issue of the Journal will include pieces written by Taiwan CDCD visiting scholars, who will be in residence at the Center in the fall of 2016.

Exploring Emerging Technologies to Control Mosquito-borne Infections

With the threat of local transmission of emerging mosquito-borne diseases such as Zika, dengue, and chikungunya, many areas of the United States—and the world—will require augmentation of mosquito control activities. These activities have been largely unchanged for decades. However, with the advent of genetic engineering, novel means of diminishing target mosquito populations via the release of genetically modified (GMO) mosquitoes now possible. The use of such technologies is not without controversy, as the general public is not fully accepting of GMO products. The Center, recognizing the vital need both to understand how these new technologies will optimally fit in a portfolio of mosquito control activities and to devise a robust public communication plan, has begun several projects to help accomplish these goals. These projects began with a survey of households in Key West before the threat of Zika emerged, thus providing unique data that now serve as a baseline. Future Center projects envisioned include the study of the trial releases of GMO mosquitoes in the Cayman Islands, Brazil, and Panama. Additionally, GMO mosquitoes will be juxtaposed to historical use of similar techniques to control agricultural pests such as the screwworm. Irradiation and bacterial modification of mosquitoes could also be explored as part of developing a comprehensive perspective on mosquito control strategies. The aim of these endeavors is to understand and overcome barriers to implementing novel technology approaches for combating mosquito-borne infections.

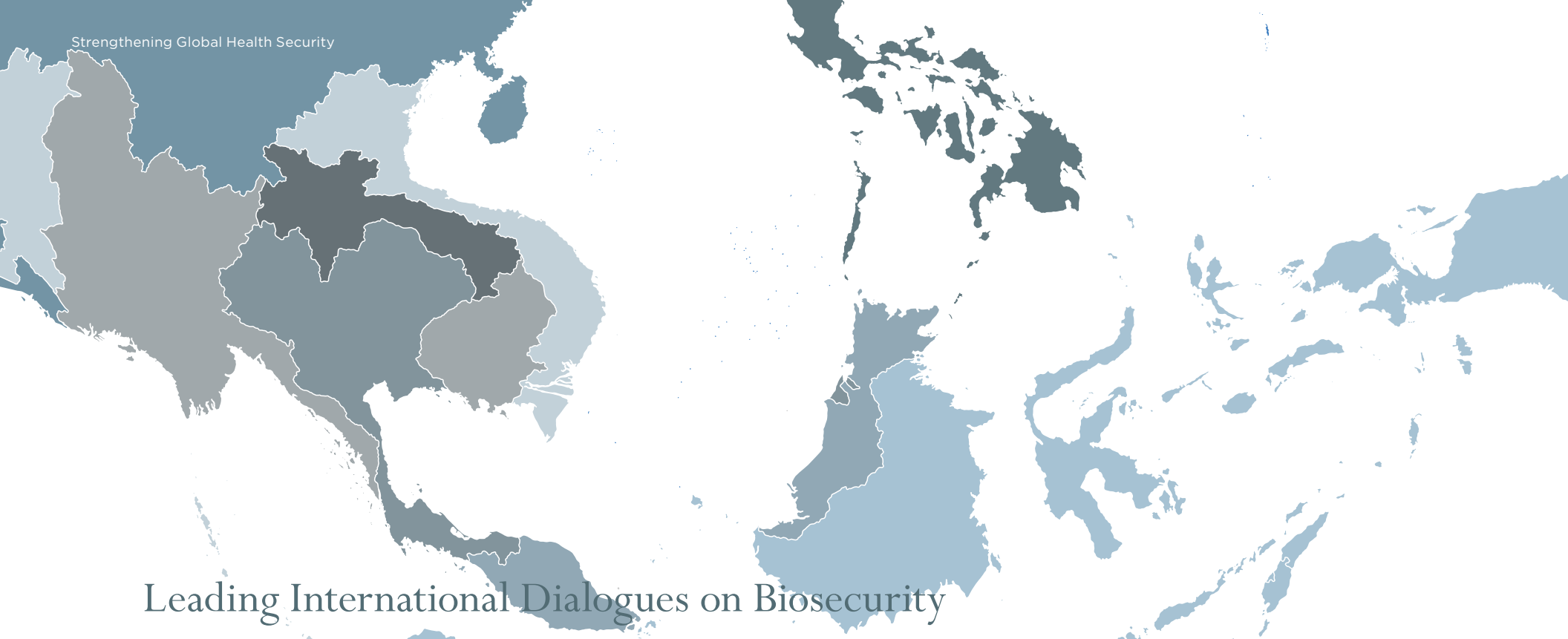
Center staff visited this Togolese hospital laboratory and other venues in Togo and Benin as part of this CDC-funded project.

Assisting Togo and Benin in Improving Biosecurity & Biosafety Practices

In 2014, together with partners from around the world, the United States launched the Global Health Security Agenda (GHSA), a multilateral and multi-sectoral initiative of more than 40 countries to enhance global capacities to prevent, detect, and rapidly respond to infectious disease threats to achieve measurable targets. The GHSA is intended to accelerate action and spur progress toward implementation of the World Health Organization's International Health Regulations and other global health security frameworks, such as the World Organization for Animal Health's Performance of Veterinary Services Pathway. The GHSA also engages the nongovernmental sector, including academic and research institutes, think tanks, industry, philanthropy, and the private sector. The Centers for Disease Control and Prevention (CDC) leads the US government effort to achieve GHSA targets.

The Center has engaged in this effort, partnering with Global Scientific Solutions for Health and with funding from the CDC, to work in the West African countries of Togo and Benin to meet the goals of the GHSA. Togo and Benin escaped having Ebola cases during the outbreak but are considered to be at high risk; more recently, Lassa fever outbreaks have hit both nations.

The Center is working to help Togo and Benin achieve the GHSA target of developing a comprehensive national biosafety and biosecurity system, including records of where and in which facilities especially dangerous pathogens and toxins are housed and consolidating dangerous pathogens and toxins in a minimal number of facilities. To do this, we have consulted with public health professionals and laboratorians working to detect and respond to public health threats in both countries and have visited many laboratories and hospitals to identify their needs and priorities. The Center is now developing a framework to help officials from Togo and Benin, as well as the CDC, evaluate the baseline of biosecurity practices and policies, including infectious waste management policies, and identify areas for building and strengthening a national biosecurity system. Ultimately, we will provide recommendations for near-term priority actions that Togo and Benin could take to fill gaps and strengthen biosecurity practices and policies.



Leading International Dialogues on Biosecurity

Biosecurity is a challenge for countries around the world, especially those with a high burden of infectious disease, vulnerabilities in lab security, porous borders, and emerging zoonoses at the human-animal interface. Opening up focused dialogues between the United States and high-level experts and policymakers in other regions on sometimes sensitive biosecurity issues helps to improve information flow and promote best practices. Over time, ongoing dialogues can also mitigate the risk of biological weapons use and provide ideas and tools for countries to strengthen their capacity for infectious disease detection and control.

The Center, with the support of the Defense Threat Reduction Agency (DTRA) and the Naval Postgraduate School, continues to run a strategic Track II biosecurity dialogue in Southeast Asia, with participation from Singapore, Malaysia, Indonesia, and the United States. This dialogue, which started as a bilateral dialogue between the United States and Singapore, is now in its third year. The Center leads 2 dialogue sessions each year, publishes the meeting reports, and briefs the findings of the dialogues to US government officials. Priority topics addressed by the dialogue over this past year included concerns about ISIS and biological terrorism, laboratory security, regional coordination on biosecurity challenges in Southeast Asia, and disease surveillance and early warning systems for biological threats. The Center has run 2 tabletop exercises with dialogue participants to engage them on these and other issues.

With the support of DTRA, the Center is launching a US-India biosecurity dialogue in the fall of 2016. High-level health and security experts will be taking part in the dialogue and will address a number of important biosecurity challenges facing the 2 nations.

Improving Security Through International Biosafety Norms

Most accidents in biocontainment laboratories are limited to the researchers involved and possibly their close contacts. While these accidents are unfortunate events that may have severe consequences for those who are affected, they would not typically become matters of international concern. However, laboratory-acquired infections (LAIs) with particularly transmissible pathogens, including noncirculating human influenza strains, SARS, or engineered influenza strains, could have consequences that go well beyond the laboratory, beyond borders, and would constitute a threat to national and global security. An accident with such pathogens could conceivably trigger regional epidemics or a pandemic. In large part, it was these biosafety concerns that fueled the decision by the US government in early 2015 to pause funding for influenza gain-of-function (GOF) research.

There is a great deal of technical guidance for researchers and institutions to achieve high levels of safety, to train workers, and to foster a laboratory environment that holds safety as a priority—even for research that would be considered to be "high risk." However, there are no national-level biosafety norms that could provide reassurance to other nations that consequential work is being performed with appropriate and sufficient safety systems. For example, it would be helpful to know that such potentially consequential research would take place in an environment where there are published national standards for the work, including for equipment maintenance, worker safety training, health monitoring, surveillance, and other myriad activities to help keep the researchers and the larger public safe, and that the nation has an adequate surveillance system in place to identify and limit potential outbreaks that could result from accidents. Without national-level standards and expectations for biosafety and interest in making sure that research institutions that perform potentially high-consequence research adhere to those standards, there may be insufficient incentive to commit the resources required to achieve that highest level of biosafety that would be required for this work. Without these kinds of norms, nations will not have confidence that all necessary steps are being taken in other nations to prevent a high-consequence laboratory accident from occurring or to limit its consequences.

In this project, sponsored by the Defense Threat Reduction Agency, we aim to provide essential ingredients for developing international biosafety norms for high-consequence research. To date, we have produced a synopsis of biosafety-related international agreements that exposes the gaps in biosafety norms for high-consequence research, and case studies that will show variabilities in biosafety requirements that exist at the national level. We have also begun a dialogue with international biosafety and security experts in an effort to build momentum toward norms for biosafety in high-consequence research on highly transmissible pathogens.

Selected Professional Activities

Briefings:

Kuala Lumpur Briefing at Defense Threat Reduction Agency (DTRA), Maj Gen Horner and senior staff; Action Office level brief; February 2, 2016

Project on Advanced Systems and Concepts for Countering WMD (PASCC) briefing at the US State Department; Christopher Park, Jesse Flynn, and Brett Goode; July 17, 2015

UPMC Biosecurity Track II Dialogue Briefing at DTRA; 25 DTRA personnel; September 14, 2015

Presentations:

CDRF Global Dialogue on the Latest Developments: Zika Response; Arlington, VA; March 24, 2016

Gain-of-Function Research: The Second Symposium, National Academies of Sciences, Engineering, and Medicine; Washington, DC; "Public Deliberation and Gain-of-Function Research Policy: Putting It into Practice"; March 10-11, 2016

National Science Advisory Board for Biosecurity (NSABB), Gain of Function Research Meeting; Bethesda, MD; February 11-12, 2016

National Science Advisory Board for Biosecurity (NSABB), Bethesda, MD; "Risks and Benefits Associated with Gain of Function (GOF) Studies"; January 7-8, 2016

Defense Threat Reduction Agency (DTRA), Project on Advanced Systems and Concepts for Countering WMD (PASCC) Workshop; "Emerging Nuclear and CBW Challenges and Management Opportunities"; March 11, 2016

School of Advanced International Studies at Johns Hopkins University, Conference on Science Diplomacy; Washington, DC; Roundtable on Science and Health Diplomacy; September 28, 2015

Taiwan Center for Disease Control Project; Taipei, Taiwan; "Global Health Security Agenda External Evaluation"; March 27-April 1, 2016

Weapons of Mass Destruction (WMD) Center, Spotlight Seminar Series; Washington, DC; "UPMC's Biosecurity Dialogues in Southeast Asia"; October 20, 2015

US-Benin Public Health Infrastructure Project; Cotonou, Benin; "National Policies for Biosafety, Biosecurity, and Infectious Waste Management"; March 12-16, 2016

Council on Foreign Relations, International Institutions and Global Governance Program; Washington, DC; "The Changing Nature of Biosecurity and the 2016 Biological Weapons Convention Review Conference"; June 27, 2016

US Government Accountability Office (GAO); expert meeting at National Academies of Science; Washington, DC; "Inactivation of Pathogens"; February 11-12, 2016

US-Togo Public Health Infrastructure Project; Lome, Togo; "National Policies for Biosafety, Biosecurity, and Infectious Waste Management"; March 17-21, 2016

Lectures:

ASM Biodefense and Emerging Diseases Research Meeting; Arlington, VA; "Partnerships in Global Health Security: Notable Solutions in Response, Mobile Laboratory Operations, and Infectious Disease Research"; February 9, 2016

CDC Public Health Grand Rounds Talk; Atlanta, GA; "Ebola Successes and Challenges and What They Mean for Future Health Security Threats"; September 29, 2015

CDC Taiwan; Taipei, Taiwan; Three lectures on "Biosurveillance," "Tuberculosis," and "The GHSA"; March 29-April 1, 2016

CSIS/State Department Meeting; Washington, DC; GHSA; December 2, 2015

Georgetown University Fall Seminar Series; Washington, DC; "Atlantic Storm Simulation"; November 11, 2015

Publications:

Wolicki SB, Nuzzo JB, Blazes DL, Pitts DL, Iskander JK, Tappero JW. Public health surveillance: at the core of the Global Health Security Agenda. *Health Secur* 2016;14(3):185-188.

Adalja AA. Sanctuary sites: what lies behind Ebola eye infections, sexual transmission, and relapses. *Health Secur* 2015;13(6):396-398.

Gronvall GK, Ravi S, Inglesby T, Cicero A. Meeting Report: Singapore-Malaysia-Indonesia-US dialogue on biosecurity. *Health Secur* 2015;13(6):399-405.

Gronvall GK, Rozo M. Synopsis of Biological Safety and Security Arrangements. UPMC Center for Health Security; July 2015

Advisory Board, Scientific Community, and Task Force Memberships:

One Health Initiative Honorary Advisory Board

WHO International Health Regulations Expert

Improving Response to Epidemics & Biothreats

Communicating About Medical Countermeasures in an Emergency

How the US Food and Drug Administration (FDA) and other US government officials convey information about medical countermeasures (MCMs) will affect uptake, compliance, and ultimately survival in the aftermath of a natural disease emergency or a chemical, biological, radiological, or nuclear attack. Moreover, effective communication regarding MCMs has the potential to strengthen psychological resilience as well as engender public trust in science, government, and public health.

In 2014 to 2016, the Center undertook an in-depth project to provide evidence-informed advice to the FDA about communication issues inherent in the emergency use of MCMs. During that initiative, the Center engaged in research, analysis, and deliberation with an expert working group that included top scholars in risk and crisis communication and leading figures in the MCM enterprise. The major outcomes of the project were the "best practices" oriented text, *How to Steward Medical Countermeasures and Public Trust in an Emergency: A Communication Casebook for FDA and Its Public Health Partners*, and the policy memo, *Securing the Future of MCM Emergency Communication: Recommended Strategies for the FDA*.

The purpose of the casebook was to provide the FDA and other officials who deliver public health information with real world–inspired opportunities for reflective learning on the principles of effective MCM emergency communication. The casebook critically examined communication dilemmas about MCMs in the context of the 2015-16 Ebola outbreak, the 2011 Fukushima nuclear accident, the 2009-10 H1N1 influenza pandemic, and the 2001 anthrax letter attacks, recommending specific action items for the FDA to help mitigate comparable issues in the future. The Ebola and anthrax cases underscored, for example, the need for sensitivity regarding historical conflicts between public health and minority communities, and the importance of taking steps—both before and during an emergency—to address any public anxiety around discrimination and human experimentation in the context of MCM clinical trials.

Informed by the case study findings and the input of broad stakeholders, the policy memo outlined high-level strategies that the FDA should consider adopting in order to strengthen its MCM emergency communication.

Improving Our Ability to Combat Antimicrobial-Resistant Bacteria

The unabated rise of antimicrobial-resistant bacteria is one of the most important public health problems the world faces. Without a solution, much of modern medicine is threatened, as everything from routine procedures to complex surgery is highly dependent on the availability of efficacious antibacterial agents. While new traditional-style broad-spectrum antibiotics are usually offered as the potential solution to the problem, they can only be temporizing, given the capacity for bacteria to rapidly evolve resistance. One potential solution lies with nontraditional therapeutics. These products, which include bacteriophages, monoclonal antibodies, lysins, microbiome-based therapies, and immunomodulators, have the potential to change the manner in which bacterial infectious diseases are treated. They are highly specific and, by their nature, not easily overcome by bacterial genetic evolution. However, the use of these specifically targeted therapeutics will require major changes in clinical practice, regulatory science, and diagnostic capacity. A cooperative agreement between the Center and the Biomedical Advanced Research and Development Authority (BARDA) in HHS is focused on providing an in-depth analysis of the relevant product classes with the aim of advising BARDA on how best to engage in this emerging field and facilitate the market entry of novel products. The results of this cooperative agreement, while primarily aimed at BARDA, can also provide a broader overall framework for how the field of infectious disease medicine can meet the existential challenge of antimicrobial resistance.

Creating Health Sector Resilience Checklists for Disasters and Epidemics

In 2012, Superstorm Sandy devastated the Eastern seaboard of the United States, with much of the damaged caused in and around New York City. The storm was so severe that its after-effects are still being felt in some affected communities to this day. In terms of economic impacts from coastal storms in the United States, Sandy is second only to Hurricane Katrina.

In 2014 and 2015, an Ebola epidemic tore through Guinea, Sierra Leone, and Liberia. When an infected traveler arrived in Dallas, Texas, and initiated a limited chain of transmission, fears of much broader transmission in the United States led to travel restrictions and federal investments in infection control for dangerous diseases.

While the particulars of these 2 crises differ, they both disrupted the functioning of the health sector in affected communities or regions. Whether it was an unexpected surge of patients or fear of infection keeping patients from seeking care, hospitals, health departments, physicians' offices, EMS providers, dialysis clinics, skilled nursing facilities, and other components of the health sector all experienced some degree of dysfunction during these events. As a result, vulnerable populations and the public at large suffered from reductions in service provision.

Both Superstorm Sandy and the Ebola crisis necessitated improvisation, creativity, and a committed health workforce in order to respond and to mitigate their worst health consequences. These and other assets contributed to health sector resilience, or the factors that preserve public health and healthcare delivery under extreme stress and contribute to the rapid restoration of normal health sector functioning after a disaster.

While the related concept of community resilience has become an important point of emphasis in preparedness scholarship and practice over the past decade, much less is known about how to build resilient health systems. With support from the CDC, the Center is conducting 2 projects to identify principles and practices that contributed to health sector resilience during Sandy and the Ebola crisis. The goal of these projects is to develop tools—derived from the experiences of the clinicians and other health professionals who lived through these events—that will empower local communities to strengthen their health systems in advance of future disruptions.

Making Disasters Less Disastrous and Inculcating a Culture of Resilience in Health Care

Substantial changes have occurred in healthcare disaster preparedness over the past 15 years since the September 11 and anthrax attacks. Prominent among these changes has been the rise of healthcare disaster preparedness coalitions intended to foster better local collaboration among hospitals, emergency management agencies, emergency medical services, and public health. While more than 500 of these coalitions now exist across the country, many struggle with ongoing issues of effective collaboration among these diverse entities. To help address this, the Center, with support from the CDC, has developed an evidence-based online tool to help coalitions self-assess and then improve the degree and quality of the collaboration among their members. Informed by several years of research into healthcare coalitions and the science of collaboration assessment, the tool is now in the final stages of pilot testing and will be made available for free in the fall of 2016.

Coincident with the rise of healthcare coalitions, the past 15 years have seen great changes in the healthcare landscape in the United States. The Affordable Care Act was been implemented, reducing the number of uninsured; hospitals and other healthcare facilities have been merging into vertically integrated healthcare networks and accountable care organizations; and many healthcare services that had previously been provided in hospitals have migrated to outpatient facilities. These changes present opportunities for and challenges to healthcare preparedness.

At the same time, evidence from natural disasters such as Hurricanes Sandy and Katrina demonstrates that a resilient healthcare sector depends on much more than prepared hospitals and coalitions. Many more parts of society need to be actively involved in building disaster-resilient communities. With support from the Robert Wood Johnson Foundation, the Center is exploring the way in which we as a nation have been thinking about how healthcare preparedness should evolve, given the significant and ongoing changes in the healthcare landscape. The outcome of this project will be proposals for refinements in the US approach to healthcare preparedness, including inculcating a culture of resilience in a culture of health.

Building Better Systems for Detecting and Characterizing Outbreaks

Collecting and making sense of complex data on infectious diseases from a wide variety of sources continue to be a major impediment to timely identification of and response to disease outbreaks like Ebola and Zika. The Center is working in partnership with software developers from Digital Infuzion to build a cloud-based, One Health surveillance tool for DTRA called the Biosurveillance Ecosytem (BSVE). The tool is being designed to mine, collate, and analyze data from a variety of traditional health data sources (e., electronic health records) and nontraditional information sources (eg, media reports, blogs, and Twitter), and to translate the data into actionable alerts for analysts in health and government and to help them distill it into briefings for decision makers. The goal of this work is to create a tool for government, health care, and other sectors that will enable faster detection, verification, and characterization of disease outbreaks and other emergencies.

The Center is providing expertise to help shape the design and refinement of this new surveillance system. We are performing quantitative and qualitative analyses of the system's ease of use and utility and the completeness and accuracy of its data. The work the Center is doing is helping direct future development of the software to ensure that it can improve the performance of professionals responsible for disease surveillance.

Enhancing the Surveillance and Control of Infectious Diseases in the Affordable Care Act Era

The Patient Protection and Affordable Care Act (ACA) has made significant changes in the way health care is provided in the United States. While many of the clinical, economic, and policy implications of the ACA are well described, there has been limited analysis of changes, if any, in the surveillance and control of infectious diseases of public health importance—such as tuberculosis, STIs, and HIV—that are anticipated or occurring as the ACA is implemented across the United States.

With funding from the Robert Wood Johnson Foundation, the Center analyzed the potential impacts of the ACA on the diagnosis, treatment, and reporting of important infectious diseases and examined ways to enhance disease surveillance and control activities under this new healthcare paradigm. We reviewed the literature for evidence of changing trends and conducted 66 semi-structured, not-for-attribution interviews with 82 participants from healthcare systems; academia; federal, state, and local public health agencies; and professional and nongovernmental organizations across the United States.

The Center identified several ways in which ACA implementation has not yet fully addressed the public health needs associated with infectious diseases, such as by providing inadequate coverage for the diagnosis and treatment of infectious diseases of public health importance. Left unaddressed, these shortcomings could lead to a rise in the incidence of these important communicable diseases, undoing decades of progress in disease control.

We recommended ways to enhance the diagnosis, treatment, surveillance, and control of infectious diseases under the ACA, including recommendations to support the continued provision of safety net care and to address coverage gaps for infectious diseases of public health importance. This analysis will be published in a major health policy journal.

Assessing Strategic Priorities for Chemical and Biological Defense at the Department of Homeland Security

Chemical and biological defense has always required balance and prioritization, with a need to carefully weigh priorities between chemical and biological defense, between preparing for likely scenarios and preparing for unlikely scenarios, and between a focus on current and traditional threats and on emerging and future threats enabled by new technology and advanced scientific methodologies. With the current biotechnology revolution enabling the diffusion and consumerization of biological methods that once required sophisticated technical ability, and in light of recent use of chemical weapons in Syria, those charged with chemical and biological defense are reassessing these priorities as the threat landscape changes.

The Chemical and Biological Defense (CBD) division of the Department of Homeland Security's (DHS) Science and Technology Directorate has asked the Center, along with the University of Maryland's National Consortium for the Study of Terrorism and Responses to Terrorism (START), to review the chem/bio threat landscape and provide DHS with strategic guidance to consider as the CBD division formulates its programmatic priorities and strategic direction for the next political administration.

Through a technical horizon-scanning process, our team is identifying scientific advancements that warrant special attention as the US government considers biological and chemical threats going forward. The results of this process will begin to identify future threats of higher concern and help set priorities. In addition, this work will evaluate CBD's specific goals and mission space, looking at where the organization fits and its role in DHS, as well as its role in the larger federal biological and chemical defense enterprise.

Recommendations resulting from this strategic analysis will help CBD leadership in their mission to "strengthen the nation's security and resiliency by providing knowledge products and innovative technology solutions to enhance National preparedness against both current and future chemical and biological threats." In addition, this work will contribute to a larger strategic orientation of chemical and biological defense programming at DHS.


CDC
EMERGENCY
MANAGEMENT

Evaluating and Supporting the Flu on Call® Triage System

In a severe influenza pandemic, getting people to the most appropriate site of care and giving them quick access to antiviral drugs and vaccines may reduce the number of deaths and lessen the burden on the healthcare system. To this end, the Centers for Disease Control and Prevention is developing a telephone triage system called Flu on Call®, which uses existing telephone advice services to provide official CDC information and medical guidance to the public in a severe pandemic. Flu on Call® is designed as a partnership with state and local public health agencies, United Way 2-1-1 call centers, poison control centers, and nurse triage lines.

Since influenza pandemics are unpredictable, the annual flu season was used to test the system. Flu on Call® was tested in a live demonstration project involving 2 communities in Wisconsin and Nebraska in January 2016. The Center is part of the CDC's team on this project focusing on liaison with medical professionals in the 2 communities and on the evaluation of the demonstration project. The purpose of the evaluation is to determine what changes in approach might be needed if Flu on Call® had to be activated in a real pandemic or other national emergency with little prior notice. The findings of the evaluation are now being incorporated into the Flu on Call® concept of operations and plans for further testing of the system.

Selected Professional Activities

Briefings:

Centers for Disease Control and Prevention; A Modeling Tool for Hospital Pandemic Response; February 23, 2016

Presentations:

Doha Fourth Symposium on Biological Weapons Conventions (BWC); Doha, Qatar; "A Strategic Approach to Biological Risk Assessment, Preparedness and Response"; March 31, 2016

Federation of American Scientists; Washington, DC; "The Issue of Biological Attribution from a Combined Policy-Technical Perspective"; November 12, 2015

Johns Hopkins University, Ethics for Lunch; Baltimore, MD; "Community Values and the Allocation of Scarce Resources in Disasters"; April 19, 2016

Meeting of States Parties to the Biological Weapons Convention; Geneva, Switzerland; "Assessing the Biothreat, Proceeding Safely"; December 16, 2015

National Association of County and City Health Officials (NACCHO) 2016 Preparedness Summit; Dallas, TX; "Flu on Call" Demonstration Project; April 20, 2016

National Defense University, Winter Workshop; Countering Biological Threats; Washington, DC; "Emerging Technologies"; February 25, 2016

Office of Secretary of Defense; Future of Biosecurity; Pentagon, Washington, DC; September 17, 2015

Lectures:

BiologyNext roundtable discussion; Arlington, VA; "Could We Do Better? Achieving Disease Outbreak Detection and Situational Awareness"; October 20, 2015

Johns Hopkins Bloomberg School of Public Health, Three Deans Lecture; Baltimore, MD; "Ethical Issues in Public Health"; May 9, 2016

Medical Grand Rounds, UPMC Shadyside; Pittsburgh, PA; "Putting MERS in Context"; July 2015

National Academies of Science; Washington, DC; "Entomological Warfare"; November 19, 2015

Urban Area Security Initiative, Office of Homeland Security and Preparedness; Middlesex County, NJ; "Decision Making in Public Health Emergencies"; October 21, 2015

Publications:

Toner ES, Ravi S, Adalja A, Waldhorn RE, McGinty M, Schoch-Spana M. Doing good by playing well with others: exploring local collaboration for emergency preparedness and response. *Health Secur* 2015;13(4):281-289.

Kilianski A, Nuzzo JB, Modjarrad K. Gain-of-function research and the relevance to clinical practice. *J Infect Dis* 2016;213(9):1364-1369.

Sama JN, Chida N, Polan RM, Nuzzo J, Page K, Shah M. High proportion of extrapulmonary tuberculosis in a low prevalence setting: a retrospective cohort study. *Public Health* April 29, 2016; epub ahead of print.

Inglesby TV, Relman DA. How likely is it that biological agents will be used deliberately to cause widespread harm? Policymakers and scientists need to take seriously the possibility that potential pandemic pathogens will be misused. *EMBO Rep* 2016;17(2):127-130.

Frank GM, Adalja A, Barbour A, et al. Infectious Diseases Society of America and gain-of-function experiments with pandemic potential. *J Infect Dis* 2016;213(9);1359-1361.

Larsen R, Boddie C, Watson M, Gronvall GK, Toner E, Nuzzo J, Cicero A, Inglesby T. *Jump Start: Accelerating Government Response to a National Biological Crisis.* UPMC Center for Health Security. July 2015.

Henderson DA. The development of surveillance systems. *Am J Epidemiol* 2016;183(5):381-386.

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Advisory Board, Scientific Community, and Task Force Memberships:

Centers for Disease Control and Prevention Botulism Medical Countermeasures Taskforce

Committee on the Future of US Biosecurity, for the President's Council of Advisors on Science and Technology (PCAST)

Department of Defense Committee for Comprehensive Review of DoD Laboratory Procedures, Processes, and Protocols Associated with Inactivating Spore-Forming Anthrax

Department of Defense, Threat Reduction Advisory Committee (TRAC)

Homeland Security Subcommittee of the US Environmental Protection Agency's (EPA) Board of Scientific Counselors

Institute of Medicine (IOM) Emerging Threats Workshop Planning Committee

Raising Awareness, Building Readiness

Responding to the Threat of Zika

The Zika virus outbreak raises important questions about strategies for meeting the health needs of vulnerable populations, mitigating the threat of mosquito-borne diseases, and financing public health emergency response efforts both locally and internationally.

In March 2016, the Center organized a Congressional seminar on Zika that featured remarks from Dr. Thomas R. Frieden (Director, Centers for Disease Control & Prevention), as well as a discussion moderated by Dr. Tom Inglesby. The seminar was attended by Congressional staffers, public health advocates and practitioners, and members of the international humanitarian response community. Dr. Frieden presented updates on the outbreak, offered suggestions for preventing infections, clarified what health authorities know and are still learning about the virus, addressed efforts to develop a vaccine against the virus, and outlined CDC's plan to mitigate the impact of Zika, both among travelers and in vulnerable communities across the United States. Drs. Frieden and Inglesby underscored the importance of securing supplemental federal funding for ongoing response and recovery activities. The seminar garnered much-needed focus on the state of the outbreak, highlighted the successes of ongoing response efforts, and identified paths forward for strengthening global health security in the face of Zika.

The Center also plans to undertake a project that will include a unique mixed-methods examination of communications around Zika and the testing of potential messages. The project would aim to advance communication and public health science and improve public health efforts to establish effective communications, thereby encouraging publicly embraced responses to the growing potential for an outbreak of Zika in the United States.

Building a More Valuable Model of Community Resilience

What if you could predict the time course for a community's return to functioning after a disaster? What if you could improve resilience for counties across the United States? How could this help local leaders organize themselves to prepare for emergencies, and how could it improve national efforts to strengthen on-the-ground resilience?

The Center is collaborating with Johns Hopkins, the University of Delaware, CDC, and other experts to develop a conceptual and computational model on resilience that helps to answer these questions. The Composite of Post-Event Well-being (COPEWELL) model is the first model aimed at showing how disasters disrupt essential community services and illuminating what will help communities strengthen resistance to disruption and accelerate recovery after disaster occurs.

COPEWELL uses a systems dynamics approach to model community interactions. It takes into account a community's social cohesion and the vulnerability of its population, as well as its natural and engineered systems that are intended to mitigate disasters. And it is based on the particular form of a disaster that a community might encounter.

The work has revealed the national need for better measures of local capacity and community functioning, and it will help to drive an effort in new, more useful measurement. In a trial in New York City, the model showed its value in helping to gather the planning and response community to see new patterns and set priorities in resilience planning. As the model evolves, undergoes evaluation, and is presented to national scientific and public health audiences this year, it is hoped that other cities and counties will use the model to identify major challenges and to help measure progress over time. And it is anticipated that it will become a tool to assist in finding areas of the country that need additional attention and resources in their efforts to promote resilience.

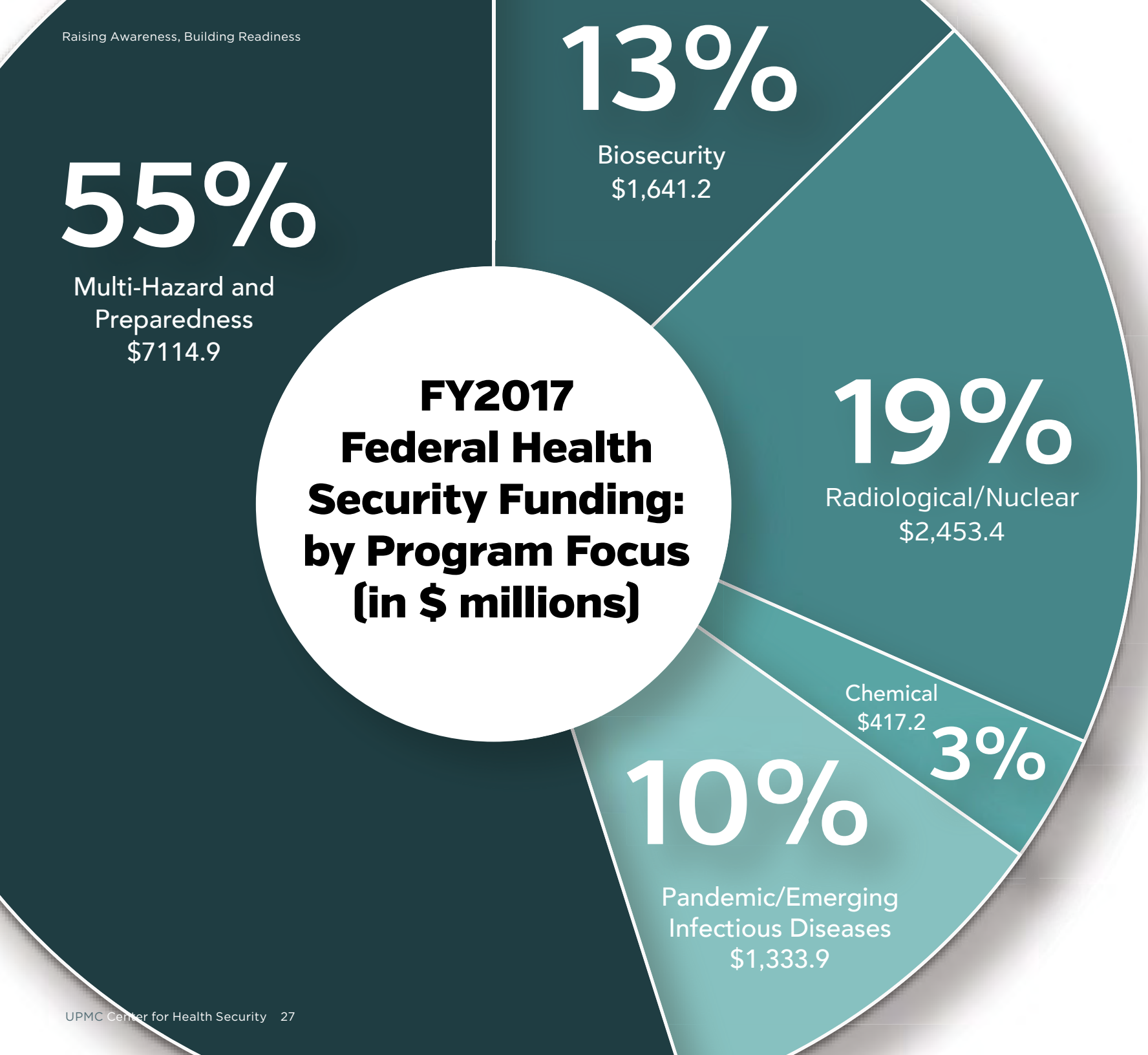
Measuring and Motivating Health Department Excellence in Community Engagement

In the fall of 2015, the de Beaumont Foundation, the National Association of County and City Health Officials (NACCHO), and the UPMC Center for Health Security partnered to field the Community Engagement for Public Health Emergency Preparedness (CEPHEP) survey. The CEPHEP survey was an opportunity for local health departments to relate personal success stories about engaging their communities in the critical work of public health emergency preparedness and, in so doing, to help generate national data about which policy and practice shifts could enable more local health department frontrunners to emerge in this arena.

NACCHO and the Center originally fielded the CEPHEP survey in 2012 to provide the first comprehensive nationwide picture of local health department efforts to integrate individuals and community- and faith-based groups into emergency preparedness. Re-fielding the same survey in 2015 has given public health emergency preparedness practitioners an opportunity to document their diverse and continued achievements since 2012 and to identify with greater fidelity the organizational predictors of successful community engagement. Comparison between the 2012 and 2015 snapshots has also helped to uncover how steady staff and budget reductions as well as competing preparedness duties amidst scarce resources may have affected community engagement efforts.

Local health departments of all sizes actively and successfully involve community partners in the public health emergency preparedness enterprise. While large local health departments often benefit from economies of scale and scope, smaller local health departments may have their own CEPHEP advantages, such as practitioners who are already well known, trusted, and influential in a tight-knit community. One-way engagement techniques such as publishing personal preparedness pamphlets are very common among local health departments, but more intense 2-way CEPHEP activities are also occurring in the field. These include standing up neighbor-to-neighbor disaster assistance networks and holding formal public deliberations about difficult decisions anticipated in a health emergency, such as how best to use scarce medical resources.

A follow up to the quantitative investigation is an in-depth qualitative study of different sized local health departments who excel in CEPHEP. Ultimately, the information gathered can help local health department officials to take community engagement more fully into account in their agencies' current operations and to advocate more aggressively for the infrastructure that supports excellence in this work.



FY2017 Federal Health Security Funding: by Program Focus (in $ millions)

Analysis of the Federal Health Security Budget

Each year, the Center conducts a review and analysis of health security programs and investments contained in the budgets of the various executive agencies of the federal government. This series of articles, now in its 12th year, provides a unique, cross-cutting view of the federal health security enterprise and is valued highly by government officials, the news media, and the general public. It provides an accounting of the significant prevention, preparedness, response, and recovery programs and their associated funding levels.

Similar to the 2015 edition of the federal funding article, the 2016 article focuses on programs in 5 categories: biological, chemical, radiological/nuclear, pandemic and emerging infectious diseases, and a threat-agnostic, all-hazards preparedness category. In addition, this article includes an accounting of federal funding for the ongoing response to the Zika virus epidemic.

In total, the president's proposed FY2017 budget includes $12.97 billion for health security-related programs, an estimated decrease in funding of $782 million from the estimated $13.75 billion in FY2016. Most FY2017 health security funding would go toward programs with Multiple-Hazard and Preparedness goals and missions ($7.11billion, 55%), while 19% of funding ($2.45 billion) would be dedicated to Radiological and Nuclear Security programs, 13% ($1.64 billion) to Biosecurity programs, 10% ($1.33 billion) to Pandamic Influenza and Emerging Infectious Diseases programs, and 3% ($417 million) to Chemical Security programs.

The Center's analysis is highly referenced and trusted by the news media and policymakers. It is unique in that the Center tracks funding across agencies and does a cross cutting analysis of various aspects of federal health security funding.

Selected Professional Activities

Briefings:

Federal Emergency Management Agency; Washington, DC; briefing on Threat and Hazard Identification and Risk Assessment (THIRA) Project; January 7, 2016

Society for Risk Analysis 2015 Annual Meeting; Arlington, VA; briefing on THIRA Project; December 6, 2015

Presentations:

Baltimore City Health Department Preparedness Panel; Baltimore, MD; September 18, 2015

Department of Homeland Security, BioFutures Synthetic Biology Working Group Meeting III; Arlington, VA; "Mitigating the Risks of Synthetic Biology"; October 22, 2015

Emergent Biosolutions lunch talk series; Women Making a Difference (WMD) presentation; Gaithersburg, MD; "Mitigating Risks from Synthetic Biology"; April 7, 2016

Institute of Medicine Workshop; Washington, DC; "The Nation's Medical Countermeasure Stockpile: Opportunities to Improve the Sustainability of the CDC Strategic National Stockpile"; February 4-5, 2016

Sandia National Laboratories Seminar; Livermore, CA; "Mitigating the Risks of Synthetic Biology"; August 20, 2015

The James Martin Center for Nonproliferation Studies; CBW short course; Washington, DC; "Approaches to Governing Contentious Research"; September 16, 2015

Lectures:

Johns Hopkins Club, Spring Lecture; Baltimore, MD; "Smallpox: Death of a Virus and Its Heritage"; March 23, 2016

Johns Hopkins University, Vaccine Policy Issues Course; Baltimore, MD; "Polio Eradication"; February 24, 2016

National Defense University; Washington, DC; "Agricultural Risk Assessment and Biotechnology Solutions"; March 22, 2016

UPMC Advanced Practice Providers Conference; Pittsburgh, PA; "The Top 10 Prescribed Drugs"; October 16, 2015

Publications:

Gronvall GK, Rozo M. Addressing the gap in international norms for biosafety. Trends *Microbiol* 2015;23(12):743-744.

Boddie C, Watson M, Ackerman G, Gronvall GK. Assessing the bioweapons threat. *Science* 2015;349(6250):792-793.

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Rozo M, Gronvall GK. Reply to "The 1977 H1N1 Influenza Virus Reemergence Demonstrated Gain-of-Function Hazards." *MBio* 2015;6(5):e01524-15.

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Gronvall GK. US competitiveness in synthetic biology. *Health Secur* 2015;13(6):378-389.

Advisory Board, Scientific Community, and Task Force Memberships:

Centers for Disease Control and Prevention Executive Laboratory Safety Working Group, examining biosafety practices of CDC, NIH, and FDA

Future of the National Preparedness and Response Science Board Working Group

Institute of Medicine (IOM) Standing Committee on Medical and Public Health Research During Large-Scale Emergency Events

National Advisory Committee for National Health Security Preparedness Index (NHSPI) of Robert Wood Johnson Foundation

Roundtable on Risk, Resilience, and Extreme Events, National Research Council

Building & Strengthening the Professional Community

Building a Community of Next-Generation Biosecurity Leaders

The biosecurity field is a discipline without an obvious or prescribed career path. Many of the professionals in this field come to it through serendipity, with very few university programs or professional training activities available to guide young professionals interested in the intersection of biology and public health and national security. With the next generation of biosecurity experts struggling to find a way into the field, the Center launched the Emerging Leaders in Biosecurity Initiative (ELBI) in 2012 with strong support from the Defense Threat Reduction Agency (DTRA). ELBI is a highly competitive fellowship program, designed to create and sustain an energetic, multidisciplinary, and engaged community of motivated young professionals who can contribute to current and future policy and practice in the field of biosecurity.

The ELBI program creates a rich array of experiences through which fellows can deepen their expertise in biosecurity, forge a network of lasting professional relationships, and collaborate on ideas and technical solutions for biosecurity problems with current and future leaders in the international biosecurity community.

This 2016 ELBI cohort is the fourth of the program, and its members hail from the United States, the United Kingdom, and Canada; they represent expertise in a wide range of disciplines, including biology, biotechnology, domestic and international policy, clinical and veterinary medicine, biopharmaceuticals, law, anthropology, public health, and emergency management. Fellows come from federal, state, and local government; the private sector; academia; and nongovernmental organizations. This class of fellows had a workshop in Washington, DC, with visits to the NIH Integrated Research Facility, the Department of Defense Labs, and the White House. Fellows will have a chance in the second half of the fellowship year to attend webinars given by experts, participate in a paper competition, and attend a biotechnology-focused workshop in the fall in the San Francisco Bay area.

In its short 5-year existence, ELBI has proved exceptionally valuable to the fellows and the field. Fellows have gone on to greater levels of responsibility and influence, have implemented novel ideas and programs examined during ELBI workshops, and have built personal and professional networks that can be called on and leveraged to help solve complex problems.

Informing and Interacting with Professionals in the Community

The Center publishes several resources intended to keep health security leaders, policymakers, and practitioners current on critical developments in all aspects of health security. Our daily news scan, *Health Security Headlines*, reaches more than 2,500 health security professionals, delivering a compilation of media reports and academic literature on current infectious diseases and biological agents, domestic preparedness and response, government affairs and national security, global health security, science and technology, medicine and public health, and other 21st century threats. In addition, special sections devoted to longer-term epidemics such as those caused by the Ebola virus and Zika virus provide a comprehensive picture of those evolving infectious disease emergencies.

The bi-weekly *Clinicians' Biosecurity News* is delivered to more than 2,500 healthcare professionals, emergency management officials, and policymakers from every state as well as many international subscribers. The *CBN* provides updates on new developments in clinical research and practice that are relevant to biosecurity and health security, including infectious diseases, clinical management, drug and vaccine development, hospital and healthcare system preparedness, and public health preparedness.

The Center also publishes *Preparedness Pulsepoints*, which is focused on government affairs and policy relevant to health security. *Pulsepoints* is sent to more than 1,300 policymakers and officials from various government agencies at the local, state, and federal levels; members of healthcare organizations and philanthropic foundations; and thought leaders in academia and industry. The publication keeps them informed about federal rulemaking, legislation, and policy developments related to preparedness, homeland security, radiological and nuclear security, and science and technology policy.

The Center's blog, *The Bifurcated Needle*, provides a forum for timely commentary and analysis by Center experts and affiliated scholars and practitioners on topics relating to biosecurity, healthcare and public health preparedness, public policy, and other topics of interest. Finally, the Center has a robust social media presence via Twitter (@UPMC_CHS) and Facebook.

Our Journal: *Health Security*

Now in its 14th year of publication, *Health Security* (formerly known as *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*) continues to publish scholarly research and policy analysis from thought leaders as well as descriptions of successful practices in the field. As we envisioned at its start, the Journal is the forum of choice for the biosecurity and preparedness community to examine issues such as community resilience and planning, dual-use research, risk communication, disease surveillance, countermeasure development, and medical and public health preparedness.

Over the years, our scope has broadened to include the continued risk of pandemics and emerging infectious diseases, natural disasters, outbreaks of foodborne illness, health emergencies caused by acts of terrorism, and the potential for biological, chemical, and nuclear accidents. *Health Security* is the only peer-reviewed journal dedicated to this set of issues.

This year, we have highlighted 3 special topics of increasing urgency:

- antimicrobial resistance as a global health emergency
- climate change and health security, or promoting resilience to climate disruption
- surveillance and health security, focusing on building the systems we need to detect and manage health threats

The Journal is published bimonthly and read in more than 170 countries, with a wide international audience of individual and institutional subscribers in Europe, Canada, Australia, South America, Japan, India, and China. Developing countries receive free online access to the Journal. Full-text downloads from the Journal have increased by 17% over past the year and average 3,000 per month.

THE JOURNAL IS ONLINE AT
www.liebertpub.com/hs

Selected Professional Activities

Presentations:

Centers for Disease Control and Prevention Botulism Clinical Guidelines Workshop; Atlanta, GA; June 14, 2016

Defence Academy of the United Kingdom; Shrivenham, UK; "US Lessons from Ebola"; August 7, 2015

Emerging Leaders in Biosecurity Initiative, Spring Workshop; Arlington, VA; "Surveillance"; March 15, 2016

Johns Hopkins University; Ethical Principles and Responsibilities for Public Health Containment in Low and Middle Income Countries (LMIC's) Working Group; Baltimore, MD; February 26, 2016

Johns Hopkins Bloomberg School of Public Health; Public Health Surveillance; Baltimore, MD; "Public Health Response to Surveillance Data"; December 1 and 15, 2015

National Association of County and City Health Officials (NACCHO) 2016 Preparedness Summit; Dallas, TX; "Gauging Collaboration with Healthcare Coalitions: Introducing a New Online Self-Assessment Tool"; April 21, 2016

National Academy of Sciences Workshop; Washington, DC; "Safeguarding the Bioeconomy: Applications and Implications of Emerging Science"; July 27-28, 2015

US Department of Health and Human Services (HHS), Office of the Assistant Secretary for Preparedness and Response (ASPR), and Hospital Preparedness Program (HPP) Partners Meeting; Washington, DC; February 12, 2016

Lectures:

Georgetown University, Health Security Class; Fairfax, VA; "Biosurveillance"; November 11, 2015

Johns Hopkins Bloomberg School of Public Health, Prevention Public Health Crisis and Response Class; Baltimore, MD; "Atlantic Storm Simulation"; October 8, 2015

Johns Hopkins Bloomberg School of Public Health, Prevention Public Health Crisis and Response Class; Baltimore, MD; "Political Response to Crisis"; October 13, 2015

Johns Hopkins Bloomberg School of Public Health, International Health Doctoral Student Seminar; Baltimore, MD; "Polio Eradication"; September 29, 2015

Johns Hopkins Bloomberg School of Public Health, MPH Students' Meeting; Baltimore, MD; "Issues in Public Health"; February 8, 2016

Johns Hopkins Bloomberg School of Public Health, Preventive Medicine Residency Program; Baltimore, MD; "The Evolution of a Career"; July 20, 2015

Johns Hopkins Bloomberg School of Public Health, Vaccine Science Seminar; Baltimore, MD; "Smallpox Vaccine"; December 16, 2015

Johns Hopkins University, 2015 Epi Course for Medical Students; Baltimore, MD; "Smallpox and the Application of Epidemiological Principles"; December 20, 2015

Johns Hopkins University, Customized Student Lunch; Baltimore, MD; "Issues in Public Health"; March 8, 2016

Johns Hopkins University, MPH Students' Meeting; Baltimore, MD; "Discussion and Questions"; December 8, 2015

Johns Hopkins University, Summer Course for MPH Students; Baltimore, MD; "Health Policy: Smallpox and Basic Principles in Public Health"; August 13, 2015

Johns Hopkins University, Undergraduate Conference; Baltimore, MD; "The Drama of Smallpox Eradication"; April 7, 2016

Medical Grand Rounds; UPMC Shadyside Conference; Pittsburgh, PA; "Zika Virus"; February 25, 2016; March 8, 2016; April 7, 2016

Sharing Knowledge to Build a Culture of Health Conference; Baltimore, MD; "The Impact of ACA on Public Health Disease Control Efforts, and on Creating a Culture of Resilience and Preparedness Within the Culture of Health"; March 9-11, 2016

Publications:

Kanabrocki J, Berns K, Hunt D, Inglesby T, Olinger P, Pentella M, Relman D, Sheeley H, Sparling F, Taylor J, Zimmerman D. Proposed Recommendations of the External Laboratory Safety Workgroup (ELSW) to the Advisory Committee to the Director, CDC, Concerning Food and Drug Administration Laboratory Safety Programs; July 2, 2015.

Advisory Board, Scientific Community, and Task Force Memberships:

National Healthcare Coalition Preparedness Conference Advisory Board

US Department of Health and Human Services (HHS), Office of the Assistant Secretary for Preparedness and Response (ASPR) TRACIE Advisory Board

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UPMC Center for Health Security recognizes these former staffers who contributed to our activities in 2015-2016

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Research Assistant

Michelle Rozo, PhD
Research Assistant

Donald Ainslee Henderson, 1928-2016

AUGUST 20, 2016—Baltimore, MD—It is with great sorrow that we announce the passing of Donald Ainslee Henderson, MD, MPH, our distinguished colleague and friend at the UPMC Center for Health Security. Dr. Henderson died on August 19 in Baltimore, Maryland, from complications following a hip fracture.

Dr. Henderson, known to all as "DA," was for decades a towering figure in the world of public health and led the campaign that ultimately eradicated smallpox from the world. At the time of his death, he held the position of Distinguished Scholar at the UPMC Center for Health Security and Professor of Public Health and Medicine at the University of Pittsburgh.

Dr. Henderson was a commissioned officer in the US Public Health Service and in the 1950s was Chief of the Epidemic Intelligence Service at the Centers for Disease Control. He spent much of the 1950s and 1960s working in the Epidemiology Branch at CDC.

He was Chief of the Smallpox Eradication Program at CDC, which led to his position, from 1966 to 1977, as Director of the World Health Organization's global smallpox eradication campaign. In a book entitled Smallpox: Death of a Disease (2009), Dr. Henderson related his personal account of the challenges, obstacles, and disasters faced by an intrepid international program in achieving the global eradication of smallpox.

From 1977 to 1990, Dr. Henderson served as the Dean of the Faculty of the Johns Hopkins School of Public Health. He later held positions as Associate Director of the Office of Science and Technology Policy, Executive Office of the President (1990-1993), Deputy Assistant Secretary for Health and Senior Science Advisor in the Department of Health and Human Services (1993-1995), and from 2001 to 2003, he served as the Director of the Office of Public Health Emergency Preparedness and, later, as a Principal Director and Senior Science Advisor for Public Health Preparedness

in the Office of the Secretary of Health and Human Services (2002-2007). He was a Founding Director (1998) of the Johns Hopkins Center for Civilian Biodefense Strategies.

In 2002, Dr. Henderson received the Presidential Medal of Freedom, the nation's highest civilian honor. In 2015, he was awarded Thailand's Prince Mahidol Award for Public Health, and in 2013 he was presented with the Order of the Brilliant Star with Grand Cordon, the highest civilian honor awarded by the Republic of China (Taiwan). He was the recipient of the National Medal of Science, the National Academy of Sciences' Public Welfare Medal, and the Japan Prize. He received honorary degrees from 17 universities and special awards from 19 countries.

Dr. Henderson was a member of the Institute of Medicine, a Fellow of the American Academy of Arts and Sciences, an Honorary Fellow of the National Academy of Medicine of Mexico, an Honorary Fellow of the Royal College of Physicians of London, an Honorary Member of the Royal Society of Medicine, and a Fellow of a number of professional medical and public health societies.

Dr. Henderson was Editor Emeritus of the peer-reviewed journal Health Security , and he authored more than 200 articles and scientific papers and 31 book chapters. He was the coauthor of the renowned Smallpox and Its Eradication (Fenner F, Henderson DA, Arita I, Jezek A, and Ladnyi ID. Geneva: World Health Organization; 1988), the authoritative history of the disease and its ultimate demise.

"DA Henderson truly changed the world for the better," noted Tom Inglesby, Director of the UPMC Center for Health Security. "He led the effort to rid the world of smallpox. He advised presidents. He was honored by countries around the planet. He changed the way schools of public health teach the next generation. With all of that, he still took the time to be a mentor to countless young people, and was a great friend. He is truly irreplaceable, and I will miss him."

Dr. Henderson, a Lakewood, Ohio, native, graduated from Oberlin College, the University of Rochester School of Medicine, and the Johns Hopkins School of Hygiene and Public Health. He served as a medical resident at the Mary Imogene Bassett Hospital in Cooperstown, New York.

He is survived by his wife, Nana, daughter, Leigh, and sons Douglas and David.

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