

FEDERAL FUNDING FOR HEALTH SECURITY IN FY2016

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This article assesses US government funding in 5 domains critical to strengthening health security: biodefense programs, radiological and nuclear programs, chemical programs, pandemic influenza and emerging infectious disease programs, and multiple-hazard and preparedness programs. This year's article also highlights the emergency funding appropriated in FY2015 to enable the international and domestic response to the Ebola outbreak in West Africa.

THIS ARTICLE CONTINUES A SERIES of articles analyzing US government funding for health security. It examines proposed funding in the President's budget for FY2016 and provides updated amounts for estimated funds in FY2015 and actual funding for FY2010 through FY2014.

First published in 2004, this series began by cataloging and analyzing funding for civilian biodefense programs in the federal government. The series, then titled "Billions for Biodefense,"¹⁻⁶ and subsequently "Federal Funding for Biodefense,"⁷⁻¹⁰ was a yearly analysis of agency budgets presented together as a representation of the federal biodefense enterprise. In 2012, the UPMC Center for Health Security conducted a complementary analysis that tracked funding for programs dedicated to consequence management of radiological and nuclear terrorism.¹¹

Last year, we expanded the focus of the article from biodefense to health security in order to capture the broad array of work in preparedness and response going on at the federal level.¹² The Department of Health and Human Services (HHS) National Health Security Strategy defines *national health security* as "a state in which the Nation and its people are prepared for, protected from, and resilient in the face of health threats. ..." ^{13(p3),14}

This article assesses US government funding in 5 domains critical to strengthening health security:

- Biodefense programs: federal programs focused on prevention, preparedness, and response to attacks on

civilians with biological agents and accidental releases of biological material;

- Radiological and nuclear programs: federal programs focused on prevention, preparedness, and consequence management of radiological and nuclear terrorism and large-scale radiological accidents;
- Chemical programs: federal programs focused on prevention, preparedness, and response to large-scale acute chemical exposures of civilian populations, both intentional and accidental;
- Pandemic influenza and emerging infectious disease programs: federal programs focused on preparedness and response to large, naturally occurring, and potentially destabilizing epidemics; and
- Multiple-hazard and preparedness programs: federal programs focused on multiple hazards or on building infrastructure and capacity to respond to large-scale health threats.

This year's article also highlights the emergency funding appropriated in FY2015 to enable the international and domestic response to the Ebola outbreak in West Africa.

GENERAL METHODS

This analysis quantifies and documents the amount of federal funding that goes toward health security. It separates

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funding for health security into categories based on the major focus of the program being included. Choices regarding how an individual program is categorized can be difficult because of the limited amount of publicly available information describing the programs or identifying program-level funding amounts.

Efforts were made to obtain funding information down to the program level in order to be as accurate as possible. However, in some cases, funding for specific programs could not be separated from larger line items, and so those line items were either included in their entirety or were included in the “multiple-hazard and preparedness” section of this analysis.

We recognize that this is not a perfect accounting of all of the federal work being done in health security. Analysis of agency budgets and programs included in previous years resulted in a number of program additions and a few changes in the categorization of programs. As a result, funding totals for different areas of health security and agencies included may be difficult to compare with previous years’ articles. Funding comparisons can be made between fiscal years in this article.

Funding was analyzed from FY2010 through proposed funding for FY2016, using information from FY2016 federal agency budget materials as well as budget documents from prior years. Sources for this analysis include federal agency “Budgets in Brief,” agency budget justifications, and personal contacts with agency representatives to obtain and track program funding. For the purpose of this analysis, programs were broken into categories based on whether they were focused on biodefense, chemical hazards, radiological/nuclear hazards, pandemic influenza and emerging infectious diseases, or multiple-hazard and general preparedness. Programs were categorized based on their major focus, as described in budget documents or on program websites. Summary tables for program funding in each category are provided in this article, while more detailed tables are available online (see supplementary material at <http://online.liebertpub.com/loi/HS>).

Programs supporting prevention, preparedness, and response, as well as related research efforts, were prioritized for inclusion in this analysis of federal health security budgets. Research programs were included if they support either medical countermeasures (MCM) research and development (R&D) or threat/risk characterization efforts. Prevention programs were included if they are explicitly intended to prevent large-scale accidents or terrorist attacks with chemical, biological, or radiological agents. Finally, federal emergency preparedness and response programs that play a role in protecting the health of US citizens in large-scale health emergencies were included.

Programs were excluded from this analysis if their focus is on routine provision of health care, on occupational health and safety, or on warfare between nation states (ie, state-level nonproliferation programs). Programs focused on protecting the warfighter, with no stated civilian applications now or in the future, were also excluded. Specific

inclusion and exclusion criteria and methods used for each category are detailed in each section.

Overall Findings

In total, the President’s proposed FY2016 budget includes \$13.7 billion for health security–related programs, an estimated increase in funding of \$1.2 billion from \$12.5 billion in FY2015. Most FY2016 health security funding would go toward programs with multiple-hazard and preparedness goals and missions (\$8.1 billion, 59%), while 19% of funding (\$2.6 billion) would be dedicated to radiological and nuclear programs, 10% (\$1.4 billion) to biodefense programs, 9% (\$1.2 billion) to pandemic influenza and emerging infectious disease programs, and 3% (\$423 million) to chemical programs (see Figure 1).

BIODEFENSE PROGRAM FUNDING

This section focuses on funding for federal programs aimed at prevention, preparedness, response, recovery, and mitigation of deliberate biological threats against the US civilian population and of accidental releases of biological threat agents from a laboratory. In total, the President’s proposed budget includes \$1.37 billion in FY2016 for programs solely devoted to civilian biodefense. The FY2016 proposed budget would represent a decrease of \$304.2 million from estimated biodefense appropriations in FY2015 (see Table 1).

Methods

Programs included in this section are solely or primarily focused on civilian biodefense as described in budget documents or on program websites. There are many programs in the federal government that address biodefense as a portion of their mission but do not focus specifically on biodefense. These programs are excluded from this section and are instead included in the analysis under the heading of “multiple-hazard and preparedness” programs.

Funding by Federal Agency

Department of Defense

The FY2016 Department of Defense (DoD) budget for biodefense programs with civilian applications totals \$841 million. This represents a reduction in funding of \$7.5 million (from \$848.5 million in FY2015). The DoD budget includes funding for civilian biodefense under the Defense Threat Reduction Agency (DTRA), the Defense Advanced Projects Agency (DARPA), the defense-wide Chemical and Biological Defense Program (CBDP), and the Defense Health Program at the Uniformed Services University of Health Sciences (USUHS).

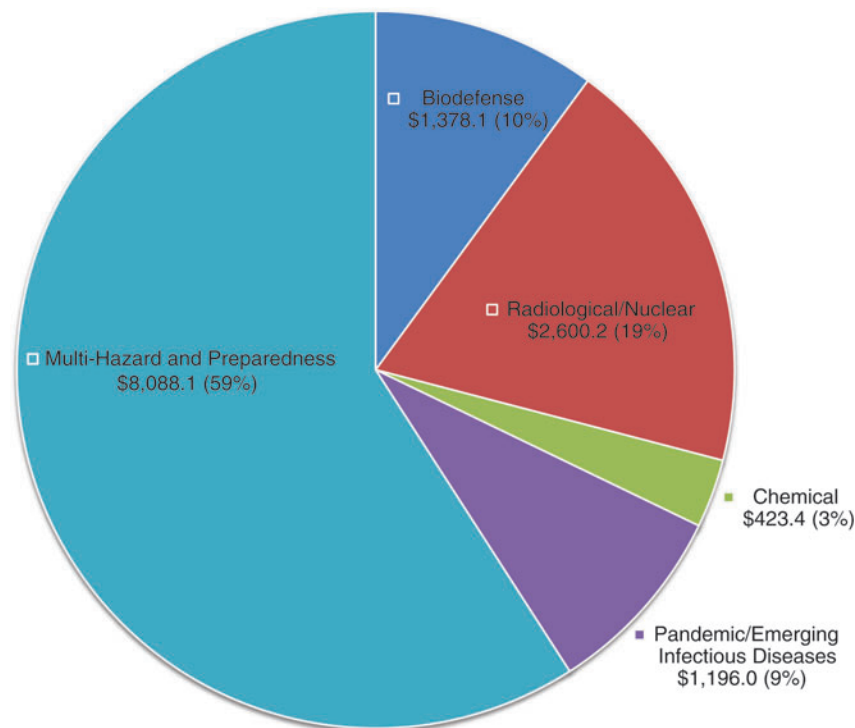


Figure 1. FY2016 Federal Health Security Funding, by Program Focus (in \$millions). Color graphics available online at www.liebertonline.com/hs

In FY2016, \$264.6 million is budgeted for DTRA’s Cooperative Biological Engagement (CBE) program, which aims to prevent proliferation of biological weapons material and expertise, improve laboratory safety, and build public health capacity internationally in order to lower the threat of a biological weapons attack in the US.¹⁵ This program is included because its threat reduction and surveillance mission reduces the potential for domestic bioterrorism.

DARPA Biodefense Research, Development, Testing, and Evaluation (RDT&E) programs with civilian applications total \$176.5 million, an increase of \$17.4 million over FY2015.¹⁶ DARPA programs focus on cutting-edge science and technology to protect the warfighter and civilians from biological threats. Only programs with stated or clear potential applications to protect and benefit civilians and homeland defense have been included in this total.

The Chemical and Biological Defense Program budget for civilian-applicable programs includes a number of research initiatives ranging from applied research to technology transition. In total, \$395.9 million in funding has been budgeted for CBDP biodefense programs with civilian applications. This represents a proposed reduction of \$33.1 million in civilian biodefense funding from FY2015 levels.¹⁷ The Biological Defense Directorate at the Naval Medical Research Center has been included under the Defense Health Program RDT&E and would receive a proposed \$4.0 million in FY2016.¹⁸

Department of Homeland Security

The FY2016 Department of Homeland Security (DHS) budget proposes \$255.4 million in civilian biodefense program funding in the Office of Health Affairs (OHA) and the Science and Technology Directorate (S&T), a decrease of more than 50% from FY2015 funding levels. This reduction in funding is largely due to the \$300 million in one-time construction funding provided for the new National Bio and Agro-Defense Facility (NBAF) in FY2015. In OHA, the BioWatch program would be funded at \$83.3 million, and the National Biosurveillance Integration Center (NBIC) would be funded at \$8.0 million in FY2016. In S&T, bioagent detection, threat assessment, and attack resiliency programs and funding for laboratory facilities, including the National Biodefense Analysis and Countermeasures Center (NBACC), NBAF, and the Plum Island Animal Disease Center (PIADC), total \$164.1 million.¹⁹⁻²¹

Department of Health and Human Services

In FY2016, the proposed HHS budget specific to civilian biodefense programs would remain flat at \$266.7 million. All biodefense programs with FY2016 funding are located in the FDA’s bioterrorism portfolio, including Food Defense (\$217.5 million), the Advancing Medical Countermeasures Initiative (MCMi) (\$24.5 million), Physical Security (\$7.0 million), and operationalizing the Life Sciences and Biodefense

Table 1. Federal Civilian Biodefense Program Funding (in \$millions)

	FY2010	FY2011	FY2012	FY2013	FY2014 (actual)	FY2015 (estimated)	FY2016 (budget)
Department of Defense (DoD)							
Defense Threat Reduction Agency (DTRA)							
Cooperative Biological Engagement	169.1	255.9	229.5	211.0	320.0	256.8	264.6
Defense Advanced Projects Agency (DARPA)							
Research, Development, Testing, and Evaluation (RDTE)							
Defense Research Sciences	—	11.1	16.5	9.9	11.0	9.6	17.8
Basic Operational Medical Science	—	—	24.5	26.3	40.5	49.8	56.5
Biomedical Technology	—	12.0	35.2	34.4	69.9	52.5	30.8
Biologically Based Materials and Devices	—	3.0	6.8	21.1	29.6	47.2	71.4
Chemical and Biological Defense Program (CBDP) (Defense-wide)							
Applied Research							
Chemical Biological Defense	—	—	—	—	7.1	2.7	3.0
Techbase Med Defense	54.9	51.3	87.9	81.9	75.5	83.8	72.1
Advanced Technology Development (ATD)							
Chemical Biological Defense	—	—	—	—	1.2	—	—
Techbase Med Defense	196.0	153.6	166.2	148.1	89.8	83.9	92.1
Advanced Component Development & Prototypes (ACD&P)							
Chemical Biological Defense	—	—	—	—	—	—	18.8
Medical Biological Defense ^a	95.5	129.7	121.2	111.4	132.7	89.1	81.9
System Development and Demonstration (SDD)							
Chemical Biological Defense	—	—	—	—	—	—	10.1
Medical Biological Defense ^a	57.6	75.7	197.9	173.5	253.7	169.5	117.9
Defense Health Program RDT&E (USUHS)							
Naval Medical Research Center: Biological Defense Research Directorate	—	—	—	3.0	4.1	3.6	4.0
Subtotal DoD Civilian Biodefense Funding	573.1	692.3	885.7	820.6	1,035.1	848.5	841.0
Department of Homeland Security (DHS)							
Office of Health Affairs (OHA)							
BioWatch	88.1	100.8	111.8	81.0	85.3	84.7	83.3
National Biosurveillance Integration Center (NBIC)	13.5	7.0	12.8	12.3	10.0	8.0	8.0
Science & Technology Directorate (S&T)							
Agriculture Thrust Area	24.2	—	—	—	—	—	—
Biological Countermeasures Thrust Area	124.9	—	—	—	—	—	—
Chemical, Biological, Explosives (CBE), Defense Thrust	—	29.9	11.4	19.8	23.5	26.4	25.0
Bioagent Detection	—	—	—	—	—	—	—
Counter Terrorist Thrust	—	22.3	12.1	20.1	24.1	21.2	23.4
Bioagent Threat Assessment	—	—	—	—	—	—	—

(continued)

TABLE 1. (CONTINUED)

	FY2010	FY2011	FY2012	FY2013	FY2014 (actual)	FY2015 (estimated)	FY2016 (budget)
Disaster Resilience Thrust							
Bioagent Attack Resiliency	—	47.9	30.4	30.6	29.0	30.3	30.8
Laboratory Facilities (NBACC, NBAF, Plum Island) ^{b,c}	150.2	96.9	127.5	112.4	97.3	381.2	84.9
Subtotal DHS Civilian Biodefense Funding	400.9	304.8	306.0	276.2	269.2	551.8	255.4
Department of Health and Human Services (HHS)							
Food and Drug Administration (FDA)							
Bioterrorism							
Food Defense	217.5	217.5	217.5	217.5	217.5	217.5	217.5
Advancing Medical Countermeasures Initiative (MCMi)	—	170.0	20.0	21.8	24.6	24.5	24.5
Physical Security	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Life Sciences Biodefense Lab (operationalizing)	—	—	—	—	17.7	17.7	17.7
Health Resources and Services Administration (HRSA)							
Countermeasure Injury Compensation Fund (smallpox)	—	3.5	—	—	—	—	—
Assistant Secretary for Preparedness and Response (ASPR)							
Medical Countermeasures Dispensing (USPS pilot program)	10.0	0	0	0	5.0	—	—
Subtotal HHS Civilian Biodefense Funding	234.5	398.0	244.5	246.3	271.8	266.7	266.7
National Science Foundation (NSF)							
Homeland Security Activities: Research to Combat Bioterrorism	15.0	15.0	15.0	15.0	16.7	15.0	15.0
Total Federal Civilian Biodefense Funding	1,223.5	1,410.1	1,451.2	1,358.1	1,592.8	1,682.0	1,378.1

^aFY2015 total does not include funding appropriated for Ebola emergency response (PL113-235, Title X).

^bTotals for Laboratory Facilities in FY2014-FY2016 were made available through personal contact with DHS officials.

^cFunding in the amount of \$404 million was appropriated for construction of NBAF in the FY2014 Appropriations Act, but these funds were never obligated.

Lab (\$17.7 million). Other programs at HHS that have bio-defense as a goal, including those at the Centers for Disease Control and Prevention (CDC), the National Institutes of Health (NIH), and the office of the Assistant Secretary for Preparedness and Response (ASPR), are included in the “multiple-hazard and general preparedness” section of this analysis, because they do not focus solely and specifically on biodefense.^{22,23}

National Science Foundation

The National Science Foundation’s (NSF) FY2016 budget request remains steady at \$15 million for its Research to Combat Bioterrorism program. Funding for this program is allocated from NSF Homeland Security Activities to Microbial Genomics, Analysis, and Modeling in the BIO Directorate.²⁴

RADIOLOGICAL/NUCLEAR PROGRAM FUNDING

This section provides funding amounts for federal programs focused on prevention, preparedness, and consequence management of terrorist and accidental radiological and nuclear incidents. In total, the proposed federal budget for radiological and nuclear programs is \$2.6 billion for FY2016. This represents a return to FY2012 funding levels after funding for radiological and nuclear-specific programs was significantly reduced from FY2013-FY2015 (see Table 2).

Methods

Programs included in this section are solely or primarily focused on radiological/nuclear hazards as described in budget documents or on program websites. Previous analyses by Sell and Franco¹¹ and Schwartz and Choubey,²⁵ as well as searches of agency budgets, were used to help identify programs for inclusion. Programs included in this analysis are focused on domestic preparedness and response, international threat reduction, non-state nonproliferation, and counterterrorism activities. Programs that are solely related to US nuclear weapons stockpile stewardship, state-level nonproliferation, and missile defense were excluded from the analysis.

Funding by Federal Agency

Department of Energy

Programs included in this analysis from the Department of Energy (DOE) are contained in the National Nuclear Security Administration (NNSA). Under the proposed FY2016 budget, counterterrorism activities, such as Nuclear Counterterrorism Incident Response and Counterterrorism and Counterproliferation programs, previously included in the Weapons Activities appropriation, would be shifted to

Defense Nuclear Nonproliferation. Activities in Defense Nuclear Nonproliferation have also been reorganized and now are represented by a total of 6 programs.²⁶

The Global Material Security program is budgeted to receive \$426.8 million in FY2016. This program works with partner countries to secure nuclear weapon stockpiles, protect nuclear and radiological materials, and improve abilities to combat trafficking of these materials. The Material Management and Minimization program has a proposed budget of \$311.6 million. The goal of this program is to minimize, eliminate, or improve management of nuclear materials. The Nonproliferation and Arms Control program, which would receive \$126.7 million in FY2016, works to strengthen nonproliferation and arms control regimes to reduce proliferation and the potential for nuclear terrorism. Nonproliferation Construction, which has a budget of \$345.0 million, was included in this analysis based on that program’s work to dispose of weapons-grade plutonium. Finally, Nuclear Counterterrorism and Incident Response, which includes activities formerly under the Counterterrorism and Counterproliferation program, provides emergency response support and rapid response teams for nuclear or radiological incidents or accidents and has an FY2016 budget of \$234.4 million.

The only program to carry over from the FY2015 budget is Defense Nuclear Nonproliferation R&D, at \$419.3 million. This program works to reduce global nuclear security threats through technology that can detect, identify, and characterize foreign nuclear weapons programs, diversion of nuclear materials, and global nuclear detonations. Total funding for these programs is \$1.86 billion, a significant increase from FY2015 funding levels. However, it should be noted that this year’s analysis includes some activities that were previously budgeted under Fissile Materials Disposition and were not included under previous fiscal years in this article.²⁶

Department of Homeland Security

Proposed funding for civilian radiological and nuclear programs under DHS totals \$400.7 million for FY2016, an increase of \$55 million over estimated FY2015 funds. The DHS Domestic Nuclear Detection Office (DNDO), which protects against radiological and nuclear attacks directed against the US or its interests, accounts for the bulk of the budget in DHS for nuclear/radiological hazards. The proposed FY2016 budget would increase funding to DNDO by \$52.9 million, for a total of \$357.3 million.

Additionally, the Federal Emergency Management Agency (FEMA) Radiological Emergency Preparedness Program (REPP), which informs and educates the public about radiological emergency preparedness, would be increased by \$1.9 million to \$39.9 million. The S&T Directorate includes an Explosive and Rad/Nuc Attack Resiliency focus area, which develops planning and funds exercises to prepare for rad/nuc attack scenarios and would be funded at \$3.5 million for FY2016.^{19,20}

Table 2. Federal Civilian Radiological/Nuclear Program Funding (in \$millions)

	FY2010	FY2011	FY2012	FY2013	FY2014 (actual)	FY2015 (estimate)	FY2016 (budget)
Department of Energy (DOE)							
Weapons Activities Appropriation ^a							
Nuclear Counterterrorism Incident Response	223.4	232.5	221.3	227.1	228.5	177.9	0
Counterterrorism & Counterproliferation Programs	—	—	—	—	—	46.1	0
NNSA Defense Nuclear Nonproliferation							
Defense Nuclear Nonproliferation R&D	311.3	355.4	347.9	0	0	393.4	419.3
Nonproliferation and International Security	1187.2	147.5	153.6	143.1	135.5	141.4	0
International Material Protection & Cooperation	572.7	578.6	575.8	527.9	415.1	270.9	0
Global Threat Reduction Initiative	333.5	444.7	503.5	462.9	444.6	325.8	0
Global Material Security	—	—	—	—	—	—	426.8
Material Management and Minimization	—	—	—	—	—	—	311.6
Nonproliferation and Arms Control	—	—	—	—	—	—	126.7
Nonproliferation Construction	—	—	—	—	—	—	345.0
Nuclear Counterterrorism and Incident Response	—	—	—	—	—	—	234.4
Subtotal DOE Civilian Rad/Nuc Funding	2,628.1	1,758.7	1,802.1	1,361.0	1,223.7	1,355.5	1,863.8
Department of Homeland Security (DHS)							
Domestic Nuclear Detection Office (DNDO)	317.0	341.7	290.0	303.0	288.1	304.4	357.3
Federal Emergency Management Agency (FEMA)							
Radiological Emergency Preparedness Program (REPP) ^b	31.5	36.6	37.1	37.4	42.3	38.0	39.9
Science & Technology Directorate (S&T)							
Explosives & Rad/Nuc Attack Resiliency	—	—	—	4.9	5.0	3.25	3.5
Subtotal DHS Civilian Rad/Nuc Funding	348.5	378.3	327.1	345.3	335.4	345.7	400.7
Department of Defense (DoD)							
Defense Threat Reduction Agency (DTRA)							
Cooperative Threat Reduction (CTR)							
Global Nuclear Security	118.6	164.5	151.1	39.3	19.4	20.7	20.6
Research, Development, Test & Evaluation (RDT&E)							
WMD Defeat Technologies (nuclear/radiological)	84.4	78.1	91.0	85.8	86.8	86.8	89.0
Counterproliferation Initiatives – Proliferation, Prevention, and Defeat	84.7	93.1	78.4	74.9	79.8	72.3	74.5
WMD Defeat Capabilities (nuclear/radiological)	9.3	7.8	5.8	5.2	12.5	6.9	7.1
Chemical and Biological Defense Program (CBDP) (Defense-wide)							
Techbase Med Defense	—	—	0.9	0.6	0	0	—
Radiation Countermeasures	9.6	6.4	2.4	0	2.7	0.0	—
Medical Radiological Defense							
Defense Health Program RDT&E (USUHS)							
Radiation Countermeasures	2.5	2.7	2.8	0.9	0.8	0.8	0.8
Army (RDT&E)							
Nuclear Arms Control Monitoring and Sensor Network	6.9	7.0	7.2	7.1	—	—	—
Subtotal DoD Civilian Rad/Nuc Funding	316.1	359.5	339.6	213.8	202.0	187.5	192.0

(continued)

TABLE 2. (CONTINUED)

	FY2010	FY2011	FY2012	FY2013	FY2014 (actual)	FY2015 (estimate)	FY2016 (budget)
Department of State							
Nonproliferation, Antiterrorism, Demining, and Related Programs							
International Atomic Energy Agency (IAEA) contribution	65.0	79.5	85.9	90.0	88.0	83.6	88.0
Environmental Protection Agency (EPA)							
Radiation Protection	16.0	15.9	13.8	13.2	13.5	12.6	13.9
Radiation Response Preparedness	7.1	7.6	6.8	6.5	7.0	6.0	7.4
Subtotal EPA Civilian Rad/Nuc Funding	23.1	23.5	20.6	19.7	20.5	18.6	21.3
Nuclear Regulatory Commission (NRC)^c							
Homeland Security (Nuclear)	27.1	22.2	26.7	24.3	19.1	18.1	18.8
Event Response	14.0	14.9	15.8	16.1	18.4	16.7	15.6
Subtotal NRC Civilian Rad/Nuc Defense Funding	41.1	37.1	42.5	40.4	37.5	34.8	34.4
Total Federal Civilian Radiological/Nuclear Funding	3,421.9	2,636.6	2,617.8	2,070.2	1,907.1	2,025.7	2,600.2

^aThe Nuclear Counterterrorism Incident Response Program and the Counterterrorism and Counterproliferation programs are proposed to be transferred from the Weapons Activities appropriation to the Defense Nuclear Nonproliferation appropriation starting in FY2016.

^bHas offsetting collection authority.

^cFY2014, FY2013, and FY2011 projection only.

Department of Defense

Total proposed funding for civilian-applicable radiological and nuclear program funding in the DoD would amount to \$192.0 million. Although many additional programs in DoD have radiological or nuclear defense in their mission, a large number were excluded from the analysis because of their primary focus on warfighters or joint CBRNE defense mission (the programs with a joint CBRNE defense mission are listed instead among the “multiple-hazard and preparedness” programs).

The Global Nuclear Security program, which works to secure nuclear weapons and materials, under the DTRA Cooperative Threat Reduction program would receive essentially flat funding at \$20.6 million.¹⁵ Also in DTRA, programs have been included from Research Development Testing and Evaluation (RDT&E), which focus on radiological/nuclear detection, forensics, effects, and survivability. These programs have been rolled up under the headings of WMD Defeat Technologies (\$89.0 million), Counterproliferation Initiatives—Proliferation, Prevention, and Defeat (\$74.5 million), and WMD Defeat Capabilities (\$7.1 million). Overall, these programs show a slight increase in funding under the proposed FY2016 budget.²⁷ Expanded spreadsheets detailing the individual programs in DTRA are available online (<http://online.liebertpub.com/loi/HS>). Finally, the Radiation Countermeasures program in the Defense Health Program is budgeted at \$0.8 million for FY2016, steady from FY2015.¹⁸

Department of State

The Department of State has a number of nuclear-related programs. However, many were excluded because of their emphasis on nonproliferation at the nation-state level. Although the mission of several other programs likely fit inclusion criteria for radiological and nuclear programs, they were difficult to separate from larger line items that focused on WMD defense. As a result, many programs in the State Department that contribute to nuclear defense are included under WMD focused line items in the “multiple-hazard and general preparedness” section of this analysis. However, contributions to the International Atomic Energy Agency (IAEA) were included in the radiological/nuclear analysis because of that agency’s work to prevent nuclear terrorism. The proposed IAEA contribution of \$88.0 million is similar to previous years’ amounts.²⁸

Environmental Protection Agency (EPA)

In the EPA, 2 programs have been selected for inclusion in this analysis, totaling \$21.3 million: Radiation Protection (\$13.9 million), which provides site characterization for areas of suspected radioactive contamination, and Radiation Response Preparedness (\$7.4 million), which generates policy guidance and procedures for EPA’s emergency response (including radiological antiterrorism activities). These programs would both see increases in funding in the proposed FY2016 budget.²⁹

Nuclear Regulatory Commission (NRC)

Homeland Security and Event Response are the 2 areas of funding from the NRC that are included in this analysis and amount to \$34.4 in proposed funding. Funding for Homeland Security would be increased by \$0.7 million to \$18.8 million in the proposed FY2016 budget. Funding for Event Response would decline by \$0.9 million, totaling \$15.6 million.³⁰

Department of Health and Human Services

Funding for programs that are solely or primarily devoted to radiological/nuclear hazards was not readily available through the HHS budget materials. Thus, specific rad/nuc program funding in HHS is not listed in this section of the analysis and is instead accounted for in the “multiple-hazards and general preparedness” section.

CHEMICAL PROGRAM FUNDING

The federal government supports a range of programs intended to prevent, prepare for, and respond to acute, potentially harmful chemical exposures. Such exposures may result from either a deliberate release of a chemical weapon or a release of a toxic industrial chemical. In FY2016, the President’s budget includes \$423.4 million for chemical defense programs (see Table 3).

Methods

Federal chemical defense programs were included in this section if they explicitly support basic research, prevention, and response capabilities for large-scale civilian exposures to either chemical weapons or toxic industrial chemicals. Research and development activities undertaken by the DoD were included because of their potential application to future civilian chemical defense capabilities. Programs were excluded if they focused primarily on environmental health or did not focus on preventing or responding to large-scale chemical releases.

Funding by Federal Agency**Department of Defense**

The DoD has the highest proposed chemical defense budget in FY2016 at \$161.1 million. This would represent a 12% decrease from the FY2015 estimate of \$183.3 million. The agencies primarily responsible for executing the chemical defense mission in the DoD are DTRA for chemical weapons destruction (\$900,000);³¹ CBDP for RDT&E of diagnostics, detection, therapeutics, and pretreatments (\$109.5 million);¹⁷ and the Department of the Army for the Chemical Stockpile Emergency Preparedness Project (\$50.7 million).³² Overall, the DoD chemical defense budget is largely dedicated to the research, development, and acquisition of antichemical medical countermeasures and personal protective equipment.

Environmental Protection Agency

The EPA’s budget for chemical defense programs in FY2016 is \$123.4 million, which is an 8% increase over the FY2015 estimate of \$113.2 million. EPA’s chemical defense portfolio includes the chemical risk review and reduction program (\$56.3 million), which assesses and manages the potential risks from toxic industrial chemicals. The Human Health Risk Assessment (\$39.3 million) conducts research on the potential health risks of chemical exposures. Finally, the EPA’s State and Local Prevention and Preparedness program (\$27.8 million) is responsible for implementation of the Improving Chemical Facility Safety and Security Executive Order.³³

Department of Homeland Security

In DHS, OHA, S&T, and the National Protection and Programs Directorate (NPPD) have responsibility for their chemical defense portfolio. In total, \$107 million has been proposed for various DHS chemical defense programs, the vast majority of which (\$94.9 million) is being requested for the implementation of the Chemical Facility Anti-Terrorism Standards (CFATS) program, which is intended to improve security at industrial facilities.^{19,20}

Department of State

The President’s FY2016 budget would provide the State Department with \$20.1 million in support of the Organization for the Prohibition of Chemical Weapons (OPCW). The OPCW is the international organization responsible for implementing the Chemical Weapons Convention (CWC).²⁸

Department of Health and Human Services

In FY2016, the CDC’s chemical laboratories program will provide \$11.8 million to enhance laboratory preparedness for chemical threats, in line with recent years.³⁴ The NIH’s CounterACT program supports basic research into the pathology and treatment of toxic chemical exposures. Because the NIH combines the research funding for radiological, nuclear, and chemical countermeasures (see the “multiple-hazard and preparedness” section),³⁵ it is not possible to accurately estimate the total budget for CounterACT. However, a newly available budget portal allows an accounting of the extramural funding provided to CounterACT researchers. If funding trends continue, in FY2016, NIH will provide roughly \$35 million to CounterACT Centers of Excellence and individual investigators.³⁶

PANDEMIC INFLUENZA AND EMERGING INFECTIOUS DISEASE PROGRAM FUNDING

This section focuses on funding for federal programs aimed at prevention, preparedness, response, recovery, and mitigation

Table 3. Federal Civilian Chemical Program Funding (in \$millions)

	FY2010	FY2011	FY2012	FY2013	FY2014 (actual)	FY2015 (estimate)	FY2016 (budget)
Department of Defense (DoD)							
Army							
Chemical Agents and Munitions Destruction, Defense Operations & Maintenance (O&M)							
Chemical Stockpile Emergency Preparedness Project (CSEPP)	87.0	111.2	75.3	53.9	51.2	52.1	50.7
Defense Threat Reduction Agency (DTRA)							
Chemical Weapons Destruction	8.0	12.0	9.8	69.0	63.0	15.7	0.9
Chemical and Biological Defense Program (CBDP) (Defense-wide)							
Applied Research							
Techbase Nontraditional Agents Defense (chemical)	—	—	—	15.2	23.7	32.2	29.3
Techbase Med Defense (chemical)	32.4	32.0	36.8	19.2	10.3	15.3	16.8
Advanced Technology Development (ATD)							
Techbase Nontraditional Agents Defense (chemical)	—	—	7.3	23.4	18.1	17.5	18.9
Techbase Med Defense (chemical)	28.0	25.5	21.2	12.1	4.2	2.0	1.6
Advanced Component Development & Prototypes (ACD&P)							
Chemical Biological Defense							
Medical Chemical Defense	20.5	4.1	7.7	—	2.0	—	—
System Development and Demonstration (SDD)							
Chemical Biological Defense							
Medical Chemical Defense	4.1	3.8	2.3	17.4	41.0	48.5	42.9
Subtotal DoD Civilian Chemical Funding	180.0	188.6	160.4	210.2	213.5	183.3	161.1
Environmental Protection Agency (EPA)							
Toxic Substances							
Chemical Risk Review and Reduction	54.9	59.8	56.5	54.7	56.1	58.1	56.3
Chemical Risk Management ^a	6.0	6.9	6.0	4.9	0	0	—
Research: Chemical Safety and Sustainability							
Human Health Risk Assessment	42.9	46.1	39.3	36.7	37.8	39.4	39.3
State and Local Prevention and Preparedness							
Environmental Program & Management (RMP chemical risk)	13.4	13.1	13.3	12.6	13.8	15.7	27.8
Subtotal EPA Civilian Chemical Funding	117.2	125.9	115.1	108.9	107.7	113.2	123.4
Department of Homeland Security (DHS)							
Office of Health Affairs (OHA)							
Chemical Defense Program	3.9	0	5.4	1.9	0.8	0.8	0.8
Science & Technology Directorate (S&T)							
Chemical Detection	—	—	—	—	—	3.0	3.0
Chemical Threat Assessment (CTRA and CSAC)	4.8	4.6	4.0	5.3	7.0	7.0	6.3
Chemical Attack Resiliency (Chemical Forensics)	4.8	4.7	2.6	3.5	3.5	2.0	2.0

(continued)

TABLE 3. (CONTINUED)

	FY2010	FY2011	FY2012	FY2013	FY2014 (actual)	FY2015 (estimate)	FY2016 (budget)
National Protection & Programs Directorate (NPPD)							
Infrastructure Security Compliance	103.4	95.9	93.3	71.7	81.0	87.0	94.9
Subtotal DHS Civilian Chemical Funding	116.9	105.2	105.3	82.4	92.3	99.8	107.0
Department of State							
Organization for the Prohibition of Chemical Weapons (OPCW)	24.0	25.5	19.6	20.1	20.1	19.4	20.1
Department of Health and Human Services (HHS)							
Centers for Disease Control and Prevention (CDC)	—	—	—	10.3	10.3	11.8	11.8
Chemical Laboratories (LRN-C) ^b	—	—	—	—	—	—	—
National Institutes of Health (NIH)	50.0	49.5	—	—	—	—	—
CounterACT	50.0	49.5	0.0	10.3	10.3	11.8	11.8
Subtotal HHS Civilian Chemical Funding	488.1	494.7	400.4	431.9	443.9	427.5	423.4
Total Federal Civilian Chemical Funding							

^aThis program was combined with Chemical Risk Review and Reduction as of FY2015.

^bFunding for this program was subtracted from the CDC State and Local Preparedness and Response Capability in the Multi-Hazard and Preparedness Section.

of pandemic influenza and emerging infectious diseases with destabilizing potential. In total, the pandemic and emerging infectious diseases funding budget for FY2016 is \$1.2 billion, an increase of almost \$200 million from FY2015. The increase in funding would result primarily from funding boosts to programs in HHS (see Table 4).

Methods

The scope of the analysis was limited to pandemic influenza preparedness and response programs, programs focused on newly emerging infectious diseases with potentially destabilizing effects (such as dengue fever), and antimicrobial resistance. This analysis used the NIH definition of emerging disease: “Emerging diseases include outbreaks of previously unknown diseases or known diseases whose incidence in humans has significantly increased in the past two decades.”³⁷

This analysis did not include programs focused on established diseases such as HIV, tuberculosis, and malaria (which have their own dedicated funding streams) or chronic diseases. Yearly funding for emerging infectious diseases, including Ebola research, is captured in this section of the analysis. However, special one-time funding for Ebola response has been separated into its own analysis.

Funding by Federal Agency

Department of Health and Human Services

HHS funds the majority of programs dedicated to pandemic influenza and emerging infectious diseases. In FY2016, proposed HHS funding totals \$1.14 billion, a significant increase from estimated FY2015 funding of \$959.7 million.

At CDC, the Core Infectious Disease program in the National Center for Emerging and Zoonotic Infectious Diseases is budgeted at \$275.6 million for FY2016, an increase in funding of \$25.9 million from FY2015. This program includes efforts to protect against antimicrobial resistance, high-consequence pathogens, vector-borne diseases, and other threats. The CDC Global Public Health Protection program, which includes the Global Disease Detection and Emergency Response program and the Global Health Security Agenda, would also see an increase in funding of \$21.6 million to \$76.7 million. Most other programs in CDC, such as Influenza Planning and Response (\$187.6 million), Advanced Molecular Detection and Response to Infectious Disease Outbreaks (\$30 million), and Quarantine (\$31.6 million), would remain at steady funding under the President’s proposed FY2016 budget.

Notably this year, the NIH has a new website that provides detailed information on estimates of funding for various Research Condition and Disease Categories (RCDC), which breaks down funding categorically, including for biodefense and influenza. Because of this high level of transparency by NIH, this year’s article now includes

Table 4. Federal Civilian Pandemic Influenza and Emerging Infectious Diseases Program Funding (in \$millions)

	FY2010	FY2011	FY2012	FY2013	FY2014 (actual)	FY2015 (estimated)	FY2016 (budget)
Department of Health and Human Services (HHS)							
Centers for Disease Control and Prevention (CDC)							
Immunization and Respiratory Diseases	159.7	159.7	172.6	166.1	172.6	187.6	187.6
Influenza Planning and Response							
Emerging and Zoonotic Infectious Diseases							
Core Infectious Disease program	213.7	186.2	225.7	217.0	218.6	249.7	275.6
Advanced Molecular Detection and Response to Infectious Disease Outbreaks	—	—	—	—	29.9	30.0	30.0
Quarantine	26.5	26.0	33.0	31.3	31.6	31.6	31.6
Global Health							
Global Disease Detection and Emergency Response (Global Health Security Initiative) ^a	44.2	41.9	45.4	44.8	—	—	—
Global Public Health Protection	—	—	—	—	62.6	55.1	76.7
National Institutes of Health (NIH)							
Influenza Research (excluding ARRA funding)	308.0	272.0	251.0	304.0	262.0	263.0	284.0
Food and Drug Administration (FDA)							
Pandemic Influenza	46.7	43.6	30.0	32.1	38.3	38.3	40.0
Antimicrobial Resistance	30.2	27.7	44.1	25.9	26.8	32.5	47.3
Office of the Secretary (OS)							
Pandemic Influenza Preparedness Activities	276.0	65.0	0	0	—	—	—
Assistant Secretary for Preparedness and Response (ASPR)							
Pandemic Influenza	—	—	—	—	110.6	67.9	166.0
Office of Global Affairs (OGA)							
International Pandemic Influenza Activities	—	—	—	—	4.0	4.0	4.0
Subtotal HHS Civilian Pandemic Flu and EID Funding	1,105.0	822.1	801.8	821.3	957.0	959.7	1,142.8
US Agency for International Development (USAID)							
Global Health Security (formerly Pandemic Influenza and Other Emerging Threats [PIOET])	156.0	47.9	58.0	54.9	72.1	50.0	50.0
Department of Defense (DoD)							
Defense Health Program (RDT&E)							
Applied Biomedical Technology	—	—	—	—	—	—	3.2
Combating Antibiotic Resistant Bacteria (GHSA)	—	—	—	—	—	—	—
Total Federal Civilian Pandemic Influenza and Emerging Infectious Diseases Funding	1,261.0	870.0	859.8	876.2	1,029.1	1,009.7	1,196.0

^aStarting in FY2014, the Global Disease Detection and Emergency Response program and the GHSI are now located under the Global Public Health Protection program.

funding for influenza research (\$284.0 million), which would be an increase of \$21 million above FY2015 levels.³⁸

The FY2016 FDA budget includes \$40 million in funding for pandemic influenza (an increase of \$1.7 million) and \$47.3 million for antimicrobial resistance (an increase of \$14.8 million).²³

The FY2016 proposed budget for Pandemic Influenza funding in ASPR would be \$166.0 million, an increase of nearly \$100 million over FY2015 estimated funding.³⁴ The ASPR FY2016 budget for pandemic influenza includes both “no year” and “annual” program funding. Annual pandemic programs at ASPR are: Diagnostics Advanced Development (\$10 million), Fill-Finish Manufacturing Network (\$13 million), and Office of Policy and Planning International Pandemic Influenza Activities (\$3 million). “No year” ASPR pandemic programs are: Vaccine Stockpiling by BARDA (\$20 million), Universal Influenza Vaccine Candidates (\$75 million), and Advanced Development of Influenza Immunotherapeutics (eg, monoclonal antibodies) (\$45 million).³⁹

Finally, starting in FY2014, HHS added a program on International Pandemic Influenza Activities in the Office of Global Affairs, which is budgeted at \$4.0 million for FY2016. This program supports “global health diplomacy in international pandemic preparedness and response.”³⁹

US Agency for International Development

The proposed FY2016 US Agency for International Development (USAID) budget includes the Pandemic Influenza and Other Emerging Threats (PIOET) program, which emphasizes early identification of and response to dangerous infectious disease outbreaks in animals before they can become significant threats to human health. Funding for this program would remain steady in the FY2016 budget at \$50.0 million.²⁸

Department of Defense

The only DoD program included in the pandemic influenza and emerging infectious disease section is Combating Antibiotic Resistant Bacteria in the Defense Health Program. This program would be funded at \$3.2 million in the President’s proposed FY2016 budget.¹⁸

MULTIPLE-HAZARD AND PREPAREDNESS PROGRAM FUNDING

This section is focused on federal programs aimed at prevention, preparedness, response, recovery, and mitigation of multiple hazards and programs that aim to build preparedness and response systems for large-scale health events. Total proposed funding for multiple-hazard and preparedness programs would amount to \$8.1 billion in FY2016. Compared with estimated funding for FY2015, proposed funding for multiple-hazard and preparedness programs would be increased by \$750 million. This in-

crease is largely because of proposed funding increases in HHS. Other agencies would see slight increases or remain relatively flat (see Table 5).

Methods

Programs included in this section have a multiple-hazard focus, have general preparedness and response goals, and/or are targeted at building infrastructure and capacity to respond to large-scale domestic health threats of many types and causes. These programs protect against one or more hazards beyond biological, radiological/nuclear, chemical, or pandemic and emerging infectious disease hazards alone. Examples of programs that are included in this section are programs aimed at a combination of CBRN threats or WMD preparedness and response; programs aimed at building public health, medical, or emergency management capacity to respond to large-scale health emergencies; and basic infectious disease research programs, the results of which may have implications for a multitude of emerging infectious diseases.

Funding by Federal Agency

Department of Health and Human Services

Total HHS funding budgeted for multiple-hazard and preparedness programs in FY2016 is \$ 4.96 billion. The largest portion of multiple-hazard and preparedness funding in HHS is provided for Biodefense and Emerging Infectious Disease Research (\$1.85 billion) in the NIH.³⁵ This program was included in the multiple-hazard section because of its dual focus on biodefense and emerging infections. In this year’s analysis, NIH funding information was available for both intramural and extramural funding for this program. In past years, only extramural funding totals have been available. This year’s analysis provides a more accurate picture of the funding totals for this program (\$1.46 billion for extramural research, and \$492 million for intramural research and other costs for the program).³⁸

CDC programs also represent a large proportion of HHS funding in this section. Programs include State and Local Preparedness and Response Capability (\$643.6 million), which includes the Public Health Emergency Preparedness (PHEP) grants; the CDC Preparedness and Response Capability (\$167.2 million); and the Strategic National Stockpile (\$571.0 million).³⁵ After remaining at \$661.0 million for FY2014 and FY2015, the State and Local Preparedness and Response Capability would be reduced by \$17.4 million in FY2016. From the program’s peak funding level in FY2002 to the estimated level for FY2015, this program has seen nearly a 30% reduction in funding, a trend that would continue into FY2016.^{7,34} The CDC Preparedness and Response Capability, which includes the BioSense program, would receive an increase of \$10 million, and the SNS program, which stockpiles MCMs

Table 5. Federal Civilian Multiple-Hazard and Preparedness Program Funding (in \$millions)

	FY2010	FY2011	FY2012	FY2013	FY2014 (actual)	FY2015 (estimated)	FY2016 (budget)
Department of Health and Human Services (HHS)							
Centers for Disease Control and Prevention (CDC)							
State and Local Preparedness and Response Capability (including PHEP and CRI) ^a	761.0	664.0	657.4	619.9	661.0	661.0	643.6
CDC Preparedness and Response Capability (including BioSense)	1660	1600	138.3	155.5	157.2	157.2	167.2
Strategic National Stockpile (SNS)	596.0	591.0	533.8	493.2	549.3	534.3	571.0
National Institutes of Health (NIH)							
Biodefense and Emerging Infectious Diseases Research (NIAID) (extramural)	1,316.2	1,305.5	1,307.8	1,233.3	1,268.5	1,261.3	1,355.8
Biodefense and Emerging Infectious Diseases Research (NIAID) (intramural and other costs) ^b	—	497.5	483.2	458.7	477.5	483.7	492.2
Nuclear/Radiologic/Chemical Countermeasures Research	96.7	95.3	95.3	90.9	92.1	92.1	93.4
Office of the Secretary (OS)							
Commissioned Corps Readiness and Response	14.8	14.8	—	—	—	—	—
Assistant Secretary for Preparedness and Response (ASPR)							
Medical Reserve Corps	13.0	12.0	11.2	11.0	9.0	9.0	6.0
Operations	37.0	44.0	33.0	31.0	31.3	31.3	30.9
Biomedical Advanced Research and Development Authority (BARDA) ^c	320.0	378.0	415.0	415.0	413.5	415.0	521.7
Project Bioshield	—	—	—	—	254.1	255.0	626.4
Preparedness and Emergency Operations	30.0	30.0	30.0	28.0	28.0	24.8	24.7
National Disaster Medical System (NDMS)	52.0	52.0	53.0	50.0	50.1	50.1	49.9
Hospital Preparedness (HPP) Grants (including ESAR-VHP)	417.0	375.0	375.0	358.0	255.1	254.6	254.6
Policy and Planning	19.0	19.0	16.0	15.0	14.9	14.9	14.9
Other Public Health and Social Services Emergency Fund (PHSSEF)							
Public Health Emergency Response Initiative ^d	—	—	—	—	—	—	110.0
Subtotal HHS Civilian Multiple-Hazard/Preparedness Funding	3,838.7	4,238.1	4,149.0	3,959.4	4,261.6	4,244.3	4,962.3
Department of Homeland Security (DHS)							
Office of Health Affairs (OHA)							
Planning and Coordination	3.7	2.3	5.9	5.1	5.0	5.0	5.0
Medical Countermeasures	—	—	0	0.8	1.0	0.5	—
Federal Emergency Management Agency (FEMA)							
Preparedness and Protection	—	—	166.0	171.1	169.8	185.0	190.9
Response	—	—	191.8	171.5	178.1	167.4	168.5
Recovery	—	—	55.3	52.8	57.0	56.0	51.5
Mitigation	—	—	30.7	28.5	27.8	25.8	25.8
State and Local Programs	2,114.9	1,691.6	1,602.9	1,731.7	1,500.0	1,205.5	1,211.4
Science & Technology Directorate (S&T)							
Counterterrorist Thrust	—	—	—	—	—	—	—
Integrated Terrorism Risk Assessment	3.0	3.0	2.5	2.5	3.8	3.8	2.0
Integrated Consortium of Laboratory Networks	4.8	4.7	2.6	3.5	—	—	—
Standards Thrust (including chemical and biological systems standards)	—	—	15.9	8.2	8.2	8.2	7.4
Customs and Border Protection (CBP)							
International Cargo Screening	145.5	103.9	74.6	70.4	67.9	69.2	69.9
Subtotal DHS Civilian Multiple-Hazard/Preparedness Funding	2,271.9	1,805.5	2,148.2	2,246.1	2,018.6	1,726.4	1,732.4

(continued)

TABLE 5. (CONTINUED)

	FY2010	FY2011	FY2012	FY2013	FY2014 (actual)	FY2015 (estimated)	FY2016 (budget)
Department of Defense (DoD)							
US Army National Guard							
CBRNE Enterprise							
WMD Civil Support Teams	32.9	34.8	16.5	11.5	12.6	17.1	17.3
Other CBRNE Capabilities	—	11.6	21.6	110.1	137.7	152.3	150.4
US Navy							
WMD Detection (fissile materials and weapons)	9.6	24.4	8.5	3.7	2.0	—	—
Stoppage of large surface vessels at sea (suspected of carrying WMD)	6.3	14.3	4.8	0	0	—	—
Defense Threat Reduction Agency (DTRA)							
Cooperative Threat Reduction Program (WMD components)							
Former Soviet Union Threat Reduction	423.6	—	—	—	—	—	—
Proliferation Prevention	29.1	36.9	63.1	87.3	152.4	40.7	38.9
Threat Reduction Engagement	5.0	5.0	2.5	2.8	0.5	2.4	2.8
Operations and Maintenance							
Nonproliferation Activities	62.8	58.8	58.8	57.4	53.0	58.8	66.7
US Strategic Command Center for Combating WMD	28.0	33.5	12.0	11.0	9.1	11.3	11.2
Research, Development, Testing, and Evaluation (RDTE)							
Fundamental Research for Combating WMD	40.0	46.1	47.7	40.8	44.8	37.8	38.4
WMD Defeat Technologies	65.9	58.4	58.9	35.3	33.4	39.9	41.1
Counterproliferation Initiatives—Proliferation, Prevention, and Defeat	41.5	41.6	49.6	29.9	47.7	53.9	68.3
Defense Advanced Research Projects Agency (DARPA)							
Research, Development, Testing, and Evaluation (RDTE)	41.3	35.3	30.8	15.1	25.6	43.8	29.3
Biological Warfare Defense Program (CBR focus)							
Chemical and Biological Defense Program (CBDP) (Defense-wide)							
Basic Research (life and physical sciences chem/bio research)							
Applied Research	63.8	48.7	46.6	45.6	50.7	48.3	46.3
Chemical Biological Defense	110.9	85.8	97.5	29.2	27.1	43.5	43.0
Techbase Nontraditional Agent Defense	—	—	0	24.2	23.6	25.0	25.1
Advanced Technology Development (ATD)							
Chemical Biological Defense	18.5	8.4	11.7	14.7	15.5	15.0	14.7
Techbase Nontraditional Agent Defense	—	—	—	0.7	1.3	1.8	3.1
Advanced Component Development & Prototypes (ACD&P)							
Chemical Biological Defense	5.7	10.5	16.2	7.4	1.2	—	—
System Development and Demonstration (SDD)							
Chemical Biological Defense	2.9	0	9.0	5.2	14.3	16.5	17.1
Operational Systems Development (OP SYS DEV)							
Chemical Biological Defense	—	—	—	—	1.8	2.0	1.9
Subtotal DoD Civilian Multiple-Hazard/Preparedness Funding	987.8	554.1	555.8	531.9	654.3	610.1	615.6
Department of State							
Arms Control, Verification, and Compliance	4.0	2.3	2.1	2.0	2.3	2.2	2.2
Office of Chemical and Biological Weapons Affairs							

(continued)

TABLE 5. (CONTINUED)

	FY2010	FY2011	FY2012	FY2013	FY2014 (actual)	FY2015 (estimated)	FY2016 (budget)
International Security and Nonproliferation	49.3	46.5	47.7	45.9	44.6	42.5	45.2
Nonproliferation, Antiterrorism, Demining, and Related Programs							
Export Control and Related Border Security Assistance	54.0	60.0	61.8	55.6	64.0	57.0	58.7
Global Threat Reduction (GTR)	70.0	70.0	69.0	64.5	77.4	65.1	64.3
Weapons of Mass Destruction Terrorism	2.0	2.0	6.0	5.5	5.0	4.8	6.2
Subtotal Department of State Civilian Multiple-Hazard/Preparedness Funding	254.3	234.1	216.6	200.5	223.3	196.6	201.6
Environmental Protection Agency (EPA)							
Homeland Security							
Grants to States (formerly Water Safety Grants)	2.9	0	—	—	—	—	—
Communication and Information	6.9	4.2	3.4	4.1	4.1	3.8	4.1
Critical Infrastructure Protection	31.6	20.9	12.6	11.3	10.9	11.3	12.9
Preparedness, Response, and Recovery	98.7	87.1	67.9	67.4	63.4	61.5	58.3
Protection of EPA Personnel and Infrastructure	16.2	16.0	12.3	14.4	10.6	13.8	14.7
Superfund							
Emergency Response and Removal	202.3	242.4	189.6	183.3	190.3	181.3	190.7
Emergency Preparedness	9.6	10.5	9.2	8.8	7.7	7.6	7.8
Subtotal EPA Civilian Multiple-Hazard/Preparedness Funding	368.2	381.2	295.0	289.3	287.0	279.3	288.5
Department of Justice (DoJ)	88.0	88.0	87.0	84.0	92.0	93.0	96.6
National Security Division							
National Science Foundation (NSF)							
Homeland Security Activities							
Protecting Critical Infrastructure and Key Assets							
Counterterrorism							
Emergency Planning and Response	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Subtotal NSF Civilian Multiple-Hazard/Preparedness Funding	56.6	50.9	51.8	51.3	51.3	50.3	50.3
Department of Commerce (DoC)	83.6	77.9	78.8	78.3	78.3	77.3	77.3
Bureau of Industry and Security—Export Administration							
US Department of Agriculture (USDA)	58.1	66.0	56.6	52.3	55.6	56.2	58.8
Animal and Plant Health Inspection Service (APHIS)							
Emergency Management	22.0	22.0	18.0	17.0	17.0	17.0	17.0
Food Safety and Inspection Service (FSIS)							
Public Health Data Communication Infrastructure System	28.0	26.0	35.0	35.0	35.0	35.0	35.0
Office of Homeland Security and Emergency Coordination	2.0	1.0	1.0	1.0	2.0	2.0	2.0
Subtotal USDA Civilian Multiple-Hazard/Preparedness Funding	52.0	49.0	54.0	53.0	54.0	54.0	54.0
Department of Veterans Affairs (VA)							
Emerging Pathogens/Bioterrorism	1.0	1.3	0.7	0.5	1.0	1.0	1.0
Total Federal Civilian Multiple-Hazard and General Preparedness Funding	8,003.5	7,495.2	7,641.7	7,495.4	7,725.7	7,338.2	8,088.1

^a\$10.3 million has been subtracted from this total for LRN-C for FY2013-FY2015.

^bData for this line are obtained from the NIH Research Condition and Disease Categories (RCDC). To calculate intramural and other costs, extramural totals have been subtracted. Data are unavailable for FY2010.

^cFor BARDA in FY2015, \$58 million has been subtracted and included instead in the Ebola emergency funding account in Table 6.

^dThis proposed fund is intended for rapid response to public health emergencies. It would be used at the discretion of the secretary and would be available until expended.

against CBRN threats, would increase by \$36.7 million in FY2016.

Multiple-hazard and preparedness funding in ASPR would see a significant increase under the proposed FY2016 budget. This is primarily because of an increase of \$371.4 million in funds provided for Project Bioshield, for a total of \$626.4 million. Although Project Bioshield largely supports the procurement of MCMs against biological threats, it has been included here because of its stated mission to support the procurement of MCMs against CBRN threats. ASPR's BARDA, which would also receive a sizable increase in funding to \$521.7 million from \$415 million in FY2015, is also included in the multiple-hazard analysis because its mission includes support for development of MCMs to protect the nation from a broad range of threats. The Hospital Preparedness Program (HPP) is another notable program contained in ASPR, and it would be funded at \$254.6 million, the same level as in FY2015. Similar to State and Local Preparedness and Response Capability at CDC, the HPP has seen significant cuts in the past decade and been reduced by 50% since FY2004.³⁹

Department of Homeland Security

The DHS budget for FY2016 would dedicate \$1.73 billion in funding for programs focused on multiple hazards and preparedness. In DHS, the largest proportion of funding would be allocated to State and Local Programs (\$1.2 billion) in FEMA. Other FEMA programs focused on Preparedness and Protection (\$190.9), Response (\$168.5 million), Recovery (\$51.5 million), and Mitigation (\$25.8 million) would bring total FEMA funding in this section to \$1.65 billion in the proposed FY2016 budget. Other multiple-hazard and preparedness programs include the Integrated Terrorism Risk Assessment (ITRA) program (\$2.0 million) and the Standards Thrust (\$7.4 million) in DHS S&T. The Standards Thrust contributes to setting standards for biological, chemical, and other detection and diagnostic technologies. Planning and Coordination in the Office of Health Affairs would receive \$5 million, and International Cargo Screening for WMD materials in Customs and Border Protection would receive \$69.9 million.^{19,20}

Department of Defense

Multiple-hazard and preparedness programs in the DoD include those that support WMD, CBRNE, and emerging infectious diseases prevention, preparedness, and response. The Army National Guard CBRNE Enterprise, which includes WMD civil support teams that support first responders with identification, assessment, and advice in the event of a domestic CBRNE incident, and CBRNE capabilities to support the teams, would receive \$167.7 million under the proposed FY2016 budget.⁴⁰

DTRA's multiple-hazard and preparedness programs include the Cooperative Threat Reduction (CTR) program, which works to reduce WMD proliferation from the

former Soviet Union and other regions;¹⁵ International Counterproliferation programs; and WMD-focused research.²⁸ In total, these programs would receive \$267.4 million under proposed FY2016 funding. This would represent an increase of \$22.4 million over estimated FY2015 funding levels. DARPA's Biological Warfare Defense Program, which focuses on a range of threats including CBRN, would receive \$29.3 million, a decrease in funding of \$14.5 million.¹⁶ Multiple-hazard research in CBDP (\$151.2 million) would retain essentially flat funding in the proposed FY2016 budget.¹⁷

Department of State

Proposed funding for multiple-hazard and preparedness programs in the Department of State would remain relatively flat in FY2016. The Office of Chemical and Biological Weapons Affairs in Arms Control, Verification, and Compliance would receive a steady \$2.2 million in proposed funding. Additionally, the International Security and Nonproliferation office (ISN) was included as a whole because of difficulty separating funding streams for specific missions and programs. However, increased granularity in the State Department budget allowed for the analysis of individual programs in the offices of Nonproliferation, Anti-Terrorism, Demining, and Related Programs (NADRP), which was not possible previously. Programs in NADRAP include the Nonproliferation and Disarmament Fund (\$25.0 million), Export Control and Related Border Security Assistance (\$58.7 million), Global Threat Reduction (\$64.3 million), and Weapons of Mass Destruction Terrorism (\$6.2 million).^{28,41}

Environmental Protection Agency

Proposed funding in the EPA for multiple-hazard and preparedness programs would be slightly increased from FY2015 for a total of \$288.5 million. Programs are included under Homeland Security and Superfund programs. EPA's Homeland Security focus includes Communication and Information (\$4.1 million), Critical Infrastructure Protection (\$12.9 million); Preparedness, Response, and Recovery (\$58.3 million); and Protection of EPA Personnel and Infrastructure (\$14.7 million) programs. In the EPA Superfund, \$7.8 million has been proposed for Emergency Preparedness, and \$190.7 million has been proposed for Emergency Response and Removal programs. These programs play a role in EPA's CBR preparedness and response to environmental contamination emergencies with impacts on human health.³³

Department of Justice

This multiple-hazard and preparedness analysis includes the National Security Division of the Department of Justice (DoJ). Under the proposed FY2016 budget, funding for this program would remain relatively steady at \$96.6 million.⁴²

Table 6. Ebola Emergency Appropriations (in \$millions)

	<i>FY2015 (estimated)</i>
PL 113-164 Continuing Appropriations Resolution, 2015 (September 19, 2014)	
Department of Health and Human Services (HHS)	
Assistant Secretary for Preparedness and Response (ASPR)	
Biomedical Advanced Research and Development Agency (BARDA)	
Ebola Emergency Funding	58.0
Centers for Disease Control and Prevention (CDC)	
Global Health Ebola Funding	30.0
Subtotal PL 113-164 Ebola Emergency Funding	88.0
Public Law 113-235: Consolidated and Further Continuing Appropriations Act, 2015	
Department of Defense (DoD)	
Defense Threat Reduction Agency (DTRA)	
CBDP	
Viral Therapeutics – Ebola	22.7
Medical Biological Defense (HFV clinical trials)	27.3
DARPA	
Ebola Response and Preparedness Congressional Add	45.0
Defense-wide Procurement	
Procurement of Necessary Equipment	17.0
Subtotal PL 113-235 DoD Ebola Emergency Funding	112.0
Department of Health and Human Services (HHS)	
Office of the Secretary/PHSSEF	
Assistant Secretary for Preparedness and Response (ASPR)	
Biomedical Advanced Research and Development Agency (BARDA)	157.0
To be allocated by the Secretary	576.0
Centers for Disease Control and Prevention (CDC)	
Domestic Preparedness and Response	416.0
Public Health Emergency Preparedness program (PHEP)	155.0
International Ebola Response	603.0
National Public Health Institutes and Global Health Security	597.0
National Institutes of Health (NIH)	
National Institute of Allergy and Infectious Diseases	238.0
Food and Drug Administration (FDA)	
Ebola Emergency Funding	
Center for Biologics Evaluation and Research	4.8
Center for Devices and Radiological Health	2.4
Office of the Commissioner	0.4
Center for Drug Evaluation and Research	1.9
Office of Regulatory Affairs	0.5
Medical Countermeasures Initiative (MCFI)	15.0
Subtotal PL 113-235 HHS Ebola Emergency Funding	2,767.0
Department of State	
Diplomatic and Consular Programs	36.4
Nonproliferation, Antiterrorism, Demining, and Related Programs	5.3
Bilateral Economic Assistance	
Global Health Programs	312.0
International Disaster Assistance	1,436.3
Economic Support Fund	711.7
USAID	
Operating Expenses	19.0
Office of Inspector General	5.6
Subtotal PL 113-235 State and USAID Ebola Emergency Funding	2,526.3
Subtotal PL 113-235 Ebola Emergency Funding	5,405.3
Total Emergency Ebola Funding for FY2015 (PL 113-164 + PL 113-235)	5,493.3

*Ebola emergency funds appropriated through PL 113-164 and PL 113-235 are not counted as part of the FY2015 funding totals elsewhere in this article.

National Science Foundation

Two programs in NSF Homeland Security activities have been included in this section of the analysis. These programs are Counterterrorism (\$27 million) and Emergency Planning and Response (\$50.3 million). Both of these programs would maintain steady funding from FY2015.²⁴

Department of Commerce

Multiple-hazard and preparedness programs in the Department of Commerce are located in the Bureau of Industry and Security (BIS) Export Administration. Proposed funding for these programs in FY2016 would total \$58.8 million.⁴³

US Department of Agriculture

Funding for US Department of Agriculture (USDA) programs related to multiple hazards and preparedness would remain flat under the proposed FY2016 budget at \$54 million. Programs include the Food Safety and Inspection Service's (FSIS) Public Health Data Communication Infrastructure System (\$35 million), the Animal and Plant Health Inspection Service (APHIS) program for Emergency Management (\$17 million), and the Office of Homeland Security and Emergency Coordination (\$2 million).⁴⁴

Department of Veterans Affairs

The Emerging Pathogens/Bioterrorism program in the Department of Veterans Affairs (VA) would receive \$1 million in the proposed FY2016 budget, representing flat funding from FY2014 and FY2015.⁴⁵

EBOLA EMERGENCY APPROPRIATIONS IN FY2015

The Ebola outbreak in West Africa, and cases of the disease in the US, spurred Congress to appropriate emergency Ebola funding in 2 separate appropriations laws:

- Public Law 113-164, the Continuing Appropriations Resolution passed on September 19, 2014;⁴⁶
- Public Law 113-235, the Consolidated and Further Continuing Appropriations Act passed on December 16, 2014.⁴⁷

Together, the 2 laws provided a total of \$5.5 billion in emergency appropriations for Ebola.

PL 113-164 provided \$58.0 million for BARDA and \$30.0 million for Global Health Ebola Funding in CDC, for a total of \$88 million.⁴⁷

The second appropriation (PL 113-235) was much larger, totaling \$5.4 billion. In this appropriation, DoD received \$112 million in funding for DTRA and DARPA

to support research and development of Ebola vaccines and therapeutics and response to the epidemic, and for DoD procurement of necessary equipment for the response. HHS received \$2.8 billion, with \$890 million appropriated to ASPR for Ebola MCM development, \$1.8 billion to the CDC for both domestic and international responses, \$238 million to NIAID in NIH for Ebola research, and \$25 million to FDA for regulatory action surrounding Ebola MCMs and clinical trials.^{39,47} The State Department and USAID received \$2.6 billion for international response coordination, diplomacy, and disaster assistance activities (see Table 6).⁴⁷

CONCLUSIONS

Federal funding for health security includes programs dedicated to civilian biological, radiological and nuclear, chemical, pandemic influenza and emerging infectious disease, and multiple-hazard and preparedness. In FY2016, proposed federal funding for health security totaled approximately \$13.7 billion. Of that total proposed for FY2016, 59% is allocated to multiple-hazard and preparedness programs, dedicated to building systems that can protect the country from a variety of threats to health. Radiological/nuclear programs would receive 19% of health security funds, which is higher than other threat-focused programs even when excluding programs focused on nation-state nonproliferation, missile defense, and US stockpile stewardship.

Biodefense programs are budgeted to receive 10% (\$1.4 billion) of health security funds in FY2016, representing a decrease in funding from FY2015 of \$304 million. Pandemic influenza and emerging infectious disease programs would receive 9% (\$1.2 billion) of the health security budget in FY2016, an increase to this category of funding of \$200 million. Programs dedicated to chemical incident prevention, preparedness, and response would receive 3% (\$423 million) of the health security funding total, with a small reduction in funding of \$4 million from FY2015.

Finally, in FY2015, Congress appropriated emergency funding for the international and domestic response to the Ebola epidemic originating in West Africa. Total emergency funding for Ebola in FY2015 was \$5.5 billion.

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