FEDERAL FUNDING FOR HEALTH SECURITY IN FY2017

Crystal Boddie, Matthew Watson, and Tara Kirk Sell

This latest article in the Federal Funding for Health Security series assesses FY2017 US government funding in 5 domains critical to strengthening health security: biosecurity, radiological and nuclear security, chemical security, pandemic influenza and emerging infectious disease, and multiple-hazard and general preparedness.

THIS ARTICLE IS THE LATEST in a series that aims to analyze annual federal funding for health security.¹⁻¹³ It examines proposed funding in the President's budget for FY2017 and provides updated amounts for FY2016 and actual funding for FY2010 to FY2015.

Health security is unique in that multiple federal agencies are responsible for discrete aspects of maintaining national readiness for epidemics and other disasters. This analysis is intended to capture and report funding levels for the broad array of health security-related work ongoing at the federal level in public health, health care, national security, and defense. For this analysis, we employ the general health security definition of the National Health Security Strategy: "A state in which a nation and its people are prepared for, protected from, and resilient in the face of health threats."^{14,15}

From that definition, this analysis further divides US federal funding into 5 domains critical to strengthening health security:

- *Biosecurity*: Federal programs focused on prevention, preparedness, and response to attacks on civilians with biological agents and accidental releases of biological material;
- *Radiological and Nuclear Security*: Federal programs focused on prevention, preparedness, and consequence management of radiological and nuclear terrorism and large-scale radiological accidents;
- *Chemical Security*: 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 Diseases*: Federal programs focused on preparedness and response to large, naturally occurring, and potentially destabilizing epidemics; and
- *Multiple-Hazard and General Preparedness*: Federal programs focused on multiple hazards or on building infrastructure and capacity to respond to large-scale health threats.

GENERAL METHODS

This analysis of federal health security funding quantifies and documents federal funding levels for health security-related programs. It separates 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 limited publicly available information describing the programs or identifying program-level funding amounts.

Efforts are made each year 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 cannot be separated from larger line items, and so those line items are either included in their entirety or they are included in the "multiple-hazard and preparedness" section of this analysis.

The authors recognize that this is not a perfect accounting of all of the federal health security work. Analysis of agency budgets and programs included in previous years resulted in a number of program additions and a few

Crystal Boddie, MPH, is a Senior Associate; Matthew Watson is a Senior Analyst; and Tara Kirk Sell, PhD, MA, is an Associate; all at the UPMC Center for Health Security, Baltimore, Maryland.

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 FY2017, using information from FY2017 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 have been categorized according to whether they focus on biodefense, chemical hazards, radiological/nuclear hazards, pandemic influenza and emerging infectious diseases, or multiple-hazard and general preparedness. Programs have been categorized based on their major focus, as described in budget documents or on program websites. Summary tables for program funding within each category are provided in this article, with more detailed tables available online (see supplemental material at www.liebertonline.com/hs/).

Programs supporting prevention, preparedness, and response, as well as related research efforts, are prioritized for inclusion in this analysis of federal health security budgets. Research programs are included if they support either medical countermeasures (MCM) research and development (R&D) or threat/risk characterization efforts. Prevention programs are 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 are included.

Programs are 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 or likely civilian applications now or in the future, are also excluded. Specific inclusion and exclusion criteria and methods used for each category are detailed in each respective section.

Overall Findings

In total, the president's proposed FY2017 budget includes \$12.95 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 (\$7.10 billion, 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 pandemic influenza and emerging infectious diseases programs, and 3% (\$417 million) to chemical security programs (see Figure 1).

BIOSECURITY 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 \$1.64 billion in FY2017 for programs solely devoted to civilian biodefense. The FY2017 proposed budget would represent a decrease of \$112.3 million from estimated biodefense appropriations in FY2016 (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 biosecurity or biodefense as a portion of their mission but do not focus specifically on biosecurity or biodefense and are instead included in this analysis under the heading of "multiple-hazard and preparedness" programs.

Funding by Federal Agency

Department of Defense (DoD)

The FY2017 DoD budget for biodefense programs with civilian applications totals \$679.1 million. This total represents a reduction in funding of \$117.7 million (from \$796.8 million in FY2016). The DoD budget includes funding for programs with civilian biodefense applications under the Defense Threat Reduction Agency (DTRA), the Defense Advanced Research Projects Agency (DARPA), the defense-wide Chemical and Biological Defense Program (CBDP), and the Defense Health Program at the Uniformed Services University of the Health Sciences (USHS).

In FY2017, \$214.0 million is budgeted for DTRA's Cooperative Biological Engagement (CBE) program, a proposed decrease of \$50.6 million in funding for this program from the FY2016 estimated level. The CBE program 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 United States.¹⁶ DARPA Biodefense Research, Development, Testing, and Evaluation (RDT&E) programs with civilian applications total \$125.4 million for FY2017, a proposed decrease of \$28.6 million from FY2016 estimated funding, with cuts primarily to Basic Operational Medical Science.¹⁷ 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 CBDP budget for civilian-applicable programs includes a number of research

Figure 1. FY2017 Federal Health Security Funding, by Program Focus (in \$millions). Color graphics available online at www.liebertonline.com/hs

initiatives, ranging from applied research to technology transition. In total, \$337.6 million in funding has been proposed for CBDP biodefense programs with civilian applications; a proposed reduction of \$36.6 million in civilian biodefense funding from FY2016 levels.¹⁸ Finally, the Biological Defense Directorate at the Naval Medical Research Center under the Defense Health Program RDT&E would receive \$2.1 million, a proposed reduction of \$1.9 million from estimated FY2016 funding.¹⁹

Department of Homeland Security (DHS)

The FY2017 DHS budget includes \$680.3 million in proposed civilian biodefense program funding, which is approximately level with estimated funding for FY2016. This year's budget proposes a major reorganization of DHS health security-related programs, in which many programs are to be relocated to a central Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Office. This reorganization is currently notional and requires congressional action to implement it. At this time it is unclear whether the reorganization will occur, but we have noted programs that may be moved to the CBRNE Office. This year's analysis includes the programs in the proposed CBRNE Office, the Science and Technology Directorate

(S&T), and Customs and Border Protection (CBP). Newly added to this year's analysis is the Agriculture Programs and Trade Liaison (ATPL) program in CBP, which conducts inspections of cargo for defense against biological and agricultural terrorism. It should be noted that fees collected by the US Department of Agriculture (USDA) largely offset the ATPL budget at DHS.²⁰

Department of Health and Human Services (HHS)

In FY2017, the proposed HHS budget specific to civilian biodefense programs would remain flat at \$266.8 million. All biodefense programs with FY2017 proposed funding are located in the FDA's bioterrorism portfolio, including Food Defense (\$217.5 million), the Advancing Medical Countermeasures Initiative (MCMi) (\$24.6 million), Physical Security (\$7.0 million), and operationalizing the Life Sciences and Biodefense Lab (\$17.7 million). Other programs at HHS that have biodefense 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.^{21,22}

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

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015 (actual)	FY2016 (estimated)	FY2017 (budget)
Department of Defense (DoD)								
Defense Threat Reduction Agency (DTTRA)								
Cooperative Biological Engagement	169.1	255.9	229.5	211.0	320.0	256.8	264.6	214.0
Defense Advanced Research Projects Agency (DARPA)								
Research, Development, Testing and Evaluation (RDT&E)	—	26.1	83.0	91.7	151.0	166.8	154.0	125.4
Chemical and Biological Defense Program (CBDP)								
Applied Research								
Chemical Biological Defense	—	—	—	—	7.1	1.6	2.9	8.4
Techbase Med Defense	54.9	51.3	87.9	81.9	75.5	77.3	65.2	53.9
Advanced Technology Development (ATD)								
Chemical Biological Defense	—	—	—	—	1.2	—	—	2.6
Techbase Med Defense	196.0	153.6	166.2	148.1	89.8	78.4	90.2	83.5
Advanced Component Development & Prototypes (ACD&P)								
Contamination Avoidance	—	—	—	—	—	—	17.4	4.7
Information Systems	—	—	—	—	—	—	1.1	1.1
Medical Biological Defense	95.5	129.7	121.2	111.4	132.7	114.2	79.5	65.6
System Development and Demonstration (SDD)								
Information Systems	—	—	—	—	—	—	10.0	11.6
Medical Biological Defense	57.6	75.7	197.9	173.5	253.7	169.4	107.9	106.2
Defense Health Program RDT&E (USUHS)								
Naval Medical Research Center: Biological Defense Research Directorate	—	—	—	3.0	4.1	3.3	4.0	2.1
Subtotal DoD Civilian Biosecurity Program Funding	573.1	692.3	885.7	820.6	1,035.1	867.8	796.8	679.1
Department of Homeland Security (DHS)								
Customs and Border Protection (CBP)								
Agriculture Programs and Trade Liaison (ATPL) (defense against bio- and agroterrorism) ^a	312.2	319.1	348.8	366.4	355.2	425.7	408.9	413.2
Office of Health Affairs (OHA) (merged with CBRNE Office)								
BioWatch	88.1	100.8	111.8	81.0	85.3	84.7	83.3	82.1
National Biosurveillance Integration Center (NBIC)	13.5	7.0	12.8	12.3	10.0	8.0	8.0	10.5

(continued)

Table 1. (Continued)

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015 (actual)	FY2016 (estimated)	FY2017 (budget)
Science & Technology Directorate (S&T)								
Agriculture Thrust Area	24.2	—	—	—	—	—	—	—
Biological Countermeasures Thrust Area	124.9	—	—	—	—	—	—	—
Research, Development and Innovation	—	29.9	11.4	19.8	23.5	26.2	32.0	24.1
Counter Terrorist Thrust								
Bioagent Threat Assessment	—	22.3	12.1	20.1	24.1	21.2	23.4	21.6
Disaster Resilience Thrust								
Bioagent Attack Resiliency	—	47.9	30.4	30.6	29.0	30.3	30.8	31.8
Laboratory Facilities	150.2	96.9	127.5	112.4	97.0	381.8	88.5	97.0
Subtotal DHS Civilian Biosecurity Program Funding	713.1	623.9	654.8	642.6	624.1	977.9	674.9	680.3
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	217.5
Advancing Medical Countermeasures Initiative (MCMi)	—	170.0	20.0	21.8	24.6	24.6	24.6	24.6
Physical Security	7.0	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	17.7
Health Resources and Services Administration (HRSA)								
Countermeasure Injury Compensation Fund (smallpox)	—	3.5	—	—	—	—	—	—
Assistant Secretary for Emergency Preparedness and Response (ASPR)								
Medical Countermeasures Dispensing (USPS pilot program)	10.0	0	0	0	5.0	—	—	—
Subtotal HHS Civilian Biosecurity Program Funding	234.5	398.0	244.5	246.3	271.8	266.8	266.8	266.8
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	15.0
Total Federal Civilian Biosecurity Program Funding	1,535.7	1,729.2	1,800.0	1,724.5	1,947.7	2,127.5	1,753.5	1,641.2

^aFunds for CBP ATPL for agriculture inspection are provided by USDA from fees collected by APHIS.^bAmounts for FY2015-2017 are approximate. Detail was lacking in the budget, so the amounts were calculated based on other totals.^cFunding in the amount of \$404 million was appropriated for construction of NBAF in the FY2014 Appropriations Act, but these funds were never obligated.

National Science Foundation (NSF)

The National Science Foundation's FY2017 budget request remains steady at \$15 million for its Research to Combat Bioterrorism program.²³

RADIOLOGICAL/NUCLEAR SECURITY 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 \$2.45 billion for FY2017. This represents a return to FY2012 funding levels after funding for radiological and nuclear-specific programs was significantly reduced from FY2013 to 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. 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 (DOE)

Programs included in this analysis from DOE are housed at the National Nuclear Security Administration (NNSA). The FY2017 DOE budget for nuclear nonproliferation is \$1.739 billion, a decrease of \$128 million compared to FY2016 estimates. This decrease in funding is mainly attributable to reductions in Defense Nuclear Nonproliferation R&D and the Nonproliferation Construction program. The Defense Nuclear Nonproliferation R&D program works to develop technologies to detect, identify, and characterize foreign nuclear weapons programs, diversion of nuclear materials, and global nuclear detonations. The Nonproliferation Construction program focuses on disposal of weapons-grade plutonium.²⁴

Department of Homeland Security

Proposed funding for civilian radiological and nuclear programs at DHS totals \$368.1 million for FY2017, which is approximately level with the estimated amount of funding for FY2016. In this year's budget, all of the programs from the DHS Domestic Nuclear Detection Office (DNDO)—which protects against radiological and nuclear attacks directed against the United States or its interests—

have been notionally moved to the newly proposed CBRNE Office. Those programs have all been included in their entirety, and their relocation to the CBRNE Office has been noted. Other programs included in this year's analysis include the Federal Emergency Management Agency (FEMA) Radiological Emergency Preparedness Program (REPP), which informs and educates the public about radiological emergency preparedness, and the Explosive and Rad/Nuc Attack Resiliency focus area in the S&T Directorate, which supports planning and exercises to prepare for radiological and nuclear attack scenarios.²⁰

Department of Defense

Total proposed funding for civilian-applicable radiological and nuclear programs in the DoD is \$191.4 million in FY2017, \$13.6 million less than the estimated total for FY2016. Programs included in this year's analysis are from DARPA,¹⁷ DTRA,^{16,25} CBDP,¹⁸ and the Defense Health Program.¹⁸ Although many additional programs in the DoD have radiological or nuclear defense in their missions, most are excluded from the analysis because of their primary focus on warfighters or joint CBRNE defense mission (programs with a joint CBRNE defense mission are listed instead among the "multiple-hazard and preparedness" programs). The reduction in funding proposed for this year is primarily due to budget cuts in the DTRA Global Nuclear Security and Counterproliferation Initiative programs.¹⁸

Department of State

In FY2017, Department of State funding for civilian radiological and nuclear defense-related programs totals \$96 million, a slight increase of \$3 million above proposed FY2016 funding. Two programs at the Department of State are included in this year's analysis: State contributions to the International Atomic Energy Agency (IAEA) and the Weapons of Mass Destruction (WMD) Terrorism Program. The WMD Terrorism Program has been included here and not in the "multiple-hazard and general preparedness" section because it focuses specifically on countering nuclear smuggling and nuclear terrorism and not on chemical or biological terrorism.²⁶ The Department of State has a number of other nuclear-related programs that are excluded from this analysis because of their emphasis on nonproliferation at the nation-state level, which is not the focus of this analysis. 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.

Environmental Protection Agency (EPA)

The budget for radiological/nuclear defense at the EPA totals \$21.6 million for FY2017, an increase of \$3 million

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

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015 (actual)	FY2016 (estimate)	FY2017 (budget)
Department of Energy (DOE)								
Weapons Activities Appropriation ^a	223.4	232.5	221.3	227.1	228.5	224.0	0	—
NNSA Defense Nuclear Nonproliferation	2,404.7	1,526.2	1,580.8	1,134.0	995.2	1,128.8	1,867.3	1,738.6
Subtotal DOE Civilian Rad/Nuc Security Program Funding	2,628.1	1,758.7	1,802.1	1,361.1	1,223.7	1,352.8	1,867.3	1,738.6
Department of Homeland Security (DHS)								
Rad/Nuc Detection Forensics and Prevention Capability (moved from DNDO to new CBRNE Office in FY2017)	317.0	341.7	290.0	303.0	288.1	280.5	322.2	327.7
Federal Emergency Management Agency (FEMA)								
Radiological Emergency Preparedness Program (REPP) ^b	31.5	36.6	37.1	37.4	42.3	44.2	38.3	35.4
Science & Technology Directorate (S&T)	—	—	—	4.9	5.0	3.25	2.0	5.0
Subtotal DHS Civilian Rad/Nuc Security Program Funding	348.5	378.3	327.1	345.3	335.4	328.0	362.5	368.1
Department of Defense (DoD)								
Army (RDT&E)	6.9	7.0	7.2	7.1	—	—	—	—
Nuclear Arms Control Monitoring and Sensor Network	—	—	—	—	—	—	—	—
DARPA								
Research, Development, Testing and Evaluation (RDTE)	—	—	—	—	—	24.0	14.5	14.2
Biological Warfare Defense	—	—	—	—	—	—	—	—
Defense Against Mass Terror Threats (nuclear attack focused)	—	—	—	—	—	—	—	—
Defense Threat Reduction Agency (DTRA)								
Cooperative Threat Reduction (CTR)	118.6	164.5	151.1	39.3	19.4	20.7	20.6	16.9
Global Nuclear Security	—	—	—	—	—	—	—	—
Research, Development, Test & Evaluation (RDT&E)								
WMD Defeat Technologies	84.4	78.1	91.0	85.8	86.8	83.8	87.4	88.7
Counterproliferation Initiatives – Proliferation, Prevention and Defeat	84.7	93.1	78.4	74.9	79.8	68.4	74.5	66.1
WMD Defeat Capabilities	9.3	7.8	5.8	5.2	12.5	6.7	7.2	4.6
Chemical and Biological Defense Program (CBDP) (Defense-wide)								
Techbase Med Defense	—	—	0.9	0.6	0	0	—	—
Medical Radiological Defense	9.6	6.4	2.4	0	2.7	0	—	—
Defense Health Program RDT&E (USUHS)								
Radiation Countermeasures	2.5	2.7	2.8	0.9	0.8	0.7	0.8	0.9
Subtotal DoD Civilian Rad/Nuc Security Program Funding	316.1	359.5	339.6	213.8	202.0	204.3	205.0	191.4

(continued)

Table 2. (Continued)

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015 (actual)	FY2016 (estimate)	FY2017 (budget)
Department of State								
Nonproliferation, Anti-Terrorism, Demining and Related Programs								
International Atomic Energy Agency (IAEA) Voluntary Contribution	65.0	79.5	85.9	90.0	88.0	88.0	88.0	89.8
Weapons of Mass Destruction Terrorism Program	2.0	2.0	6.0	5.5	5.0	5.0	5.0	6.2
Subtotal DoS Civilian Rad/Nuc Security Program Funding	67.0	81.5	91.9	95.5	93.0	93.0	93.0	96.0
Environmental Protection Agency (EPA)								
Radiation Protection	16.0	15.9	13.8	13.2	13.5	12.2	12.3	14.2
Radiation Response Preparedness	7.1	7.6	6.8	6.5	7.0	6.3	6.3	7.4
Subtotal EPA Civilian Rad/Nuc Security Program Funding	23.1	23.5	20.6	19.7	20.5	18.5	18.6	21.6
Nuclear Regulatory Commission (NRC)^c								
Homeland Security (Nuclear)	27.1	22.2	26.7	24.3	19.1	18.1	18.5	18.0
Event Response	14.0	14.9	15.8	16.1	18.4	16.7	17.3	19.7
Subtotal NRC Civilian Rad/Nuc Security Program Funding	41.1	37.1	42.5	40.4	37.5	34.8	35.8	37.7
Total Federal Civilian Radiological/Nuclear Security Program Funding	3,423.9	2,638.6	2,623.8	2,075.8	1,912.1	2,031.4	2,582.2	2,453.4

^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 FY 2016.

^bHas offsetting collection authority.

^cFY2015, FY2014, FY2013, and FY2011 projection only.

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

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015 (actual)	FY2016 (estimate)	FY2017 (budget)
Department of Defense (DoD)								
Army								
Chemical Agents and Munitions Destruction, Defense Operations and Maintenance								
Chemical Stockpile Emergency Preparedness Project (CSEPP)	87.0	111.2	75.3	53.9	51.2	52.1	50.7	49.5
Defense Threat Reduction Agency (DTRA)								
Chemical Weapons Destruction	8.0	12.0	9.8	69.0	63.0	1.0	0.9	2.9
Chemical and Biological Defense Program (CBDP) (Defense-wide)								
Applied Research								
Chemical Biological Defense	—	—	—	—	—	1.0	0	0.7
Techbase Nontraditional Agents Defense	—	—	—	25.2	37.8	43.8	41.6	39.4
Techbase Med Defense	32.4	32.0	36.8	19.8	10.3	13.2	14.5	14.2
Advanced Technology Development (ATD)								
Chemical Biological Defense	—	—	—	—	—	0.1	0	0.1
Techbase Nontraditional Agent Defense	—	—	7.0	23.0	18.0	18.4	18.7	14.5
Techbase Med Defense	28	25.5	21.1	12.1	4.2	1.8	1.6	0.4
Advanced Component Development & Prototypes (ACD&P)								
Chemical Biological Defense	20.5	4.1	7.7	—	2.0	0	0	5.7
Medical Chemical Defense								
System Development and Demonstration (SDD)								
Chemical Biological Defense	4.1	3.8	2.3	17.4	41.0	26.0	42.9	39.5
Medical Chemical Defense	180.0	188.6	160.0	220.4	227.5	157.4	170.9	166.9
Subtotal DoD Civilian Chemical Security Program Funding								
Environmental Protection Agency (EPA)								
Toxic Substances								
Chemical Risk Review and Reduction	54.9	59.8	56.5	54.7	56.1	58.7	58.6	67.2
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	39.0	37.6	39.3
State and Local Prevention and Preparedness								
Environmental Program & Management (RMP chemical risk)	13.4	13.1	13.3	12.6	13.8	17.9	15.3	23.7
Subtotal EPA Civilian Chemical Security Program Funding	117.2	125.9	115.1	108.9	107.7	115.6	111.5	130.2

(continued)

Table 3. (Continued)

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015 (actual)	FY2016 (estimate)	FY2017 (budget)
Department of Homeland Security (DHS)								
Office of Health Affairs (OHA)								
Chemical Defense Program (moved to CBRNE Office)	3.9	0	5.4	1.9	0.8	0.8	0.8	0.8
Science & Technology Directorate (S&T)								
Multifunction Detectors	—	—	—	—	—	—	—	3.1
Chemical Threat Assessment (moved to CBRNE Office)	4.8	4.6	4.0	5.3	7.0	7.0	6.3	5.6
Chemical Attack Resiliency (Chemical Forensics)	4.8	4.7	2.6	3.5	3.5	2.0	0.9	0
National Protection & Programs Directorate (NPPD)								
Infrastructure Security Compliance	103.4	95.9	93.3	71.7	81.0	82.3	77.6	78.9
Subtotal DHS Civilian Chemical Security Program Funding	116.9	105.2	105.3	82.4	92.3	92.1	85.6	88.4
Department of State								
Organisation for the Prohibition of Chemical Weapons (OPCW)	24.0	25.5	19.6	20.1	20.1	17.0	19.0	20.1
Department of Health and Human Services (HHS)								
Centers for Disease Control and Prevention (CDC)								
Chemical Laboratories (LRN-C) ^b	—	—	—	10.3	10.3	11.6	11.6	11.6
National Institutes of Health (NIH)								
CounterACT	50.0	49.5	—	—	—	—	—	—
Subtotal HHS Civilian Chemical Security Program Funding	50.0	49.5	0.0	10.3	10.3	11.6	11.6	11.6
Total Federal Civilian Chemical Security Program Funding	488.1	494.7	400.0	442.1	457.9	393.7	398.6	417.2

^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.

above FY2016 estimated amounts. Two programs from EPA are included: Radiation Protection, which provides site characterization for areas of suspected radioactive contamination, and Radiation Response Preparedness, which generates policy guidance and procedures for EPA's emergency response (including radiological anti-terrorism activities).²⁷

Nuclear Regulatory Commission (NRC)

Homeland Security and Event Response are the 2 areas of civilian radiological/nuclear security funding from the NRC included in this analysis. These 2 programs total \$37.7 million in proposed funding for FY2017, an increase in funding of \$1.9 million above the FY2016 estimate.²⁸

Department of Health and Human Services

Funding for programs that are solely or primarily devoted to radiological/nuclear hazards was not readily available in HHS budget materials. Thus, while programs do exist, 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 SECURITY PROGRAM FUNDING

The federal government supports a range of programs intended to prevent, prepare for, and respond to acute, potentially harmful chemical exposures, resulting either from a deliberate release of a chemical weapon or a deliberate or accidental release of a toxic industrial chemical. In FY2016, the President's budget includes \$417.2 million for chemical security programs (see Table 3).

Methods

Federal chemical security 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, but advanced development of detection technologies was excluded unless there was a stated civilian/interagency application. Programs were also 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 FY2017 at \$166.9 million. This budget rep-

resents a slight decrease of \$4 million from the FY2016 estimate of \$170.9 million. The agencies and offices primarily responsible for executing the civilian-applicable chemical defense mission in the DoD are DTRA, for chemical weapons destruction;¹⁶ CDBP for RDT&E of diagnostics, detection, therapeutics, and pretreatments;¹⁸ and the Department of the Army for the Chemical Stockpile Emergency Preparedness Project.²⁹ Overall, the DoD chemical defense budget is largely dedicated to research, development, and acquisition of anti-chemical medical countermeasures and personal protective equipment.

Environmental Protection Agency

The EPA's budget for chemical security programs in FY2016 is \$130.2 million, which is an increase of \$18.7 million above the FY2016 estimate of \$111.5 million. EPA's chemical defense portfolio includes the chemical risk review and reduction program, which works to manage the potential risks from toxic industrial chemicals; the Human Health Risk Assessment program, which conducts research on the potential health risks of chemical exposures; and the State and Local Prevention and Preparedness program, which is responsible for implementing the Improving Chemical Facility Safety and Security Executive Order.³⁰

Department of Homeland Security

Chemical security programs at DHS are budgeted at \$88.4 million in FY2017, a slight increase from the FY2016 estimated total of \$85.6 million. Two programs in this budget have been notionally moved to the new CBRNE Office: the Chemical Defense Program from OHA and the Chemical Threat Assessment program from S&T. Once again the majority of chemical program funding (\$78.9 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.²⁰ In S&T, a new program for development of multifunction chemical detectors is proposed (\$3.1 million), and the Chemical Forensics program appears to be zeroed out for this year.

Department of State

The President's FY2017 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).²⁶

Department of Health and Human Services

In FY2017, \$11.6 million is budgeted for the Chemical Laboratories program, to enhance laboratory preparedness for chemical threats, which is steady funding in comparison to FY2015 and FY2016.³¹ Not included in this year's

analysis is the NIH's CounterACT program, which supports basic research into the pathology and treatment of toxic chemical exposures. The CounterAct program is instead included under the "multiple-hazard and general preparedness section" because the NIH budget combines research funding for radiological, nuclear, and chemical countermeasures into one budget line item.^{32,33}

PANDEMIC INFLUENZA AND EMERGING INFECTIOUS DISEASES PROGRAM FUNDING

This section focuses on funding for federal programs aimed at prevention, preparedness, response, recovery, and mitigation of pandemic influenza and emerging infectious

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

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015 (actual)	FY2016 (estimated)	FY2017 (budget)
Department of Health and Human Services (HHS)								
Centers for Disease Control and Prevention (CDC)								
Immunization and Respiratory Diseases								
Influenza Planning and Response	159.7	159.7	172.6	166.1	172.6	187.6	187.6	187.6
Emerging and Zoonotic Infectious Diseases								
Core Infectious Disease program	213.7	186.2	225.7	217.0	218.6	225.4	393.3	427.9
Advanced Molecular Detection and Response to Infectious Disease Outbreaks	—	—	—	—	29.9	30.0	30.0	30.0
Quarantine	26.5	26.0	33.0	31.3	31.6	31.6	31.6	46.6
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	55.2	65.2
National Institutes of Health (NIH)								
Influenza Research (excluding ARRA funding)	308.0	272.0	251.0	304.0	262.0	280.0	285.0	285.0
Food and Drug Administration (FDA)								
Pandemic Influenza	46.7	43.6	30.0	32.1	38.3	35.7	35.6	33.9
Antimicrobial Resistance	30.2	27.7	44.1	25.9	26.8	32.5	41.7	41.7
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	68.0	121.0
Subtotal HHS Civilian Pandemic Flu and EID Program Funding	1,105.0	822.1	801.8	821.3	953.0	945.8	1,128.0	1,238.9
US Agency for International Development (USAID)								
Global Health Security (formerly Pandemic Influenza and Other Emerging Threats)	156.0	47.9	58.0	54.9	72.1	72.5	72.5	72.5
US Department of Homeland Security (DHS)								
Office of Health Affairs (moved to CBRNE Office in FY2017)								
Health and Emerging Infectious Disease	—	—	—	—	—	9.1	10.2	10.0
Department of Defense (DoD)								
Defense Health Program (RDT&E)								
Combating Antibiotic Resistant Bacteria (GHSA)	—	—	—	—	—	—	3.2	2.9
DARPA								
Research, Development, Testing and Evaluation (RDT&E)								
Basic Operational Medical Science								
Outpacing Infectious Disease	—	—	—	—	—	—	—	9.6
Subtotal DoD Civilian Pandemic Flu and EID Program Funding	0.0	0.0	0.0	0.0	0.0	0.0	3.2	12.5
Total Federal Civilian Pandemic Flu and EID Program Funding								
	1,261.0	870.0	859.8	876.2	1,025.1	1,027.4	1,213.9	1,333.9

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

diseases with destabilizing potential. In total, funding budgeted for pandemic and emerging infectious diseases programs in FY2017 is \$1.33 billion, a proposed increase of \$120 million, mostly for HHS programs (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 potential destabilizing effects (such as Zika or dengue), and antimicrobial resistance. This analysis used the NIH definition of emerging infectious disease: “Emerging diseases include outbreaks of previously unknown diseases or known diseases whose incidence in humans has significantly increased in the past two decades.”³⁴ This analysis did not include programs focused on established infectious diseases such as HIV, TB, and malaria (which have their own dedicated funding streams) or chronic diseases. This section does not reflect the emergency funding appropriations for Ebola response in 2014 and 2015, but these amounts can be found in last year’s federal funding analysis.¹³

Funding by Federal Agency

Department of Health and Human Services

HHS continues to fund the majority of federal programs dedicated to pandemic influenza and emerging infectious diseases. In FY2017, proposed HHS funding totals \$1.24 billion, an increase from estimated FY2016 funding of \$110.9 million.

At CDC, the Core Infectious Disease program in the National Center for Emerging and Zoonotic Infectious Diseases (EZID) is budgeted at \$427.9 million for FY2017, an increase in funding of \$34.6 million from FY2016. This program includes efforts to protect against antimicrobial resistance, high-consequence pathogens, vector-borne diseases, and other threats. Also under EZID, the Quarantine program is budgeted to receive a \$15 million boost in funding for a total of \$46.6 million. 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 \$10 million, for a total of \$65.2 million. Other programs in CDC, such as Influenza Planning and Response (\$187.6 million) and Advanced Molecular Detection and Response to Infectious Disease Outbreaks (\$30 million), would remain at steady funding under the President’s proposed FY2017 budget.³¹

The FY2017 proposed budget for pandemic influenza funding at ASPR is \$121 million, representing a proposed increase of \$53 million over FY2016 estimated funds.³⁵ In the ASPR budget for pandemic influenza are both “no year” and “annual” program funding. No year ASPR pandemic programs are: Universal Influenza Vaccine Ad-

vanced Development (\$65 million), Advanced Development of Influenza Immunotherapeutics (eg, monoclonal antibodies) (\$25 million), and Vaccine Stockpiling (\$21 million). Annual pandemic programs at ASPR are: Diagnostics Advanced Development (\$7 million), Office of Policy and Planning International Pandemic Influenza Activities (\$3 million), and Office of Global Affairs International Influenza Activities (\$4 million).³⁵

At the NIH, funding for influenza research is proposed at \$285.0 million, steady funding when compared to FY2016.³⁶ The FY2017 FDA budget includes \$33.9 million in funding for Pandemic Influenza and \$41.7 million for Antimicrobial Resistance.²² 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.”³⁵

US Agency for International Development (USAID)

The proposed FY2017 USAID budget includes the Global Health Security program (formerly the Pandemic Influenza and Other Emerging Threats [PIOET] program). This program emphasizes early identification of and response to dangerous infectious disease outbreaks in humans and animals before they can become significant threats to human health. Funding for this program would remain steady in the FY2017 budget at \$72.5 million.²⁶

Department of Homeland Security

In FY2017, DHS has included a new program in the Office of Health Affairs (notionally moved to the new CBRNE Office) on Health and Emerging Infectious Disease. This program is budgeted at \$10 million in FY2017 and is aimed at bringing expertise in emerging infectious disease issues to CBRNE decision analysis at DHS. Subprograms under this heading focus on providing support to first responders and DHS components, providing occupational health guidance to the DHS workforce, supporting cross-discipline animal and food emergency planning collaborations, and supporting US-Canada cross-border health security initiatives.²⁰

Department of Defense

In FY2017, DoD funding for Pandemic Influenza and Emerging Infectious Disease programs totals \$12.5 million. This year, 2 DoD programs are included: the Combating Antibiotic Resistant Bacteria program in the Defense Health Program¹⁹ and, new this year, the Outpacing Infectious Disease Program in DARPA.¹⁷ This new DARPA program aims to develop genetic and immunological technologies that can detect, diagnose, and treat infectious diseases with greater precision and rapidity. This program would be funded at \$9.6 million in the President’s proposed FY2017 budget.¹⁷

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

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015 (actual)	FY2016 (estimated)	FY2017 (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	650.7	649.4	656.6	648.4
CDC Preparedness and Response Capability (includes BioSense)	166.0	160.0	138.3	155.5	157.2	157.2	161.8	167.2
Strategic National Stockpile (SNS)	596.0	591.0	533.8	493.2	549.3	534.3	575.0	575.0
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	1,263.0	1,375.0	1,370.3
Biodefense and Emerging Infectious Diseases Research (NIAID) (intramural) ^b	—	497.5	483.2	458.7	477.5	347.5	364.4	369.1
Nuclear/Radiologic/Chemical Countermeasures Research	96.7	95.3	95.3	90.9	92.1	92.1	93.4	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	6.0
Operations	37.0	44.0	33.0	31.0	31.3	31.3	30.9	30.9
Biomedical Advanced Research and Development Authority (BARDA)	320.0	378.0	415.0	415.0	413.5	473.0	511.7	511.7
Project Bioshield	—	—	—	—	254.1	255.0	510.0	350.0
Preparedness and Emergency Operations	30.0	30.0	30.0	28.0	28.0	24.8	24.7	24.7
National Disaster Medical System (NDMS)	52.0	52.0	53.0	50.0	50.1	50.1	49.9	55.1
Hospital Preparedness (HPP) Grants (includes ESAR-VHP)	417.0	375.0	375.0	358.0	255.1	254.6	254.6	254.6
Policy and Planning	19.0	19.0	16.0	15.0	14.9	14.9	14.9	14.9
Office of Global Affairs (OGA)	—	—	—	6.4	6.3	6.3	6.0	6.0
Other Public Health and Social Services Emergency Fund (PHSSEF)								
Public Health Emergency Response Initiative ^c	—	—	—	—	—	—	110.0	—
Subtotal HHS Civilian Multiple-Hazard/Preparedness Program Funding	3,838.7	4,238.1	4,149.0	3,965.8	4,257.6	4,162.5	4,744.9	4,477.3
Department of Homeland Security (DHS)								
Office of Health Affairs (OHA) (moved to CBRNE Office)								
Planning and Coordination	3.7	2.3	5.9	5.1	5.0	5.0	5.0	5.0
Medical Countermeasures	—	—	0	0.8	1.0	1.9	1.9	1.9
Federal Emergency Management Agency (FEMA)								
Preparedness and Protection	—	—	166.0	171.1	169.8	49.9	48.7	49.7
Response and Recovery	—	—	247.1	224.3	235.1	231.8	222.4	237.2
Mitigation	—	—	30.7	28.5	27.8	11.4	10.7	10.6
State and Local Programs	2,114.9	1,691.6	1,602.9	1,731.7	1,500.0	1,267.0	1,317.0	875.0

(continued)

Table 5. (Continued)

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015 (actual)	FY2016 (estimated)	FY2017 (budget)
Science & Technology Directorate (S&T)								
Integrated Terrorism Risk Assessment (moved to CBRNE office)	3.0	3.0	2.5	2.5	3.8	3.8	2.0	2.0
Integrated Consortium of Laboratory Networks	4.8	4.7	2.6	3.5	—	—	—	0.8
Standards Thrust (including chemical and biological systems standards)	—	—	15.9	8.2	8.2	8.2	3.0	3.0
Customs and Border Protection (CBP)								
International Cargo Screening	145.5	103.9	74.6	70.4	67.9	66.6	59.7	59.7
Subtotal DHS Civilian Multiple-Hazard/Preparedness Program Funding	2,271.9	1,805.5	2,148.2	2,246.1	2,018.6	1,645.6	1,670.4	1,244.9
Department of Defense (DoD)								
US Army National Guard								
CBRNE Enterprise								
WMD Civil Support Teams	32.9	34.8	16.5	11.5	12.6	12.7	17.3	15.7
Other CBRNE Capabilities	—	11.6	21.6	110.1	137.7	129.1	153.5	155.0
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)	423.6	—	—	—	—	—	—	—
Former Soviet Union Threat Reduction	29.1	36.9	63.1	87.3	152.4	49.8	38.9	50.7
Proliferation Prevention	5.0	5.0	2.5	2.8	0.5	2.4	2.8	2.0
Operations and Maintenance								
Nonproliferation Activities	62.8	58.8	58.8	57.4	53.0	55.4	66.7	70.3
US Strategic Command Center for Combating WMD	28.0	33.5	12.0	11.0	9.1	12.6	11.2	10.3
Research, Development, Testing and Evaluation (RDT&E)								
Basic Research for Combating WMD	40.0	46.1	47.7	40.8	44.8	36.6	38.4	35.4
WMD Defeat Technologies								
Information Sciences and Applications	49.3	44.9	42.3	24.9	21.9	26.3	29.4	29.1
Countering WMD Test and Evaluation	16.6	13.5	16.6	10.4	11.5	10.30	11.1	13.7
Counterproliferation Initiatives – Proliferation, Prevention, and Defeat								
Information Sciences and Applications	8.4	4.8	13.4	3.0	0.1	0.3	12.2	11.4
Countering WMD Test and Evaluation	—	1.8	0	0	0.1	12	0	0
Target Assessment Technologies	33.1	35.0	36.2	26.9	47.5	45.6	56.1	41.8
Defense Advanced Research Projects Agency (DARPA)								
Research, Development, Testing and Evaluation (RDT&E)	41.3	35.3	30.8	15.1	25.6	18.5	9.8	7.1
Biological Warfare Defense Program (CBR focus)								

(continued)

Table 5. (Continued)

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015 (actual)	FY2016 (estimated)	FY2017 (budget)
Chemical and Biological Defense Program (CBDP) (Defense-wide)								
Basic Research (Life and physical sciences chem/bio research)	63.8	48.7	46.6	45.6	50.7	45.7	47.8	44.8
Applied Research								
Chemical Biological Defense	110.9	85.8	97.5	29.0	27.0	43.0	41.0	41.0
Techbase Nontraditional Agent Defense	—	—	0	24.2	23.6	25.1	24.1	25.1
Advanced Technology Development (ATD)								
Chemical Biological Defense	18.5	8.4	11.7	14.7	16.0	15.0	14.6	15.3
Techbase Nontraditional Agent Defense	—	—	—	0.7	1.3	1.3	3.0	1.8
Advanced Component Development & Prototypes (ACD&P)								
Chemical Biological Defense								
Contamination Avoidance								
Global Biosurveillance Technology Initiative (GBTI) (multiple hazards)	—	—	—	—	—	—	2.9	4.2
Homeland Defense (WMD-CST and SPU-CBE support)	5.7	10.5	16.2	7.4	1.2	—	—	—
Test & Evaluation (chem and bio defense testing)	—	—	—	—	—	10.9	17.4	14.9
System Development and Demonstration (SDD)								
Chemical Biological Defense								
Contamination Avoidance								
Global Biosurveillance Technology Initiative (GBTI)	—	—	—	—	—	—	1.8	3.3
Homeland Defense (WMD-CST and SPU-CBE support)	2.9	0	9.0	5.2	14.3	31.0	7.2	11.2
Operational Systems Development (OP SYS DEV)								
Chemical Biological Defense								
Homeland Defense (WMD-CST support)	—	—	—	—	1.8	1.3	2.0	1.6
Subtotal DoD Civilian Multiple-Hazard/Preparedness Program Funding	987.8	554.1	555.8	531.7	654.7	585.1	609.1	605.7
Department of State								
Arms Control, Verification, and Compliance								
Office of Chemical and Biological Weapons Affairs	4.0	2.3	2.1	2.0	2.3	1.9	2.0	2.0
International Security and Nonproliferation	49.3	46.5	47.7	45.9	44.6	43.3	44.0	44.7
Nonproliferation, Anti-Terrorism, Demining and Related Programs								
Nonproliferation and Disarmament Fund	75.0	53.3	30.0	27.0	30.0	27.0	27.0	20.0
Export Control and Related Border Security Assistance	54.0	60.0	61.8	55.6	64.0	57.0	58.7	41.5
Global Threat Reduction (GTR)	70.0	70.0	69.0	64.5	77.4	65.1	64.3	67.0
Subtotal State Civilian Multiple-Hazard/Preparedness Program Funding	252.3	232.1	210.6	195.0	218.3	194.3	196.0	175.2

(continued)

Table 5. (Continued)

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015 (actual)	FY2016 (estimated)	FY2017 (budget)
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	3.3	3.9	4.1
Critical Infrastructure Protection	31.6	20.9	12.6	11.3	10.9	11.9	11.5	11.9
Preparedness, Response and Recovery	98.7	87.1	67.9	67.4	63.4	66.4	61.3	57.2
Protection of EPA Personnel and Infrastructure	16.2	16.0	12.3	14.4	10.6	15.5	13.7	16.0
Superfund								
Emergency Response and Removal	202.3	242.4	189.6	183.3	190.3	191.0	181.3	185.2
Emergency Preparedness	9.6	10.5	9.2	8.8	7.7	8.3	7.6	7.9
Subtotal EPA Civilian Multiple-Hazard/Preparedness Program Funding	368.2	381.2	295.0	289.3	287.0	296.4	279.3	282.3
Department of Justice (DoJ)								
National Security Division	88.0	88.0	87.0	84.0	92.0	93.0	95.0	97.3
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	27.0
Subtotal NSF Civilian Multiple-Hazard/Preparedness Program Funding	56.6	50.9	51.8	51.3	51.3	53.7	50.3	49.6
Department of Commerce (DoC)	83.6	77.9	78.8	78.3	78.3	80.7	77.3	76.6
Bureau of Industry and Security – Export Administration								
US Department of Agriculture (USDA)	58.1	66.0	56.6	52.3	55.6	56.7	58.6	62.0
Animal and Plant Health Inspection Service (APHIS)								
Emergency Management	22.0	22.0	18.0	17.0	17.0	17.0	17.0	45.0
Food Safety and Inspection Service (FSIS)								
Public Health Data Communication Infrastructure System	28.0	26.0	35.0	35.0	35.0	34.0	34.0	34.0
Office of Homeland Security and Emergency Coordination	2.0	1.0	1.0	1.0	2.0	1.0	1.0	2.0
Subtotal USDA Civilian Multiple-Hazard/Preparedness Program Funding	52.0	49.0	54.0	53.0	54.0	52.0	52.0	81.0
Department of Veterans Affairs (VA)								
Emerging Pathogens/Bio-Terrorism	1.0	1.3	0.7	0.5	1.0	1.0	1.0	1.0
Total Federal Civilian Multiple-Hazard and Preparedness Program Funding	8,001.5	7,493.2	7,635.7	7,496.0	7,716.7	7,166.9	7,783.8	7,103.3

^aFunding has been subtracted from this total for LRN-C for FY2013-FY2017.^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.^cThis 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.

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 in FY2017 is \$7.10 billion. Compared with estimated funding for FY2016, this year's budget represents a significant decrease in funding of \$680.5 million. This proposed decrease is largely due to funding reductions at HHS and DHS (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 chemical, biological, radiological and nuclear threats (CBRN) or weapons of mass destruction 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 FY2017 HHS funding for multiple-hazard and preparedness programs is proposed at \$4.48 billion. This represents a reduction in funding of \$267.6 billion in comparison to the FY2016 estimated level. The largest proportion of multiple-hazard and preparedness funding in HHS is provided for Biodefense and Emerging Infectious Disease Research (\$1.74 billion of combined intramural and extramural funding) in the NIH.^{32,36} CDC programs also represent a large proportion of HHS funding under this heading. Programs include State and Local Preparedness and Response Capability (\$648.4 million, including the Public Health Emergency Preparedness [PHEP] grants), CDC Preparedness and Response Capability (\$167.2 million), and Strategic National Stockpile (\$575 million).³¹ The State and Local Preparedness and Response Capability at CDC would be cut by \$8.2 million in FY2017, and the CDC Preparedness and Response Capability, which includes the BioSense program, would receive an increase of \$5.4 million.

Multiple-hazard and preparedness funding in ASPR would see a significant decrease under the proposed FY2017 budget. This is primarily due to a decrease of \$160 million in funds for Project BioShield. Although BioShield largely supports the procurement of MCMs against biological threats, it is included in this section because of its stated mission to support the procurement of MCMs against chemical, biological, radiological, and nuclear (CBRN) threats. The proposed reduction to BioShield is not fully explained in HHS budget documents. However, documents do specify that the \$350 million budget for BioShield in FY2017 is intended to support procurement of 3 MCMs (1 antibiotic, 1 anthrax diagnostic device, 1 radiological biodosimetry diagnostic device) and late-stage development of 2 MCMs (Ebola).³⁵ Funding for ASPR's Biomedical Advanced Research and Development Authority (BARDA) would remain steady at \$511.7 million, as would the Hospital Preparedness Program (HPP) at \$254.6 million. In this year's ASPR budget, only the National Disaster Medical System (NDMS) would receive a funding increase (+\$5.2 million for a total of \$55.1 million).³⁵

Department of Homeland Security

The DHS budget for FY2017 dedicates approximately \$1.24 billion in funding to programs focused on multiple hazards and preparedness related to health security. This represents a significant proposed decrease in funding compared with the FY2016 estimated level of \$1.67 billion and an even larger decrease in funding when compared to actual funding amounts before FY2014, which were around \$2 billion per year. In DHS, the largest proportion of funding is allocated to State and Local Programs (\$875 million) in FEMA. However, this is also the program that is projected to receive the largest cut, with a \$267 million reduction to the State Homeland Security Grant Program and a \$270 million reduction to the Urban Area Security Initiative (UASI) in the State and Local Programs budget. The DHS Budget Justification notes that "the reduction from FY2016 reflects FEMA's successful investments in prior year grants awarded. FEMA grants provide investments to support core capabilities and incorporate effective measures. These measures inform investments based on required capability levels rather than the funding levels of prior years."^{20(vol 3,p42)} Other FEMA programs focused on Preparedness and Protection and Mitigation would receive approximately level funding, and the Response and Recovery program would receive a \$14.8 million increase for a total of \$237.2 million. Altogether, total FEMA funding for multiple-hazard and preparedness programs is budgeted at \$1.17 billion for FY2017.

Other multiple-hazard and preparedness programs at DHS include the Integrated Terrorism Risk Assessment (ITRA) program, which is currently proposed to be moved from S&T to the new CBRNE Office, and the Standards

Thrust in DHS S&T, which contributes to setting standards for biological, chemical, and other detection and diagnostic technologies. Planning and Coordination and Medical Countermeasures programs in OHA would receive level funding, but are also set to move to the new CBRNE Office. Finally, the International Cargo Screening for WMD materials program in Customs and Border Protection would receive level funding at \$59.7 million.²⁰

Department of Defense

Multiple-hazard and preparedness programs in the DoD include those that support WMD and CBRN threat 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 \$170.7 million under the proposed FY2017 budget.³⁷

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;¹⁶ international nonproliferation programs; and WMD-focused research and development.²⁵ In total, these programs would receive \$264.7 million under the proposed FY2017 budget, funding approximately level with estimated FY2016 funding. DARPA's Biological Warfare Defense Program, which focuses on a range of threats including CBRN, would receive \$7.1 million, a decrease in funding of \$2.7 million from estimated FY2016 amounts and \$11.4 million from actual FY2015 funding.¹⁷ Multiple-hazard research in CBDRP would retain essentially flat funding (\$163.2 million) in the proposed FY2017 budget.¹⁸

Department of State

Proposed funding for multiple-hazard and preparedness programs in the Department of State would be reduced by \$20.8 million in FY2017 for a total of \$175.2 million. The Office of Chemical and Biological Weapons Affairs in Arms Control, Verification, and Compliance would receive relatively steady funding (\$2 million) in FY2017, as would the International Security and Nonproliferation office (ISN) (\$44.7 million). However, 2 of 3 programs in State's Nonproliferation, Anti-Terrorism, Demining and Related Programs (NADRP) would receive funding reductions in this year's proposed budget: The Nonproliferation and Disarmament Fund would decrease \$7 million for a total of \$20 million, and Export Control and Related Border Security Assistance funding would decrease \$17.2 million to \$41.5 million. There are no details provided in the Department of State budget materials that explain these funding reductions. Finally, the Global Threat Reduction program under NADRP would receive a slight increase of \$2.7 million in FY2017.^{26,38}

Environmental Protection Agency

Proposed funding in the EPA for multiple-hazard and preparedness programs totals \$282.3 million for FY2017. These programs are grouped under Homeland Security and Superfund categories. EPA's Homeland Security programs include Communication and Information; Critical Infrastructure Protection; Preparedness, Response, and Recovery; and Protection of EPA Personnel and Infrastructure. Total funding for Homeland Security programs proposed for FY2017 is \$89.2 million. Under Superfund, programs include Emergency Preparedness and Emergency Response and Removal, totaling \$193.1 million. These programs play a role in EPA's CBR preparedness and response to environmental contamination emergencies with impacts on human health.³⁰

Department of Justice (DoJ)

This multiple-hazard and preparedness analysis includes the National Security Division of DoJ. Under the proposed FY2017 budget, funding for this program would remain relatively steady at \$97.3 million.³⁹

National Science Foundation (NSF)

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 FY2016.²³

Department of Commerce (DoC)

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 FY2017 would total \$62.0 million, a small increase of \$3.4 million over FY2016.⁴⁰

US Department of Agriculture (USDA)

Funding for USDA programs related to multiple hazards and preparedness would increase substantially to \$81.0 million in FY2017 from \$52 million the year before. Programs include the Food Safety and Inspection Service's (FSIS) Public Health Data Communication Infrastructure System, the Office of Homeland Security and Emergency Coordination, and the Animal and Plant Health Inspection Service (APHIS) program for Emergency Management. The increase in funding for FY2017 would be allocated to the Emergency Management program and is being requested in order to better respond to animal health emergencies such as avian influenza, to increase preparedness for health events involving large animals, and to more fully fund the USDA Select Agents program, among other activities.⁴¹

Department of Veterans Affairs (VA)

The Emerging Pathogens/Bioterrorism program in the VA would receive \$1 million in the proposed FY2017 budget, representing flat funding from FY2015 and FY2016.⁴²

CONCLUSIONS

Federal funding for health security programs dedicated to civilian biological, radiological and nuclear, and chemical security; pandemic influenza and emerging infectious diseases; and multiple-hazard and preparedness is budgeted at \$12.95 billion for FY2017. This proposed funding level represents a potential budget decrease for health security programs totaling \$782 million across all agencies and program types. Of the total proposed health security funding for FY2017, a majority of programs (55%, or \$7.10 billion) are considered to be multiple-hazard and preparedness programs dedicated to building systems that can protect the country from a variety of threats to health. While this multiple-hazard and preparedness funding is the largest proportion of health security program funding, it also is scheduled to receive the biggest funding cut (\$680.5 million, or 10%) in FY2017.

Radiological/nuclear security programs make up about 19% (\$2.45 billion) of health security program funds in FY2017, a steady amount of funding when compared to FY2016 estimated totals. Biosecurity programs comprise around 13% (\$1.64 billion) of the overall health security budget in FY2017. This represents a decrease in funding of \$112.3 million (6.5%) from FY2016 for programs dedicated specifically to biosecurity. In FY2017, pandemic influenza and emerging infectious diseases programs contribute about 10% (\$1.33 billion) to the health security budget, an increase of \$120 million (10%) above FY2016. Finally, programs dedicated to chemical incident prevention, preparedness, and response would receive 3% (\$417 million) of the health security funding total this year, an increase in funding of \$18.6 million (5%) from FY2016.

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Address correspondence to:

Crystal Boddie, MPH

Senior Associate

UPMC Center for Health Security

621 East Pratt St., Ste 210

Baltimore, MD 21202

E-mail: boddiecr@upmc.edu