

# **Lewis-Burke** **Associates LLC**

## **Analysis of the President's FY 2017 Budget Request for Federal Research, Health and Education Programs**

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Government Relations for Research & Education

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## Executive Summary

President Obama released the last budget request of his Administration on February 9<sup>th</sup>. The budget proposal nominally adheres to the top defense and non-defense discretionary spending levels agreed to by Congress in the fall of last year. However, the White House is relying on mandatory spending, which requires Congress to pass legislation to make these expenditures outside of the yearly appropriations process, to fund additional priorities in a flat budget environment. While the new initiatives and policy priorities provide the research and education communities a rallying point for advocacy, this mandatory funding will almost certainly not be embraced, since Congress would have to enact new taxes and designate the revenue specifically for the purposes of funding these programs.

As in prior years, the budget request outlines a consistent agenda for research and education organizations, with initiatives focused on advanced manufacturing, neuroscience, Alzheimer's research, basic and applied energy, and advanced computing as well as efforts to increase college access (e.g. year-round Pell Grants), completion, and outcomes. These types of focused thrusts would continue to receive the bulk of proposed new investments directed toward federal research and education agencies. At the same time, the request continues prior proposals to identify savings and increased efficiencies such as cuts to indirect medical education in favor of new policies associated with healthcare delivery and cuts in defense basic research accounts in favor of more applied or translational initiatives.

To further his legacy on research, education, and other funding priorities and potentially influence the next White House Administration and Congress, the President has laid out ambitious multi-year agendas for his top priorities, despite this being his last year in the White House. While the Congress may disagree with many of his proposed savings, mandatory funding streams, and new initiatives, several of the recommendations are bipartisan priorities that will receive some traction from both parties. In particular, new investments in exascale computing, a focused cancer initiative (as first discussed during the President's State of the Union), cybersecurity, and expansion of science, technology, engineering, and mathematics (STEM) education are all expected to receive congressional support. Beyond the budget proposal itself, the White House also recently released a Federal Cybersecurity Research and Development Strategic Plan, a Cybersecurity National Action Plan, and a \$1.8 billion emergency funding plan to combat the Zika virus, all of which are expected to be met with strong congressional support and interest.

The submission of the President's budget request officially kicks off what is expected to be a fairly aggressive congressional cycle to consider annual appropriations bills. While the advocacy communities will advance their priorities, with only \$3 billion in additional spending from FY 2016 to FY 2017 across the entire federal discretionary budget, FY 2016 enacted funding levels provide a more realistic starting point for FY 2017 budget discussions.

## Department of Defense

The President's FY 2017 budget request would provide \$71.4 billion for Research, Development, Test, and Evaluation (RDT&E) programs at the Department of Defense (DOD), including \$12.5 billion for Science and Technology (S&T) accounts. Compared to the FY 2016 enacted levels, these amounts would represent an increase of 4.3 percent for RDT&E and a 3.8 percent decrease for S&T.

- The *Bipartisan Budget Act of 2015* set the overall FY 2017 base budget and Overseas Contingency Operations (OCO) funding levels for DOD. The budget request adheres to these caps, but some in Congress are likely to push for additional OCO funding to address their defense priorities.
- For the third year in a row, the President would reduce basic research funding across the Department. In FY 2017, the budget request would also propose reductions to applied research and the Army's advanced technology development accounts. Advanced Technology and Development has been increased for the Navy and Air Force as well as DOD-wide for advanced component development and prototypes for strategic capabilities.
- Over the past several years, Congress has shown strong support for basic research and science and technology accounts overall. Many Members of Congress appreciate the value of DOD S&T, but there will be tough trade-offs to make between near-term needs for current conflicts and long-term capabilities to address future threats.

### New and Signature Initiatives

The President proposes a base FY 2017 defense budget of \$523.9 billion and an additional \$58.8 billion in **Overseas Contingency Operations (OCO)** funding for ongoing military operations in Syria, Afghanistan, Iraq, and other areas. The FY 2017 budget request would fund efforts to support both the ongoing conflict against the Islamic State of Iraq and the Levant (ISIL) and Afghanistan's security and development operations, while also seeking advanced new weapons and capabilities to deter technological and military advances by Russia, China, North Korea, Iran and Russia. With a modest increase of \$3 billion above the current level, the DOD budget still falls approximately \$11 billion short of the planned pre-sequestration budget levels creating significant cuts in the FY 2017 budget.

The President's budget request for FY 2017 would grow the RDT&E account to \$71.4 billion as the DOD moves forward with the "third offset" technology development strategy that is part of the **Defense Innovation Initiative** started in the fall of 2014. The Initiative is designed to spur advancements in science and innovation needed to create game-changing defense technologies for the long-term (for example from 2025-2035). Ideas for a portion of the third offset have recently emerged that emphasize the use of robotics and autonomy (including artificial intelligence) to create five warfighting capability foundations which include:

- Autonomous Learning Systems;
- Human-Machine Collaborative Decision Making;
- Assisted Human Operations;
- Advanced Manned-Unmanned System Operations; and

- Network-enable, autonomous weapons hardened to operate in a future cyber/electronic warfare (EW) environment.

To bolster conventional deterrence and accelerate delivering new capabilities, near-term emerging technologies that would receive increased funding include:

- Assured positioning, navigation and timing;
- Large displacement unmanned undersea vehicles;
- High speed strike weapons;
- Arsenal plane;
- Hypersonics;
- Low-cost unmanned systems; and
- High-Velocity Projectiles from “powder guns”.

The technologies would undergo experimentation primarily by the Navy and Air Force which would receive advanced technology development funding for these activities, including the Air Force’s request for \$93 million to modernize test and evaluation facilities.

The President’s FY 2017 budget request would decrease basic research (6.1) across DOD and applied research (6.2) in areas such as materials research, combat vehicle development, and Army and Navy aircraft. In contrast applied research areas such as electronic warfare, next generation GPS, intelligence, surveillance and communications would see increases. In particular, for the Air Force, proposed funding increases for applied and advanced development (6.3-6.5) for directed energy, intercontinental ballistic missiles, space situation awareness systems, and ground based strategic deterrents are indicative of the need to provide capability to address near-peer adversaries that are challenging the U.S. technological superiority and ultimately national security. With the President’s 9 percent reduction to basic research, as well as a 3.6 percent reduction to applied research, it remains to be seen whether Congress will accept the proposed reductions after reversing similar proposals for the last two fiscal years.

## Proposed Reductions and Terminations

While President Obama proposes to increase total defense spending, his FY 2017 budget request cuts S&T investments by \$500 million, procurement spending for weapons platforms by \$8 billion, and new military construction by \$1.1 billion relative to last year.

Of significance to the university and research community, the **Defense Threat Reduction Agency (DTRA)** would be funded at \$461 million, a decrease of \$27.5 million from FY 2016. Within DTRA, the Basic Research Initiative would be funded at \$35.4 million, a decrease of 8.4 percent from the FY 2016 enacted level.

The proposed reduction to **Defense Health Research and Development**, reflected in the chart below, is due to the President’s omission of congressionally-directed medical research funding which was included in the final FY 2016 Defense Appropriations Bill. It is standard practice for the President not to request the funding, which supports research into a variety of diseases and conditions affecting service members, veterans, and their families, before it is restored by the congressional appropriations committees.

With the 49 percent decrease to the defense-wide basic research initiatives account, FY 2016 congressional increases for the **Minerva** program and **National Security Science and Engineering Faculty Fellowship** are in jeopardy, but details about this account have not yet been released. The **Multi-disciplinary University Research Initiative (MURI)** program is also at risk due to the 30 percent decrease proposed in the Navy's University Research Initiatives account. The **Defense Rapid Innovation Fund** was not requested in the FY 2017 budget, but funding is anticipated to be restored by Congress.

## Ongoing Areas of Interest

President Obama's FY 2016 budget request identifies biotechnology, electronic warfare, cyber/computing, hypersonics, directed energy, and manufacturing among its research priorities for FY 2017. These are all areas where DOD has already invested during the Obama Administration and are highlighted in the request to attract industry participation. In addition, a new-start program for Wargaming is proposed at \$4 million. This program would support the **Defense Innovation Initiative**. The National Defense Education Program would be increased by 28 percent to support STEM education for military families.

The President's FY 2017 budget request would maintain the Department's role in advanced manufacturing through the **National Network for Manufacturing Innovation (NNMI)**. For FY 2017, the President proposes \$158.3 million for DOD to sustain the six existing or in-progress NNMI institutes, plus two additional institutes, creating eight total institutes under the Department. In addition, the Defense Logistics Agency would be allocated \$31.2 million for a new start manufacturing technology program.

Finally, President Obama continues to propose funding increases for **DARPA**, which would receive an additional \$105 million in base funding for a total of \$2.97 billion to support high-risk, high-reward research. Additionally, DARPA's basic research program would see a 9 percent increase in contrast to the rest of the DOD basic research portfolio. While DARPA enjoys bipartisan support, some Members of Congress continue to question the agency's ability to effectively execute robust funding levels that were reduced in last year's appropriations.

Source: The overview of DOD's FY 2017 budget request can be viewed at [http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2017/FY2017\\_Budget\\_Request.pdf](http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2017/FY2017_Budget_Request.pdf); detailed budget documents for each of the service branches and defense-wide programs are available on the DOD comptroller's website at [http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2017/fy2017\\_r1.pdf](http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2017/fy2017_r1.pdf).

### Department of Defense\*

(In thousands)

	FY 2016 Enacted	FY 2017 Request	Request vs. FY 2016
RDTE, total	69,737,016	71,391,771	1,654,755 (2.4%)
S&T, Total	12,996,559	12,500,756	-495,803 (3.8%)
6.1, Total	2,309,196	2,101,832	-207,364 (9.0%)
6.2, Total	4,996,199	4,815,400	-180,799 (3.6%)

<b>6.3, Total</b>	<b>5,691,164</b>	<b>5,583,524</b>	<b>-107,640 (1.9%)</b>
<b>Army RDTE</b>	<b>7,562,170</b>	<b>7,515,399</b>	<b>-46,771 (0.6%)</b>
<i>Army Basic</i>	469,079	428,943	-40,136 (8.6%)
<i>Army Applied</i>	1,092,885	907,574	-185,311 (17.0%)
<i>Army ATD</i>	1,127,304	930,065	-197,239 (17.5%)
<b>Navy RDTE</b>	<b>18,111,247</b>	<b>17,276,301</b>	<b>-834,946 (4.6%)</b>
<i>Navy Basic</i>	671,875	542,970	-128,905 (19.2%)
<i>Navy Applied</i>	965,872	861,151	-104,721 (10.8%)
<i>Navy ATD</i>	696,226	736,988	40,762 (5.9%)
<b>Air Force RDTE</b>	<b>25,194,457</b>	<b>28,112,251</b>	<b>2,917,794 (11.6%)</b>
<i>Air Force Basic</i>	530,253	500,024	-30,229 (5.7%)
<i>Air Force Applied</i>	1,240,141	1,260,152	20,011 (1.6%)
<i>Air Force ATD</i>	710,377	725,805	15,428 (2.2%)
<b>DW RDTE</b>	<b>18,681,659</b>	<b>18,308,826</b>	<b>-372,833 (2.0%)</b>
<i>DW Basic</i>	637,989	629,895	-8,094 (1.3%)
<i>DW Applied</i>	1,697,301	1,786,523	89,222 (5.3%)
<i>DW ATD</i>	3,157,257	3,190,666	33,409 (1.1%)
<b>Defense Health R&amp;D</b>	<b>2,121,452</b>	<b>822,907</b>	<b>-1,298,545 (61.2%)</b>

\*Does not include Overseas Contingency Operations funding (OCO).

## Department of Health and Human Services

### National Institutes of Health

The President's FY 2017 budget request includes \$33.1 billion for the National Institutes of Health (NIH), which is a \$1 billion (3.1 percent) increase over the FY 2016 enacted level.

- Employing a similar tactic used for other agencies, the Administration is proposing that \$1.8 billion of the total NIH budget be in new mandatory funding directed to White House priorities, such as the Vice President's Cancer Moonshot Initiative and precision medicine. This leaves \$31.3 billion in discretionary funding NIH, which is less than the \$32.1 billion provided for NIH in FY 2016. While congressional appropriators are unlikely to accept the use of mandatory funds to prop up the NIH budget, the strong bipartisan support for NIH suggests they will find a way to provide additional discretionary funding for NIH in FY 2017.
- As previewed by the White House in the weeks leading up to the budget release, the NIH budget request includes funding to launch the National Cancer Moonshot, which is designed to be a multi-year initiative to accelerate the fight against cancer. The budget request would provide \$680 million in mandatory funding for the National Cancer Institute (NCI) to substantially increase progress in the cancer prevention, treatment, and discovery. The Moonshot Initiative also includes \$75 million in mandatory funding for the Food and Drug Administration (FDA) to develop regulatory pathways for new technologies and to facilitate the sharing of important data across government, academia, and industry.
- This final budget request from the Obama Administration continues the trend of carving out significant funding for White House priority initiatives. This approach appears to resonate with Congress, as it has included increased funding for precision medicine, Alzheimer's, and BRAIN in appropriations bills over the last couple years. However, these signature programs come at the expense of general NIH research funding, as illustrated by flat funding for most Institutes and Centers in the FY 2017 budget request.

### New and Signature Initiatives

#### **National Cancer Moonshot**

First announced in the President's State of Union address, the Cancer Moonshot (or NIH Cancer Research Initiative, the agency's preferred term) would receive \$680 million to engage across the cancer research and oncology community. This would support a range of activities, including developing new techniques to detect cancer earlier, expanding recent successes in cancer immunotherapy to more tumor types, and supporting enhanced data sharing to speed discovery and verify treatment response. This funding would follow \$195 million provided to NIH in FY 2016 to launch Moonshot activities immediately.

#### **Precision Medicine**

The budget request would provide \$230 million for the Precision Medicine Initiative Cohort Program through the Common Fund, a \$100 million (77 percent) increase above FY 2016. The cohort program aims to enroll more than 1 million volunteers to broaden understanding of precision medicine approaches that take into account individual variability in genes, environment, and lifestyle. This

significant increase for the cohort program would enable implementation of the infrastructure needed to support initial enrollees.

The budget request would also provide \$70 million for the Precision Medicine Initiative for Oncology (PMI-O) program at NCI, the same level as FY 2016. The primary element of this program is expanding clinical trials that select drug therapies based on the patient's molecular abnormalities rather than the site of the tumor's origin. The additional funding would help expand the NCI Molecular Analysis for Therapy Choice (NCI-MATCH) trial launched in 2015 and a similar trial, Pediatric MATCH, to be launched next year that would test the approach in children. Congress has been broadly supportive of PMI by including increases in the FY 2016 omnibus appropriations bill, and authorizing additional funds in both the *21<sup>st</sup> Century Cures Act* and the Senate's proposed medical innovation legislation.

### **BRAIN Initiative**

The budget request would provide a \$45 million increase in mandatory funding for the NIH BRAIN Initiative, for a total of \$195 million in FY 2017. Launched in 2013, the multi-agency initiative aims to develop new technologies to produce a clearer picture of the brain. The additional funding would support the ambitious goals of this initiative by funding basic neuroscience research, human neuroscience, neuroimaging, and training, as well as collaborative projects with industry to test new devices in the brain and to address big data collected from brain research.

### **Alzheimer's Disease**

The NIH budget request would provide \$350 million for Alzheimer's disease research through the National Institute on Aging (NIA). The budget request highlights basic neuroscience research, epidemiologic studies to identify risk factors and protective genes, and clinical trials to test preventive and therapeutic interventions. NIH's efforts are part of the National Plan to Address Alzheimer's Disease, which aims to prevent and effectively treat the disease by 2025.

### **Antimicrobial Resistance**

The budget request would provide NIH with \$413 million in FY 2017, which is the same amount as FY 2016, to respond to the threat of antibiotic-resistant bacteria. These funds would accelerate the development of new therapeutics, vaccines, and drugs to more effectively treat drug-resistant bacteria. NIH also would enhance support for developing rapid diagnostics to ensure dangerous strains are quickly identified and treated; building a national database of genome sequence data of reported infections; and creating a rapid response clinical trial network to test new antibiotics.

### **Big Data to Knowledge**

In FY 2017, NIH would direct \$69.1 million to the Big Data to Knowledge (BD2K) program through the Common Fund to facilitate broad use of biomedical big data by supporting the development of big data software, reference datasets, data analysis, and dissemination methods. This would be a \$6.2 million (9.8 percent) increase over FY 2016 to make big data software innovations more user-friendly and support innovative approaches using crowdsourcing and interactive digital media, as well as create a comprehensive data commons for NIH data resources.

### **Ongoing Areas of Interest**

NIH estimates it would devote \$18.2 billion to support 36,440 competitive **Research Project Grants (RPGs)** in FY 2017, which would be 600 more than FY 2016. This would include 9,946 new and competing RPGs, 807 less than FY 2016.

The National Center for Advancing Translational Sciences (NCATS) congressional budget justification specifies that the **Clinical and Translational Science Awards (CTSA)** program within NCATS would receive \$500 million, which would be level with the FY 2016 enacted level. Additionally, the budget request would direct \$25.8 million to the **Cures Acceleration Network (CAN)**, which is also equal to the FY 2016 amount. Both of these programs received fairly significant increases in the FY 2016 omnibus as part of Congress' interest in accelerating the development of drugs and therapies.

The President's budget request would direct a total of \$849 million to support training 16,421 scientists through the **Ruth L. Kirschstein National Research Service Awards** program. The budget also includes a 2 percent stipend increase for predoctoral and postdoctoral trainees in FY 2017.

The budget request includes \$320.8 million for the **Institutional Development Award (IDeA) program**, which is the same level provided in FY 2016. This program, which is a priority for many Members of Congress from states where institutions are not typically as successful at acquiring NIH grants, received a sizeable increase of \$47.5 million in FY 2016. Given the interest of some congressional leaders to expand the program, it may receive additional funds in FY 2017.

The budget request would retain the **salary cap for extramural grants at Executive Level II**, which is the same level as in FY 2016. The decrease from Executive Level I was first enacted in the FY 2012 budget.

Sources: HHS Budget in Brief, pages 47-51: <http://www.hhs.gov/sites/default/files/fy2017-budget-in-brief.pdf>; NIH FY 2017 budget overview: <https://officeofbudget.od.nih.gov/pdfs/FY17/31-Overview.pdf>; NCI FY 2017 congressional budget justification: <http://www.cancer.gov/about-nci/budget/congressional-justification/fy2017-nci-congressional-justification.pdf>; NCATS FY 2017 congressional budget justification: <https://ncats.nih.gov/files/FY17-justification.pdf>.

### National Institutes of Health

(In thousands)

	FY 2015 Enacted	FY 2016 Enacted	FY 2017 Request	Request vs. FY 2016
<b>NIH total</b>	<b>30,311,349</b>	<b>32,311,349</b>	<b>33,136,349</b>	<b>825,000 (2.6%)</b>
<b>National Cancer Institute (NCI)</b>				680,000* (13.0%)
	4,953,028	5,213,509	5,893,509	
<b>National Heart, Lung, and Blood Institute (NHLBI)</b>	2,995,865	3,113,533	3,113,533	--
<b>National Institute of Dental and Craniofacial Research (NIDCR)</b>	397,700	413,396	413,396	--
<b>National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)</b>	1,899,140	1,966,310	1,966,310	--
<b>National Institute of Neurological Disorders and Stroke (NINDS)</b>	1,604,607	1,695,180	1,695,180	--

<b>National Institute of Allergy and Infectious Diseases (NIAID)</b>	4,417,558	4,715,697	4,715,697	--
<b>National Institute of General Medical Sciences (NIGMS)</b>	2,372,301	2,512,437	2,512,437	--
Institutional Development Award (IDeA)	273,325	320,840	320,840	--
<b>Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)</b>	1,286,869	1,338,348	1,338,348	--
<b>National Eye Institute (NEI)</b>	676,764	707,998	707,998	--
<b>National Institute of Environmental Health Sciences (NIEHS)</b>	744,682	770,882	770,882	--
<b>National Institute on Aging (NIA)</b>	1,197,523	1,598,246	1,598,246	--
<b>National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)</b>	521,528	541,662	541,662	--
<b>National Institute on Deafness and Other Communications Disorders (NIDCD)</b>	405,207	442,936	442,936	--
<b>National Institute of Mental Health (NIMH)</b>	1,433,651	1,518,673	1,518,673	--
<b>National Institute on Drug Abuse (NIDA)</b>	1,015,705	1,050,550	1,050,550	--
<b>National Institute on Alcohol Abuse and Alcoholism (NIAAA)</b>	447,153	467,445	467,445	--
<b>National Institute of Nursing Research (NINR)</b>	140,852	145,912	145,912	--
<b>National Human Genome Research Institute (NHGRI)</b>	498,677	513,227	513,227	--
<b>National Institute of Biomedical Imaging and Bioengineering (NIBIB)</b>	327,243	342,506	342,506	--
<b>National Institute on Minority Health and Health Disparities (NIMHD)</b>	270,969	280,680	280,680	--
<b>National Center for Complementary and Integrative Health (NCCIH)</b>	124,062	129,941	129,941	--
<b>National Center for Advancing Translational Sciences (NCATS)</b>	632,710	685,417	685,417	--
Cures Acceleration Network (CAN)	9,834	25,835	25,835	--
<b>John E. Fogarty International Center (FIC)</b>	67,634	70,117	70,117	--
<b>National Library of Medicine (NLM)</b>	337,324	395,684	395,684	--
<b>Office of the Director (OD)</b>	1,413,734	1,571,200	1,716,200	145,000 (9.2%)
Common Fund	545,639	675,639	775,639 <sup>†</sup>	100,000 (14.8%)
<b>Building and Facilities</b>	128,863	128,863	128,863	--

\*This increase is supported by mandatory funding.

†This amount includes mandatory funding for the Precision Medicine Initiative Cohort Program.

### **Other HHS Agencies and Priorities**

The President's FY 2017 budget request would provide \$1.15 trillion in budget outlays for the Department of Health and Human Services (HHS), a 3 percent increase above the FY 2016 enacted level. This includes both mandatory and discretionary funding. Of that amount, \$82.8 billion would be discretionary funding.

- As in previous budget requests, the President's budget request for FY 2017 targets indirect medical education (IME) payments by proposing a 10 percent reduction to IME.
- The budget request would include both mandatory and discretionary funding across HHS agencies to support mental and behavioral health activities, which would include increasing access to services and treatment, early intervention activities, and workforce initiatives.
- The budget request would provide several legislative proposals focused on service delivery reform and access to healthcare, including a new proposal to fully fund a state's Medicaid expansion for three years, for newly expanded states.

### **New and Signature Initiatives**

#### **Mental and Behavioral Health**

The President's FY 2017 budget request would provide both mandatory and discretionary funding across HHS agencies to support mental and behavioral health activities. Following a recent discussion between Speaker Paul Ryan (R-WI), Senate Majority Leader Mitch McConnell (R-KY), and President Obama, mental health was identified as one area where legislative progress could be achieved this year.

Overall, the President's budget request would include funding for mental and behavioral health activities across HHS focused on expanding services, expanding and improving treatments, supporting the mental and behavioral workforce, and improving access to early intervention activities. Examples of this funding would include \$30 million for the Centers for Disease Control and Prevention (CDC) for the evaluation of suicide prevention programs. The budget request would provide \$115 million for a new state formula grant for evidence-based early intervention programs for serious mental illness at the Substance Abuse and Mental Health Services Administration (SAMHSA).<sup>1</sup> SAMHSA would also support a new \$10 million demonstration project, Crisis Systems, which would help states and communities build, fund, and sustain crisis response systems capable of preventing and de-escalating behavioral health crises, including testing models of effective, coordinated, and integrated crisis response systems.<sup>2</sup>

The budget request would continue investments under the *Now is the Time* initiative focused on helping ensure treatment for young adults, and would provide \$10 million for a new peer professional program. Aligning with the *Now is the Time* Initiative, the budget request would also provide \$10 million to the CDC to conduct research on the causes and prevention of gun violence.

<sup>1</sup> <http://www.hhs.gov/sites/default/files/fy2017-budget-in-brief.pdf>, Fiscal Year 2017 Budget in Brief, Department of Health and Human Services (pg. 53)

<sup>2</sup> <http://www.hhs.gov/sites/default/files/fy2017-budget-in-brief.pdf>, Fiscal Year 2017 Budget in Brief, Department of Health and Human Services (pg. 54)

The President's budget request would also continue funding for key mental and behavioral health workforce and education programs such as the joint SAMHSA and Health Resources and Services Administration (HRSA) Behavioral Health Workforce Education and Training program, which would receive \$56 million in the President's budget request, a \$6 million increase above the FY 2016 enacted level. However, the funding would flow directly to HRSA as opposed to going through SAMHSA as in past years. In addition, the Minority Fellowship Program at SAMHSA, which focuses on reducing health disparities by providing grants to increase the number of racial and ethnic minorities in the nation's behavioral health workforce and better prepare behavioral health practitioners to more effectively treat and serve people of different cultural and ethnic backgrounds,<sup>3</sup> would receive \$11.669 million, the same level enacted in FY 2016.

### **Addressing Opioid Abuse and Heroin Addiction**

The budget request would provide \$1 billion in mandatory funding to address prescription opioid abuse and heroin addiction. The President has said addressing the opioid epidemic is a priority, and has backed this statement up with investments from the Administration over the last year. The \$1 billion in mandatory funding would be used for states to expand medical assistance treatment based on the severity of the epidemic. Additionally, the budget would provide mandatory and discretionary funding across HHS to support these activities, including mandatory funding to expand the National Health Service Corps for substance abuse treatment providers; mandatory funding for evaluating the effectiveness of treatment programs; and discretionary funding for grants to prevent prescription drug- and opioid overdose-related deaths.

### **Promoting Affordable Prescription Drugs**

To address concerns about access to affordable medication, the President's budget request includes new proposals which would provide HHS some ability to negotiate drug prices with manufacturers. For example, the budget proposes allowing the Secretary of HHS to negotiate high-cost drugs and biologics under Medicare Part D. In addition, the budget request proposes allowing the Centers for Medicare and Medicaid Services (CMS) and state Medicaid programs to partner with a private sector contractor to negotiate supplemental rebates from drug manufacturers.<sup>4</sup> Other mechanisms to promote affordable drugs would include reducing the drug company exclusivity for generic biologics to seven years, implementing new requirements on manufacturers to report on certain costs, and speeding up closing the donut hole under Medicare.

## **Proposed Reductions and Terminations**

### **Education Research Centers**

The budget request would eliminate funding for CDC Education Research Centers at institutions of higher education. These Centers have previously been targeted in the budget request, but Congress continues to provide funding.

### **Racial and Ethnic Approaches to Community Health (REACH)**

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<sup>3</sup> <http://www.samhsa.gov/minority-fellowship-program>, Substance Abuse and Mental Health Services Administration, 2017

<sup>4</sup> <http://www.hhs.gov/sites/default/files/fy2017-budget-in-brief.pdf>, Fiscal Year 2017 Budget in Brief, Department of Health and Human Services (pg. 98)

The budget request would also reduce funding for the REACH program at the CDC, which focuses on reducing health disparities. According to the CDC, the budget request would fund the most effective and evidence-based REACH programs and would award a new cooperative agreement in 2017 to incorporate lessons learned from prior community grant programs.<sup>5</sup>

### **Reductions to Hospital Bad Debt**

In previous budget requests from this Administration, the President has recommended reducing Medicare payments to hospitals for Medicare bad debt. This issue arises when Medicare beneficiaries cannot pay their required cost sharing, which is a serious concern for teaching hospitals. The budget request would reduce payments for Medicare bad debt from 65 percent to 25 percent over three years.

### **Area Health Education Centers (AHECs)**

Within Title VII Health Professions Programs at HRSA, the budget request would eliminate funding for AHECs. This Administration has proposed eliminating funding for AHECs in its previous budgets requests, but Congress continues to fund AHECs each year. Furthermore, HRSA is planning to recompute these centers next year, indicating that the Administration does not anticipate the program would actually be eliminated.

### **Ongoing Areas of Interest**

#### **Healthcare Workforce/Teaching Health Centers**

The budget request would provide \$231.3 million for Title VII health professions programs at HRSA, which is \$31.2 million below FY 2016 enacted levels. The decrease in Title VII programs would reflect the elimination of the AHEC program discussed above. Title VIII Nursing Workforce Development Programs would receive \$229.5 million, the same as the FY 2016 enacted level.

In addition, the budget request would include \$60 million in already enacted funding for the Teaching Health Centers Graduate Medical Education program at HRSA, and would also extend the program through 2020 and include new mandatory funding totaling \$245 million in FY 2018 and \$141 million in FY 2019 and 2020.<sup>6</sup>

#### **Patient Protection and Affordable Care Act**

The budget request includes a legislative proposal which would provide an incentive for states that have not yet expanded their respective Medicaid programs as outlined in the *Patient Protection and Affordable Care Act (ACA)*. To date, only 31 states (including D.C.) have chosen to expand Medicaid to non-elderly adults with incomes below 133 percent of the federal poverty level, per the ACA. The President's budget request includes a legislative proposal that would provide three years of full expansion funding for any state that expands Medicaid under the ACA. Essentially, this would cover 100 percent of the cost of expansion for three years no matter when a state chooses to expand. Just like the

<sup>5</sup> <http://www.cdc.gov/budget/documents/fy2017/fy-2017-cdc-congressional-justification.pdf>, Department of Health and Human Services Fiscal Year 2017, Centers for Disease Control and Prevention, Justification of Estimates for Appropriations Committees, 2017 (pg. 15)

<sup>6</sup> <http://www.hrsa.gov/about/budget/budgetjustification2017.pdf>, The Department of Health and Human Services Fiscal Year 2017, Health Resources and Services Administration, Justification of Estimates for Appropriations Committees, 2017 (pg. 192)

original Medicaid expansion provision in ACA, this funding would be phased down over three years. Congress would need to enact this proposal.

### **Agency for Healthcare Research and Quality (AHRQ)**

The President's FY 2017 budget proposal would provide \$470 million in total funding for AHRQ, a \$40 million increase above the FY 2016 level. Areas at AHRQ that would see an increase above the FY 2016 level as part of the budget request include a \$2 million increase for patient safety research, \$27 million increase for health costs, quality and outcomes research, and \$24 million increase for research to identify the most effective ways to organize, manage, finance, and deliver high quality care. This is characterized by HHS as going beyond the "what" of patient care to the "how" - meaning how inputs, policies, procedures, and training can be changed to produce better functioning health systems and better patient outcomes.<sup>7</sup>

### **Health System Delivery Reforms**

The budget request would provide legislative proposals focused on service delivery reforms including (but not limited to) implementing bundled payments for post-acute care, establishing a bonus payment for hospitals that "furnish a sufficient portion of their services through eligible alternative payment entities,"<sup>8</sup> and implementing a value-based purchasing program for additional providers such as hospital outpatient departments and community mental health providers. The budget request would also reinstate the expired enhanced payment rate for primary care providers authorized in the ACA.

The budget request also includes a proposal that would allow the Secretary to revise the Hospital Readmission Reduction Program based on broad categories of conditions instead of discrete application conditions.<sup>9</sup> As we have seen in other budget proposals from Congress and the Administration, the FY 2017 budget request proposes rebasing Medicaid Disproportionate Share Hospital (DSH) Payments, extending the cut through 2026 as a way to calculate a cost savings.

### **340B Drug Pricing Program**

The President's FY 2017 budget request includes a proposal to provide clear regulatory authority for the 340B Drug Pricing program at HRSA. HRSA has been criticized by some Members of Congress for its oversight of the 340B program, while also having its authority over the 340B program challenged in court; this has left HRSA apprehensive about its statutory authority to issue regulations.

According to HRSA's FY 2017 budget justification to Congress, clear legislative authority to conduct rulemaking for all provisions in the 340B statute would be most effective in facilitating HRSA's oversight and management of the 340B Program. It also would allow HRSA to provide greater clarity and specificity for its program requirements, enabling the agency to respond to some key GAO findings, such as clarifying hospital eligibility requirements and the definition of a 340B patient. HRSA notes that

<sup>7</sup> <http://www.hhs.gov/sites/default/files/fy2017-budget-in-brief.pdf>, Fiscal Year 2017 Budget in Brief, Department of Health and Human Services (pg. 60)

<sup>8</sup> <http://www.hhs.gov/sites/default/files/fy2017-budget-in-brief.pdf>, Fiscal Year 2017 Budget in Brief, Department of Health and Human Services (pg. 69)

<sup>9</sup> <http://www.hhs.gov/sites/default/files/fy2017-budget-in-brief.pdf>, Fiscal Year 2017 Budget in Brief, Department of Health and Human Services (pg. 69)

because regulations are binding and enforceable, they would allow the agency to be more specific about 340B Program requirements and provide necessary clarity for stakeholders.<sup>10</sup>

Sources: Department of Health and Human Services FY 2017 budget can be viewed at <http://www.hhs.gov/budget/>; FY 2017 HRSA budget can be viewed at <http://www.hrsa.gov/about/budget/>; FY 2017 budget for SAMHSA can be viewed at <http://www.samhsa.gov/budget/>; FY 2017 budget for CDC can be viewed at <http://www.cdc.gov/budget/>; FY 2017 budget for CMS can be viewed at <https://www.cms.gov/About-CMS/Agency-Information/PerformanceBudget/index.html?redirect=/performancebudget>.

### Department of Health and Human Services\*

(In millions)

	FY 2015 Actual	FY 2016 Enacted	FY 2017 Request*	Request vs. FY 2016
<b>HHS, total</b>	<b>1,045,210</b>	<b>1,116,973</b>	<b>1,150,252</b>	<b>33,279 (3.0%)</b>
<b>Health Resources and Services Administration (HRSA)</b>	<b>6,347</b>	<b>10,593</b>	<b>10,677</b>	<b>84 (.8%)</b>
<i>Title VII</i>	254	262	231	-31 (11.8%)
<i>Title VIII</i>	231	229	229	--
<b>Substance Abuse and Mental Health Services Administration (SAMHSA)</b>	<b>3,619</b>	<b>3,731</b>	<b>4,322</b>	<b>591 (15.8%)</b>
<i>Mental Health Services</i>	1,078	1,159	1,274	115 (9.9%)
<i>Substance Abuse     Treatment</i>	2,183	2,192	2,661	469 (21.4%)
<i>Substance Abuse     Prevention</i>	175	211	211	--
<b>Agency for Healthcare Research and Quality (AHRQ)</b>	<b>363</b>	<b>428</b>	<b>470</b>	<b>42 (9.8%)</b>
<b>Food and Drug Administration (FDA)</b>	<b>4,505</b>	<b>4,745</b>	<b>5,104</b>	<b>359 (7.6%)</b>
<b>Centers for Disease Control and Prevention (CDC) †</b>	<b>6,900</b>	<b>7,178</b>	<b>7,013</b>	<b>-165 (2.3%)</b>
<i>Chronic Disease Prevention     and Health Promotion</i>	1,199	1,177	1,117	-60 (5.1%)
<i>National Institute for     Occupational Safety and     Health (NIOSH)</i>	334	339	285	-54 (5.9%)
<i>Environmental Health</i>	179	182	182	--

<sup>10</sup> <http://www.hrsa.gov/about/budget/budgetjustification2017.pdf>, The Department of Health and Human Services Fiscal Year 2017, Health Resources and Services Administration, Justification of Estimates for Appropriations Committees, 2017 (pg. 389)

<b>Indian Health Service (IHS)</b>	<b>5,951</b>	<b>6,160</b>	<b>6,562</b>	<b>402 (6.5%)</b>
<b>Administration on Community Living (ACL)</b>	<b>1,700</b>	<b>2,048</b>	<b>2,076</b>	<b>28 (1.4%)</b>
<b>Administration for Children and Families (ACF)</b>	<b>52,000</b>	<b>53,416</b>	<b>63,005</b>	<b>9,589 (18.0%)</b>
<i>National Institute on Disability, Independent Living, and Rehabilitation Research (NIDLR)</i>	104	104	104	--
<b>Office of the National Coordinator for Health IT (ONC)</b>	<b>60</b>	<b>60</b>	<b>82</b>	<b>22 (36.7%)</b>

\* The chart reflects the total program level funding, combining discretionary and mandatory funding.

†The CDC funding levels do not include the Agency for Toxic Substances and Disease Registry (ATSDR).

## National Science Foundation

The President's FY 2017 budget request includes \$7.964 billion for the National Science Foundation (NSF), which is an increase of \$500.5 million or 6.7 percent over the FY 2016 enacted level. Of this increase, \$400 million would be new mandatory funding. For discretionary funding, NSF would be funded at \$7.564 billion, \$100.5 million or 1.3 percent above FY 2016.

- Fundamental research as well as strategic investments in Administration priority areas such as clean energy, neuroscience, resilience, sustainability, and broadening participation remain priorities for NSF.
- New mandatory funding of \$400 million is proposed to strengthen core research support across Directorates with a focus on early career investigators. However, this funding stream is unlikely to be supported in Congress.
- While Congress remains supportive of the basic research funded by NSF, continued disagreements over whether to fund NSF at the individual directorate level complicate efforts to raise NSF's budget overall. Additionally, concerns remain over issues of transparency and oversight.

### New and Signature Initiatives

The President's budget request for NSF for FY 2017 continues to support cross-disciplinary research through NSF-wide activities and initiatives. The new and signature initiatives outlined below build on Administration priorities, linking fundamental research to societal needs.

#### Clean Energy

The FY 2017 budget request includes \$512 million, a 37.9 percent increase above FY 2016 levels, to support fundamental research and education on clean energy technologies including solar, wind, wave, and geothermal as well as alternative fuels (chemical and biofuels). Under the clean energy technology umbrella, NSF also supports research into the collection, conversion, storage, and distribution of energy sources. This investment would be part of the Administration's proposed Mission Innovation Initiative.

#### Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS)

The INFEWS initiative would be supported at \$62 million for FY 2017, an increase of \$13.5 million or 28 percent above FY 2016. INFEWS is an NSF-wide interdisciplinary initiative that aims to understand, design, and model the interconnected food, energy, and water (FEW) systems. For FY 2017, NSF will continue to support activities in INFEWS with a focus on how FEW systems are embedded in societal contexts; innovations to protect FEW resources; systems to facilitate FEW systems distribution, generation, and consumption; cyberinfrastructure tools for modeling and analyzing FEW systems; and education and training. The Directorate for Biological Sciences (BIO) plans to release a new solicitation focused on phytobiomes and plant ecosystems under the INFEWS umbrella. NSF also expects to continue to emphasize FEW themes in NSF-wide programs, such as the Experimental Program to Stimulate Competitive Research (EPSCoR), Research Experiences for Undergraduates (REU), and programs related to sustainability and data science.

### Understanding the Brain (UtB)

The Understanding the Brain (UtB) initiative includes NSF-supported cognitive science and neuroscience research as well as activities specifically focused on the Administration's Brain Research through Advancing Innovation and Neurotechnologies (BRAIN) initiative. UtB would be supported at \$141.6 million in FY 2017, down \$5.3 million or 3.6 percent, following a major increase of \$37.5 million from FY 2015 to FY 2016. Within the total proposed for UtB, \$74 million would support the BRAIN Initiative. Priority areas for UtB continue to include "develop[ing] innovative technologies, tools, experimental approaches, theories, and models to integrate neuroscience information across scales and disciplines; identify[ing] the fundamental relationships among neural activity, cognition, and behavior; transform[ing] our understanding of how the brain responds and adapts to changing environments and recovers from lost functionality; and train[ing] a new generation of scientists, engineers, and educators for a transdisciplinary, globally competitive workforce in neuroscience and neuroengineering."<sup>11</sup>

### Risk and Resilience

The Risk and Resilience initiative would be supported at \$43 million in FY 2017, which is \$2 million or 4.9 percent above FY 2016. The program aims to improve predictability and risk assessment and increase resilience to extreme events to ensure minimal impact on quality of life, society, and the economy. For FY 2017, NSF plans to continue the Critical Resilient Interdependent Infrastructure Systems and Processes (CRISP) program, led by the Directorate for Engineering (ENG), and the Prediction of and Resilience against Extreme Events program (PREEVENTS), led by the Directorate for Geosciences (GEO).

### Inclusion across the Nation of Communities of Learners that have been Underrepresented for Diversity in Engineering and Science (NSF INCLUDES)

NSF INCLUDES would be supported at \$16 million in FY 2017, an increase of 3.2 percent or \$500,000 over FY 2016. NSF INCLUDES is an initiative that began in FY 2016 and is planned to continue through FY 2020 to support NSF-wide activities as well as domain specific efforts to increase the participation of underrepresented groups in science, technology, engineering, and mathematics (STEM) fields. NSF plans to issue a solicitation in late FY 2016 to create the NSF INCLUDES National Network, including a call for up to five broadening participation Alliances and one Backbone Organization that will ensure collaboration and organize the network. Discipline specific efforts are also expected through Dear Colleague letters and changes to program solicitations for existing broadening participation activities.

### Additional Priorities

The FY 2017 budget request also includes the following priorities and highlights:

- **Rules of Life:** An increase of \$13 million would support activities related to a new emphasis in BIO with a focus on genotype to phenotype challenge, plant and microbial sciences, microbiome, synthetic biology, and the origin of life.
- **Computer Science for All (CS for All):** A total of \$20 million would build on current investments to ensure access to computer science classes in K-12 schools. Investments would support development of instructional materials, professional development models, and preservice preparation approaches for computer science teachers as well as research on effective approaches for teaching and learning computer science.

<sup>11</sup> [http://www.nsf.gov/about/budget/fy2017/pdf/42\\_fy2017.pdf](http://www.nsf.gov/about/budget/fy2017/pdf/42_fy2017.pdf), FY 2017 Budget Request to Congress, National Science Foundation, 2016 (pg. NSF-Wide Priorities-42)

- **Smart and Connected Communities:** An increase of \$13 million proposed for the Directorate for Computer and Information Science and Engineering (CISE) to support a network of regional hubs to research networking; sensors; and data management, analysis, and decision making. This will be an NSF-wide activity to include community building efforts, to improve quality of life, health, well-being, and learning in smart and connected communities.

## Proposed Reductions and Terminations

### Cyberinfrastructure Framework for 21<sup>st</sup> Century Science, Engineering, and Education (CIF21)

The budget request proposes \$100 million to support the CIF21 initiative, 24.4 percent below FY 2016. CIF21, which is sun-setting at the end of FY 2017, is intended to provide the advanced cyberinfrastructure and new computational capabilities that the NSF community needs to accelerate scientific discovery and innovation. Many CIF21 investments will transition to the new multi-agency National Strategic Computing Initiative (NSCI) and the new NSF Data for Scientific Discovery and Action (D4SDA) investment area. NSCI is proposed for \$33 million in FY 2017. Support for Computational and Data Enabled Science and Engineering (CDSE) will also continue beyond the end of CIF21.

### Science, Engineering, and Education for Sustainability (SEES)

The budget would support the NSF-wide SEES initiative at \$52 million for FY 2017, 29.8 percent below the FY 2016 level. This continued reduction of funding for SEES is consistent with original plans to complete the program by FY 2017. Investments in FY 2017 will continue support for a few SEES programs, including Dimensions of Biodiversity (DoB); Decadal and Regional Climate Prediction Using Earth System Models (EaSM); Sustainability Research Networks (SRN); Coastal SEES; and Sustainable Chemistry, Engineering, and Materials (SusChEM). SusChEM is expected to become an ongoing program following the sun-setting of SEES. Additionally, activities related to programs with broad community interest are planned to be supported beyond FY 2017 through core programs, including Arctic SEES, Coastal SEES, DoB, EaSM, Ocean Acidification (OA), and Dynamics of Coupled Natural and Human Systems (CNH).

### Additional Reductions

The FY 2017 budget request also includes the following reductions and terminations:

- **Enhancing Access to the Radio Spectrum (EARS):** would experience a \$16 million decrease as NSF plans to terminate investment in this cross-cutting program. Support would continue for ongoing research in wireless communication, spectrum sharing, mobile computing, and wireless and spectrum testbed development.
- **Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE):** down \$25 million decrease as NSF plans to end dedicated funding for this program that enabled a special internal review mechanism for potentially transformative interdisciplinary proposals. Individual Directorates would continue to support INSPIRE-like research through core and cross-cutting programs. NSF plans to develop a new funding mechanism using many of the INSPIRE principles.

## Ongoing Areas of Interest

### Secure and Trustworthy Cyberspace (SaTC)

The SaTC program would be supported at \$150 million in FY 2017, an increase of 15.4 percent above FY 2016. SaTC aims to lay the foundations of cybersecurity research for years to come and aligns with the four thrusts outlined in the *Trustworthy Cyberspace: Strategic Plan for the Federal Cybersecurity Research and Development Program*.<sup>12</sup> NSF plans to add a new Transition to Education mechanism in FY 2017 to support transition of research results to relevant curricula. In addition to continuing current thrusts, SaTC would also focus on secure advanced manufacturing, the security of cyber-physical systems and the internet of things, and transitioning research results. NSF plans to support at least one experimental testbed for cybersecurity. In addition, the CyberCorps Scholarship for Service (SFS) program would increase 40 percent to \$70 million, with \$25 million used to lay the groundwork for SFS alumni to help the government rapidly respond to cybersecurity challenges.

### **Cyber-enabled Materials, Manufacturing, and Smart Systems (CEMMSS)**

The CEMMS program supports research into materials, advanced manufacturing, robotics, and cyber-physical systems, and contributes to interagency priorities including the Materials Genome Initiative (MGI), the Advanced Manufacturing Partnership (AMP), and the National Robotics Initiative (NRI). In FY 2017, CEMMS would be funded at \$257 million, an increase of 0.3 percent over FY 2016 levels. In FY 2017, NSF intends to continue existing programs under the CEMMS umbrella such as Designing Materials to Revolutionize and Engineer our Future (DMREF), Cyber Physical Systems (CPS), the NSF NRI program, and programs related to advanced manufacturing. In addition, NSF plans to begin a new investment in Smart and Autonomous Systems, including workshops on social and behavioral aspects of these systems, competitions and challenges for multidisciplinary efforts, and computational and physical infrastructure needs.

### **Innovation Corps (I-Corps™)**

The Administration continues to support the NSF I-Corps program and would include \$30 million in FY 2017, the same level as FY 2016. Funding would support up to 230 I-Corps™ Teams, including up to nine I-Corps™ Nodes and up to 71 active I-Corps™ Sites.

### **NSF Research Traineeships (NRT)**

The NRT program would receive \$58 million in its third year of operation, a slight increase of 0.8 percent above FY 2016 levels, although significantly down from the FY 2015 enacted amount of \$74 million. NRT aims to support innovative approaches to graduate education in areas of national need and emerging scientific priority. For FY 2017, NSF plans to continue UtB and INFEWS as priority areas, while conducting the emphasis on computation- and data-enabled science and engineering. In addition, the Innovations in Graduate Education (IGE) track would be supported at \$7 million.

### **Improving Undergraduate STEM Education (IUSE)**

The President's budget request would include \$109 million for the Improving Undergraduate STEM Education (IUSE) umbrella, a 3.8 percent increase over FY 2016. IUSE is an NSF-wide effort to improve undergraduate STEM education that includes individual programs in the Directorate for Education and Human Resources (EHR) and individual research Directorates. BIO and CISE both plan to fund new IUSE investments in FY 2017. BIO would fund development of curricula to support biologist education in the

<sup>12</sup> [http://www.whitehouse.gov/sites/default/files/microsites/ostp/fed\\_cybersecurity\\_rd\\_strategic\\_plan\\_2011.pdf](http://www.whitehouse.gov/sites/default/files/microsites/ostp/fed_cybersecurity_rd_strategic_plan_2011.pdf), Trustworthy Cyberspace: Strategic Plan for the Federal Cybersecurity Research and Development Program, National Science and Technology Council

context of a data-rich world. CISE would issue a Dear Colleague Letter or solicitation focused on challenges related to growing enrollment and expanding disciplinary backgrounds of students interested in computer science courses, as well as focus on increasing the number of women completing computer science degrees. EHR plans to increase research opportunities for undergraduates within the IUSE:EHR program through support for course-based research and new research courses as well as to increase opportunities for undergraduate research in NSF-funded facilities and national laboratories through the S-STEM program.

### Science, Technology, Engineering, and Mathematics (STEM) Education

Beyond graduate and undergraduate education discussed above, NSF continues to prioritize core STEM education research to foster the development of STEM education research communities. EHR Core Research (ECR) would be supported at \$107 million in FY 2017, an increase of 58.6 percent. However, much of this increase would be provided through mandatory funding. Under discretionary funding alone, EHR core would be increased 31.0 percent to \$91 million.

Source: The full NSF FY 2017 Budget Request can be viewed at:  
<http://www.nsf.gov/about/budget/fy2017/toc.jsp>.

### National Science Foundation

(In millions)

	FY 2016 Estimate	FY 2017 Request (discretionary)	FY 2017 Request (discretionary) vs. FY 2016	FY 2017 Request (mandatory)	FY 2017 Request (total)	FY 2017 Request (total) vs. FY 2016
<b>NSF, total</b>	<b>7,463.49</b>	<b>7,564.02</b>	<b>100.53 (1.3%)</b>	<b>400.00</b>	<b>7,964.02</b>	<b>500.53 (6.7%)</b>
<b>Research and Related Activities</b>	<b>6,033.65</b>	<b>6,079.43</b>	<b>45.78 (0.8%)</b>	<b>346.01</b>	<b>6,425.44</b>	<b>391.80 (6.5%)</b>
Biological Sciences	744.17	745.73	1.56 (0.2%)	44.79	790.52	46.35 (6.2%)
Computer and Information Science and Engineering	935.82	938.43	2.61 (0.3%)	56.37	994.80	58.98 (6.3%)
Engineering	916.19	946.41	30.22 (3.3%)	56.32	1,002.73	56.32 (6.0%)
Geosciences	1,318.54	1,319.56	1.02 (0.1%)	79.27	1,398.83	80.29 (6.1%)
Mathematical and Physical Sciences	1,349.15	1,355.06	5.91 (0.4%)	81.39	1,436.45	87.30 (6.5%)
Social, Behavioral, and Economic Sciences	272.2	272.41	0.21 (0.1%)	16.36	288.77	12.58 (4.6%)
International Science and Engineering	49.10	49.10	--	2.95	52.05	2.95 (6.0%)
Integrative Activities	447.06	451.30	4.24 (0.9%)	8.56	459.86	12.80 (2.9%)
US Arctic Research Commission	1.43	1.43	--	0	1.43	--
<b>Education and Human Resources</b>	<b>880.00</b>	<b>898.87</b>	<b>18.87 (2.1%)</b>	<b>53.99</b>	<b>952.86</b>	<b>72.86 (8.3%)</b>
<b>Major Research Equipment and Facilities Construction</b>	<b>200.31</b>	<b>193.12</b>	<b>-7.19 (3.6%)</b>	<b>0</b>	<b>193.12</b>	<b>-7.19 (3.6%)</b>
<b>Agency Operation and Award Management</b>	<b>330.00</b>	<b>373.02</b>	<b>43.02 (13.0%)</b>	<b>0</b>	<b>373.02</b>	<b>43.02 (13.0%)</b>

<b>National Science Board</b>	<b>4.37</b>	<b>4.38</b>	<b>0.01 (0.2%)</b>	0	<b>4.38</b>	<b>0.01 (0.2%)</b>
<b>Office of Inspector General</b>	<b>15.16</b>	<b>15.20</b>	<b>0.04 (0.3%)</b>	0	<b>15.20</b>	<b>0.04 (0.3%)</b>

Totals may not add due to rounding.

## U.S. Department of Agriculture

The President's FY 2017 budget request would provide \$24.6 billion in discretionary funding for the U.S. Department of Agriculture (USDA), a decrease of \$1 billion from the FY 2016 enacted level. Within the request, the President proposed a significant increase for the National Institute of Food and Agriculture (NIFA), while a modest decrease is requested for USDA's intramural program, the Agricultural Research Service (ARS).

- Several agencies and programs within USDA align closely with the Administration's priorities, especially in the areas of rural communities, nutrition assistance, and investing in beginning farmers and ranchers. Specifically, the President proposes to quadruple funding for rural small business support and triple funding for broadband access in rural communities. Several reforms to increase access to the Supplemental Nutrition Assistance Program (SNAP) are also proposed, as well a substantial new program to support summer feeding for low-income children. The budget would double funding for programs designed to support and incentivize beginning farmers and ranchers, with a focus on increasing veteran participation in the agricultural workforce.
- In the FY 2017 budget request, the Administration proposes a significant increase to the National Institute of Food and Agriculture's (NIFA) competitive extramural program, the Agriculture and Food Research Initiative (AFRI). However, this increase would be a mix of mandatory and discretionary funding. The discretionary request would provide \$375 million, an increase of about seven percent. The mandatory funding would add \$325 million, bringing AFRI's total to the fully authorized amount of \$700 million.
- Even with considerable fiscal pressure, congressional support for agriculture research and innovation has been growing steadily in recent years. This momentum is expected to continue in the upcoming year, although full funding of programs may not be possible due to budgetary constraints.

### New and Signature Initiatives

Within the President's FY 2017 budget, NIFA would receive a total of about \$1.4 billion, an increase of 3.6 percent over the FY 2016 level for discretionary programs. The request proposes to cut discretionary programs at ARS by approximately \$100 million, although research programs would receive a slight increase of about two percent above the FY 2016 level.

#### Agriculture and Food Research Initiative (AFRI)

The President's budget request for AFRI is a combination of mandatory and discretionary funding, which in total would fund the program at its fully authorized level of \$700 million. The discretionary total for AFRI would be \$375 million, a \$25 million increase, directed to sustainable bioenergy research. The budget request seeks \$325 million in mandatory spending for the program. The request supports both the AFRI Foundational Program and the Challenge Area Programs prioritized by the Administration since AFRI's creation, including water for agriculture, sustainable bioenergy, climate variability, child obesity, food safety, and education and literacy. Additionally, AFRI would receive about \$10 million to improve and consolidate its grants management system in an effort to lower costs for applicants and increase speed and accuracy of proposal receipts.

### **Home Visits for Remote Areas Program (HVRAP)**

The request would create a new competitive grants program within NIFA, to supplement the Department of Health and Human Services' Maternal, Infant, and Early Childhood Home Visiting Program, specifically focused on rural communities and Indian country. HVRAP would receive \$20 million, and would capitalize on the network of Cooperative Extension agents in rural communities and tribal areas to provide education services and support to families in high-poverty environments.

### **Proposed Reductions and Terminations**

Continuing a proposal the President has made the past several years, but Congress has yet to accept, science, technology, engineering, and math (STEM) programs within NIFA would be consolidated into programs managed by the Department of Education and National Science Foundation. Six STEM programs would be moved, including the Higher Education Challenge Grants and the Graduate and Postgraduate Fellowships.

Within ARS, cuts would be made to several research program areas, including a \$2 million cut to Human Nutrition.

Wildfire management and suppression efforts, currently funded through discretionary accounts, would be treated as emergency funding, and thus not subject to existing budget caps.

Additionally, as in previous years, the President has proposed a restructuring and reduction to federal crop insurance programs. The measures, which build on reductions already enacted in the 2014 Farm Bill, would save USDA approximately \$18 billion over the next 10 years.

### **Ongoing Areas of Interest**

The budget request for USDA is organized around six main strategic goals: support for agriculture; rural opportunities; conservation for private and public lands; food security and safety; innovation; and modernization. Each of these goals is reflected in programs across the Research, Education, and Economics (REE) Mission Area, which would receive an almost ten percent increase overall compared to the FY 2016 enacted level.

As part of the President's Strategy to Combat Antimicrobial Resistance, ARS would receive \$22 million to address research questions on antimicrobials in both humans and animals, as well as continue to investigate the relationships between the environment, human health, and microbes.

The request would provide an additional \$3 million for pollinator health work, specifically Cooperative Extension assistance for implementation of improved pest management strategies. Despite this increase, the budget request would not provide additional research dollars.

As in prior years, the President proposes the creation of an endowment fund for Hispanic Serving Agricultural Colleges and Universities to increase Hispanic student participation in the agricultural sciences. The agency would receive \$10 million in mandatory funds to support this endowment.

The FY 2017 budget continues mandatory spending on Farm Bill programs of interest: the Organic Agriculture Research and Education Initiative would receive \$20 million, the Beginning Farmer and Rancher Development Program would receive \$20 million, the Specialty Crop Research Initiative would receive \$55 million, and the Biomass Research and Development Program would receive \$3 million.

Finally, the budget request sustains formula funds under the Smith-Lever Act 3(b) and 3(c) and Hatch Act programs at current funding levels.

Source: USDA's FY 2017 budget materials can be viewed at <http://www.obpa.usda.gov/budsum/fy17budsum.pdf>.

### U.S. Department of Agriculture—Discretionary Funding

(In thousands)

	FY 2015 Actual	FY 2016 Estimated	FY 2017 Request	Request vs. FY 2016
<b>USDA, Research, Education, Economics</b>	<b>2,901,000</b>	<b>3,141,000</b>	<b>3,438,000</b>	<b>297,000 (9.5%)</b>
Agricultural Research Service (ARS)	1,178,000	1,356,000	1,256,000	-100,000 (7.4%)
National Institute of Food and Agriculture (NIFA)	1,295,000	1,331,000	1,379,000	48,000 (3.6%)
AFRI*	325,000	350,000	375,000	25,000 (7.1%)
Hatch Act	244,000	244,000	244,000	--
Higher Education Programs	34,000	34,000	33,000	-1,000 (2.9%)
Smith-Lever Act 3(b) and 3(c)	300,000	300,000	300,000	--
Food Safety and Inspection Service (FSIS)	1,016,000	1,015,000	1,030,000	15,000 (1.5%)

\*New in FY 2017, the request provides an additional \$325 million in mandatory funds.

## Interagency Initiatives and Priorities

### Advanced Manufacturing

The President's budget request for FY 2017 would provide \$2 billion<sup>13</sup> for advanced manufacturing research and development across the federal agencies, including the National Science Foundation (NSF), Department of Defense (DOD), Department of Energy (DOE), Department of Commerce (DOC), and other agencies. In addition, the President continues to support the National Network for Manufacturing Innovation (NNMI) with new mandatory funding of \$1.89 billion proposed to support a national network of 45 manufacturing innovation institutes.

#### **NNMI Proposals Included in the FY 2017 Budget Request:**

- Department of Defense:
  - The budget request proposes \$158.3 million for DOD to sustain its current six NNMI institutes (five awarded and one undergoing competition), plus two additional institutes expected to be competed in FY 2016. This would create eight total Institutes for Manufacturing Innovation (IMI) for the Department. In addition, the Defense Logistics Agency would receive \$31.2 million for a new manufacturing technology program.
- Department of Energy:
  - The budget request would provide \$14 million each to support the two new Clean Energy Manufacturing Innovation Institutes as follows:
    - A Grid Clean Energy Manufacturing Innovation Institute to reduce the cost of critical metals used in grid applications; this would be supported through the Office of Electricity and Energy Reliability.
    - A Clean Energy Manufacturing Innovation Institute to be supported through the Office of Energy Efficiency and Renewable Energy; the topic is not yet known.
- Department of Commerce through the National Institute of Standards and Technology (NIST):
  - The President's request proposes \$47 million for NNMI in discretionary funding for FY 2017. The funding would support the two new Department of Commerce-led institutes expected to be awarded in FY 2016, and the creation of one additional institute in FY 2017.
  - The budget request also proposes that NIST receive a one-time, mandatory appropriation of \$1.89 billion for NNMI to support 29 new institutes to complete the 45 center network by FY 2025. Under the budget request, NIST would manage all new solicitations, which would be open competitions inspired by industry need, for the 29 new institutes.

#### **Existing NNMI Institutes:**

- Department of Defense:
  - America Makes (*Location: Youngstown, OH; Launched: 8/16/2012*)
  - Digital Manufacturing & Design Innovation Institute (*Location: Chicago, IL; Launched: 2/25/2014*)
  - Lightweight Innovations for Tomorrow (*Location: Detroit, MI; Launched: 2/25/2014*)

<sup>13</sup> [https://www.whitehouse.gov/sites/default/files/microsites/ostp/ostp\\_fact\\_sheet\\_2017\\_budget\\_final.pdf](https://www.whitehouse.gov/sites/default/files/microsites/ostp/ostp_fact_sheet_2017_budget_final.pdf), White House factsheet: President's 2017 Budget Invests in American Innovation: R&D, Innovation, and STEM Education, 2016 (pg. 2).

- American Institute for Manufacturing Integrated Photonics (AIM Photonics), (*Location: Rochester, NY; Launched: 7/28/2015*)
- FlexTech - Manufacturing Innovation Institute for Flexible Hybrid Electronics (*Location: San Jose, CA; Launched: 2/25/2014*)
- Department of Energy:
  - PowerAmerica (*Location: Raleigh, NC; Launched: 1/15/2014*)
  - Institute for Advanced Composites Manufacturing Innovation (*Location: Knoxville, TN; Launched: 1/9/2015*)

#### **In Competition, Yet-To-Be Awarded NNMI Institutes:**

- Department of Defense:
  - Revolutionary Fibers and Textiles – Manufacturing Innovation Institute (full proposals due July 13, 2015)
- Department of Energy:
  - Manufacturing Innovation Institute for Smart Manufacturing: Advanced Sensors, Controls, Platforms, and Modeling for Manufacturing (full proposals due Jan 29, 2016)

#### **Six Potential New NNMI Institutes for FY 2016 (topics TBD):**

- Department of Defense (DOD):
  - Request for Information (RFI) released in early January 2016 with comments due February 16, 2016. RFI to “gather information from industry regarding possible seventh and eighth Manufacturing Innovation Institutes (MII) to be established by DOD.”
- Department of Energy (DOE)
  - FY 2016 Omnibus includes funding for two additional Clean Energy Manufacturing Innovation Institutes. Potential topics include: high efficiency modular chemical processing, advanced materials manufacturing, and grid integration.
- Department of Commerce (DOC) through the National Institute of Standards and Technology (NIST):
  - Notice of Intent released on Dec 22, 2015 to support up to two centers in open topic areas with particular interest in in manufacturing robotics and biopharmaceutical manufacturing. The funding opportunity was expected to be announced in January 2016 but NIST has indicated it should come out soon.

#### **National Strategic Computing Initiative**

In July 2015, the Administration released the National Strategic Computing Initiative (NSCI), a government-wide effort aimed at developing a cohesive, multi-agency strategy for federal investment in high-performance computing (HPC). The initiative has five strategic themes:

- Create systems that can apply exaflops of computing power to exabytes of data – to combine the strengths of computers focused on simulation and complex modeling and computers focused on managing large amounts of data and create new capabilities with combinations of modeling, simulation, and data analytics.
- Keep the United States at the forefront of HPC capabilities – primarily through the Department of Energy pursuing exascale computing
- Improve HPC application developer productivity – by making systems easier to program, removing a major barrier to widespread use

- Make HPC readily available – through deployment of computing systems and education for researchers in the public and private sectors
- Establish hardware technology for future HPC systems – through fundamental research on potential successors to current semiconductor technology.

The Administration's request for FY 2017 builds upon this initial effort by proposing substantial investments in HPC through multiple agencies. DOE and NSF would receive the largest investments at \$285 million and \$33 million, respectively, and the Networking and Information Technology Research and Development (NITRD) program would continue to serve as the central planner and coordinator of government-wide HPC research.

In addition to focusing on the opportunities that big data can provide for scientific research and development, the FY 2017 request also continues the federal government's focus on securing private data and the need to protect U.S. systems from cyberattack. Specific ways to address these challenges are outlined in the 2016 Federal Cybersecurity Research and Development Strategic Plan, which was released concurrently with the budget.<sup>14</sup>

Sources: <https://www.whitehouse.gov/the-press-office/2015/07/29/executive-order-creating-national-strategic-computing-initiative>; and [https://www.whitehouse.gov/sites/default/files/microsites/ostp/nsci\\_fact\\_sheet.pdf](https://www.whitehouse.gov/sites/default/files/microsites/ostp/nsci_fact_sheet.pdf)

### **Neuroscience and BRAIN Initiative**

The Administration continues to support and grow investments in neuroscience and neurotechnology as part of the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, originally introduced in 2014 at a level of \$100 million. The President's budget request for FY 2017 specifically proposes at least \$278 million, spanning several different agencies in the interest of treating, preventing, and curing brain disorders like Alzheimer's, schizophrenia, autism, and traumatic brain injury. In addition to the federal involvement, the BRAIN Initiative spans dozens of foundations and many public and private research institutions.

The FY 2017 budget request includes the following proposed investments in the BRAIN Initiative:

- **National Institutes of Health (NIH):** NIH continues to lead the cross-agency efforts to support revolutionary breakthroughs in understanding the function of the brain and ways in which aberrant function develops. The agency requests \$195 million for BRAIN, \$45 million over FY 2016 levels, to support basic neuroscience research, neuroimaging technology, novel devices for mapping and manipulating brain circuitry, and new ways to manage the massive amounts of data generated from all of this research. These investments would continue to focus on the technological applications of this research, in addition to the many other investments made in neuroscience through the NIH's institutes and centers. The budget request proposes that the \$45 million increase be in mandatory funding, which is unlikely to be supported by Congress. However, given Congress' general support for NIH and this initiative, it is likely to provide an increase for neuroscience research at NIH.

<sup>14</sup> <https://www.whitehouse.gov/blog/2016/02/08/national-challenges-and-goals-cybersecurity-science-and-technology>, National Challenges and Goals for Cybersecurity Science and Technology, The White House, 2016.

- **National Science Foundation (NSF):** The NSF requests \$142 million to support neuroscience research across the agency through its Understanding the Brain (UtB) initiative, \$2 million less than was requested in FY 2016. Roughly half of the research under the UtB umbrella is aligned with the priorities of the BRAIN Initiative. The NSF requests a \$2 million increase over FY 2016 levels to support these investments as part of UtB, for a total request of \$74 million for BRAIN Initiative activities in FY 2017.
- **Department of Energy (DOE):** As part of the Office of Science investment to accelerate the development of exascale computing with significantly greater performance than current capabilities, \$9 million has been requested to support the BRAIN Initiative. DOE, in coordination with the NIH, would direct this funding to support the creation of imaging and sensing technologies using x-ray light sources and nanoscale research centers.
- **Defense Advanced Research Projects Agency (DARPA):** In past years, DARPA has highlighted its efforts that align with the BRAIN Initiative, going so far as to internally reorganize some programs to create the Biological Technologies Office (BTO) to house BRAIN-related research. In FY 2016, BTO supported nearly \$100 million in BRAIN research. While the FY 2017 DARPA budget request includes flat funding for BTO and does not provide details on BRAIN-related research, it is reasonable to expect that it will continue to invest in this area although perhaps not at the same levels as previous years.



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