



Total Federal Research and Development Funding Down 1% in FY 2015, but Funding for Research Up 1%

by Michael Yamaner¹

Current-dollar federal obligations² for research and development and R&D plant decreased 1% from FY 2014 to FY 2015, from \$132.5 billion to \$131.4 billion. Within this total, funding for research increased 1% to \$63.6 billion while development funding fell 4% to \$64.9 billion. R&D plant funding increased substantially (by 27%) to \$2.8 billion (table 1). Federal agencies estimated an 8% total increase in FY 2016 obligations for R&D and R&D plant, to \$142.6 billion, and projected a 2% increase in FY 2017 to \$145.4 billion.

After adjusting for inflation, total federal R&D and R&D plant obligations decreased 2% to \$119.6 billion from FY 2014 to FY 2015. Constant-dollar obligations were estimated to increase 7% to \$127.7 billion in FY 2016 and were projected to remain essentially flat at \$128.0 billion in FY 2017 (table 1).

Data are from the Survey of Federal Funds for Research and Development, sponsored by the National Center for Science and Engineering Statistics

(NCSES) within the National Science Foundation (NSF). Figures for FY 2015 are actual amounts, for FY 2016 are preliminary, and for FY 2017 are projected.

Federal Funding for Research

In FY 2015, research accounted for 48% of all federal obligations for R&D and R&D plant. Total federal funding for research increased by \$0.7 billion in FY 2015 to \$63.6 billion (table 1), led by a \$0.6 billion increase from the

TABLE 1. Federal obligations for research and development and R&D plant, by type of R&D: FYs 2013–17

Type of R&D	Current \$millions					Constant 2009 \$millions				
	2013	2014	2015	2016 preliminary	2017 projected	2013	2014	2015	2016 preliminary	2017 projected
All R&D and R&D plant	127,291	132,496	131,398	142,555	145,408	119,399	122,195	119,561	127,692	127,955
R&D	125,386	130,279	128,573	140,070	142,608	117,612	120,150	116,991	125,466	125,491
Research	59,198	62,909	63,645	67,761	69,744	55,528	58,018	57,912	60,696	61,373
Basic	29,779	31,588	31,527	33,227	34,323	27,933	29,132	28,687	29,763	30,203
Applied	29,419	31,321	32,118	34,533	35,421	27,595	28,886	29,225	30,932	31,169
Development	66,188	67,370	64,928	72,309	72,865	62,084	62,132	59,079	64,770	64,119
Science and technology	13,471	14,313	15,279	16,339	16,311	12,636	13,200	13,903	14,635	14,353
Major systems ^a	52,717	53,057	49,649	55,971	56,554	49,448	48,932	45,177	50,135	49,766
R&D plant	1,905	2,218	2,825	2,485	2,799	1,787	2,046	2,571	2,226	2,463

^a To better differentiate between the part of the federal R&D budget that supports science and key enabling technologies (including technologies for military and nondefense applications) and the part that primarily supports testing and evaluation (mostly of defense-related systems), this survey collects development dollars from the Department of Defense in two categories: advanced technology development and major systems development.

NOTES: Gross domestic product implicit price deflators were used to convert current to constant dollars. Detail may not sum to total due to rounding.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development.

Department of Energy (DOE) (table 2). Research funding was estimated to increase by \$4.1 billion to \$67.8 billion (6%) in FY 2016 and was projected to increase by \$2.0 billion (3%) to \$69.7 billion in FY 2017.

Basic Research

Basic research obligations accounted for 24% of total R&D and R&D plant

funding in FY 2015 and decreased by less than 1% (\$61 million) from FY 2014 (table 1). The Department of Health and Human Services (HHS) accounted for almost all of the decrease with its basic research obligations falling by \$928 million (6%) in FY 2015. HHS's decrease was mostly offset by increases at DOE (\$385 million), NSF (\$249 million), and the National

Aeronautics and Aerospace Administration (NASA) (\$187 million) (table 2). Funding for basic research was estimated to increase 5% to \$33.2 billion in FY 2016 and was projected to increase 3% to \$34.3 billion in FY 2017 (table 1).

Applied Research

Applied research obligations accounted for 24% of the total federal R&D

TABLE 2. Federal obligations for research, by agency in FY 2015 rank order: FYs 2013–17

Agency	Current \$millions					Constant 2009 \$millions				
	2013	2014	2015	2016 preliminary	2017 projected	2013	2014	2015	2016 preliminary	2017 projected
All agencies	59,198	62,909	63,645	67,761	69,744	55,528	58,018	57,912	60,696	61,373
Basic	29,779	31,588	31,527	33,227	34,323	27,933	29,132	28,687	29,763	30,203
Applied	29,419	31,321	32,118	34,533	35,421	27,595	28,886	29,225	30,932	31,169
HHS	29,315	30,587	30,197	31,816	32,507	27,497	28,209	27,477	28,499	28,605
Basic	15,288	16,005	15,077	15,991	16,340	14,340	14,761	13,719	14,324	14,379
Applied	14,026	14,582	15,120	15,825	16,167	13,156	13,448	13,758	14,175	14,227
DOE	7,333	8,092	8,642	9,493	10,097	6,878	7,463	7,864	8,503	8,885
Basic	3,851	4,075	4,460	4,604	4,828	3,612	3,758	4,058	4,124	4,249
Applied	3,482	4,017	4,181	4,889	5,268	3,266	3,705	3,804	4,379	4,636
DOD	5,955	6,704	6,691	7,332	6,939	5,586	6,183	6,088	6,568	6,106
Basic	1,863	2,074	2,133	2,327	2,208	1,747	1,913	1,941	2,084	1,943
Applied	4,093	4,631	4,558	5,005	4,731	3,839	4,271	4,147	4,483	4,163
NSF	4,956	5,403	5,670	5,693	6,071	4,649	4,983	5,159	5,099	5,342
Basic	4,362	4,725	4,974	4,941	5,258	4,092	4,358	4,526	4,426	4,627
Applied	594	678	696	751	813	557	625	633	673	715
NASA	5,422	5,336	5,539	6,179	6,715	5,086	4,921	5,040	5,535	5,909
Basic	2,824	3,023	3,210	3,644	3,898	2,649	2,788	2,921	3,264	3,430
Applied	2,598	2,313	2,330	2,534	2,816	2,437	2,133	2,120	2,270	2,478
USDA	1,868	2,060	2,128	2,265	2,327	1,752	1,900	1,936	2,029	2,048
Basic	844	908	924	974	998	792	837	841	872	878
Applied	1,024	1,152	1,204	1,290	1,328	961	1,062	1,096	1,155	1,169
Other	4,349	4,727	4,778	4,983	5,089	4,079	4,359	4,348	4,463	4,478
Basic	747	778	748	746	792	701	718	681	668	697
Applied	3,602	3,948	4,030	4,238	4,298	3,379	3,641	3,667	3,796	3,782

DOD = Department of Defense; DOE = Department of Energy; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; NSF = National Science Foundation; USDA = Department of Agriculture.

NOTES: Gross domestic product implicit price deflators for 2015 were used to convert current to constant dollars. Detail may not sum to total due to rounding. Other agencies includes: Department of Commerce, Department of Education, Department of Homeland Security, Department of Housing and Urban Development, Department of the Interior, Department of Justice, Department of Labor, Department of State, Department of Transportation, Department of the Treasury, Department of Veterans Affairs, Agency for International Development, Appalachian Regional Commission, Consumer Product Safety Commission, Environmental Protection Agency, Federal Communications Commission, Federal Trade Commission, Library of Congress, National Archives and Records Administration, Nuclear Regulatory Commission, Smithsonian Institution, and Social Security Administration.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development.

and R&D plant funding in FY 2015. Applied research obligations increased 3% (\$797 million) to \$32.1 billion in FY 2015 (table 1). HHS, DOE, and the Department of Agriculture (USDA) combined accounted for 95% of the FY 2015 increase (table 2). Applied research was estimated to increase by 8% to \$34.5 billion in FY 2016 and was projected to increase by 3% to \$35.4 billion in FY 2017 (table 1)

Agencies' Funding for Research

HHS

HHS's funding for research decreased by 1% (\$390 million) to \$30.2 billion in FY 2015 but still was the largest agency share (47%) of the research total. HHS estimated a 5% increase in research obligations in FY 2016 and projected a 2% increase in FY 2017. It reported a 48% to 52% split between basic research and applied research, respectively, in FY 2013 and FY 2014. Beginning in FY 2015 and projected

to continue through FY 2017 the basic research and applied research split is reported at 50% of total for each (table 2). In FY 2015, HHS accounted for 83% of the \$30.5 billion of federal funding for the life sciences (table 3).

Department of Energy

DOE's obligations for research rose 7% to \$8.6 billion in FY 2015, were estimated to increase 10% in FY 2016, and were projected to increase 6% in FY 2017. Of DOE's FY 2015 research obligations, 52% were for basic research and 48% for applied research (table 2). Most of this funding was slated to support research in engineering (\$3.7 billion) and in the physical sciences (\$2.7 billion), which together account for three-fourths of the department's total research funding in FY 2015 (table 3).

Department of Defense

Department of Defense (DOD) research funding decreased slightly (\$12 million) in 2015, to \$6.7 billion. Its research

obligations were estimated to increase 10% in FY 2016 but were projected to decrease by 5% in FY 2017. DOD's share of total FY 2015 federal funding for research was 11% (\$6.7 billion) (table 2). DOD reported that 41% (\$2.7 billion) of its FY 2015 research funding supported engineering and 19% (\$1.3 billion) supported computer sciences and mathematics (table 3).

NSF

NSF obligations for research grew by 5% to \$5.7 billion in FY 2015, were estimated to increase slightly by \$23 million in FY 2016, and were projected to increase 7% in FY 2017 (table 2). Almost all (88%) of NSF's research obligations in FY 2015 supported basic research. NSF's research support is spread more evenly than that of other agencies across multiple fields. Of total FY 2015 NSF research funding, 21% was for environmental sciences (\$1.2 billion), 18% for mathematics and computer science (\$1.0 billion), 18%

TABLE 3. Federal obligations for research, by broad field of science and engineering and agency in rank order: FY 2015
(Millions of dollars)

Field	All agencies	HHS	DOD	DOE	NSF	NASA	USDA	Other
All fields	63,645	30,197	6,691	8,642	5,670	5,539	2,128	4,778
Life sciences	30,473	25,164	785	394	702	318	1,756	1,353
Engineering	11,956	1,489	2,714	3,715	998	2,068	53	919
Physical sciences	6,510	109	788	2,741	911	1,490	83	387
Environmental sciences	4,414	454	177	326	1,199	1,270	18	971
Computer sciences and mathematics	3,863	191	1,276	1,017	1,047	96	8	229
Other sciences nec ^a	3,299	792	864	449	591	275	0	329
Psychology	1,995	1,769	70	0	34	21	0	100
Social sciences	1,136	228	19	*	187	1	211	489

* = amount greater than 0 but less than 500,000.

DOD = Department of Defense; DOE = Department of Energy; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; NSF = National Science Foundation; nec = not elsewhere classified; USDA = Department of Agriculture.

^a Other sciences nec is used for multidisciplinary or interdisciplinary projects that cannot be classified within one of the broad fields of science.

NOTES: Detail may not sum to total due to rounding. Other includes the following agencies: Department of Commerce, Department of Education, Department of Homeland Security, Department of Housing and Urban Development, Department of the Interior, Department of Justice, Department of Labor, Department of State, Department of Transportation, Department of the Treasury, Department of Veterans Affairs, Agency for International Development, Appalachian Regional Commission, Consumer Product Safety Commission, Environmental Protection Agency, Federal Communications Commission, Federal Trade Commission, Library of Congress, National Archives and Records Administration, Nuclear Regulatory Commission, Smithsonian Institution, and Social Security Administration.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development, FYs 2015–17.

for engineering (\$1.0 billion), 16% for physical sciences (\$0.9 billion), and 12% for life sciences (\$0.7 billion) (table 3).

National Aeronautics and Space Administration

Federal funds obligated for research by NASA increased 4% to \$5.5 billion in FY 2015, were estimated to increase 12% in FY 2016, and were projected to increase 9% in FY 2017 (table 2). NASA provided 87% of its total FY 2015 research funding in support of three fields: engineering (\$2.1 billion), physical sciences (\$1.5 billion), and environmental sciences (\$1.3 billion) (table 3).

Federal R&D Obligations by State

The ten states that received the most federal R&D funding in FY 2015 through businesses, universities, federal labs, and all other institutions combined accounted for 57% (\$71.7 billion) of total FY 2015 federal R&D obligations. Maryland, home of HHS's National Institutes of Health (NIH), was the top state recipient at \$16.8 billion and received 48% of its funding from HHS. California was the second highest recipient at \$15.3 billion and received most of its funding (93%) from DOD, DOE, HHS and NASA. Virginia ranked third, receiving \$7.5 billion in

federal R&D obligations, with 77% coming from DOD in FY 2015 (table 4).

Data Notes

The 27 federal agencies that report R&D obligations to the Survey of Federal Funds for Research and Development submitted actual obligations for FY 2015, preliminary data for FY 2016, and projected data for FY 2017. Data were requested from agencies beginning in February 2016. Agencies later revise the preliminary data based on actual changes in the funding levels of R&D programs, and agencies may provide changes in prior-year data to reflect program reclassifications or other data corrections.

TABLE 4. Federal obligations for research and development to the top 10 state or location recipients, by total amount received and selected agency: FY 2015 (Dollars in millions)

Rank	State or location	Total	DHS	DOC	DOD	DOE	DOI	DOT	EPA	HHS	NASA	NSF	USDA
	All locations	125,846	731	1,330	60,891	11,389	800	855	515	30,006	11,344	5,648	2,337
1	Maryland	16,751	72	708	5,727	52	85	26	16	7,983	1,608	291	182
2	California	15,281	66	26	5,983	2,148	67	39	11	3,402	2,643	762	134
3	Virginia	7,487	90	14	5,778	153	96	171	59	364	554	186	22
4	Massachusetts	6,055	78	33	2,764	141	12	58	16	2,372	178	377	26
5	Texas	5,574	19	8	2,371	104	22	34	7	961	1,691	273	85
6	New York	4,567	31	23	935	1,000	12	21	5	1,996	103	395	47
7	Alabama	4,538	5	1	2,924	29	2	13	0	295	1,220	23	26
8	District of Columbia	4,222	48	33	2,385	604	22	132	76	231	143	192	356
9	Pennsylvania	3,710	3	3	1,245	563	4	25	1	1,525	34	241	66
10	New Mexico	3,543	47	4	1,120	2,156	6	4	1	95	37	60	13
	All other states or locations ^{a, b}	54,118	272	478	29,658	4,440	472	333	322	10,783	3,132	2,847	1,380

DHS = Department of Homeland Security; DOC = Department of Commerce; DOD = Department of Defense; DOE = Department of Energy; DOI = Department of the Interior; DOT = Department of Transportation; EPA = Environmental Protection Agency; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; NSF = National Science Foundation; USDA = Department of Agriculture.

^aIncludes America Samoa, Baker Island, Guam, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Midway Islands, Navassa Island, Northern Mariana Islands, Palmyra Atoll, U.S. Virgin Islands, and Wake Island.

^bIncludes R&D performed or administered in foreign countries by the U.S. government.

NOTES: Detail may not sum to total due to rounding. Eleven agencies are required to report data for this section of the survey: the Departments of Agriculture, Commerce, Defense, Energy, Health and Human Services, Homeland Security, the Interior, and Transportation; the Environmental Protection Agency; the National Aeronautics and Space Administration; and the National Science Foundation. Obligations of these 11 agencies represented 98% of total federal R&D obligations in FY 2015. The totals reported here differ from the those in Table 1 because only 11 agencies are required to report these data. Geographic distribution of DOD development funding to industry reflects location of prime contractors and not the numerous subcontractors who perform much of the R&D.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development, FYs 2015–17.

Definitions

Basic research is defined as systematic study directed toward fuller knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications toward processes or products in mind.

Applied research is defined as systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met.

Development is defined as systematic application of knowledge or understanding that is directed toward the production of useful materials, devices, and systems or methods, including

design, development, and improvement of prototypes and new processes to meet specific requirements.

Obligations represent the amounts for orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds were appropriated and of when future payment of money is required.

Data Availability

The full set of detailed tables from this survey will be available in the report *Federal Funds for Research and Development: Fiscal Years 2015–17* at <https://www.nsf.gov/statistics/fedfunds/>. Individual detailed tables may be available

in advance of the full report. For more information, please contact the author.

Notes

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2. Obligations represent the amounts for orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds were appropriated and when future payment of money is required.

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