



Federal Funding of Basic and Applied Research Increases in FY 2009

by Michael Yamaner¹

Preliminary FY 2009 data from the National Science Foundation (NSF) show funds obligated by federal agencies for research were estimated to increase by 8.8% over FY 2008, in inflation-adjusted constant dollars. This follows an estimated 2.6% constant-dollar decrease in research obligations between FY 2007 and FY 2008.

Total federal funding obligations for research and development and R&D plant (facilities and fixed equipment) dropped 2.5% in constant dollars from FY 2007 to FY 2008, but they showed only a slight decrease of 0.3% when measured in current dollars, from \$129.4 billion to \$129.1 billion. The FY 2008 R&D and R&D plant total was 3.4% lower in constant dollars than it was at its peak level in FY 2005 (table 1). Preliminary FY 2009 and projected FY 2010 total federal obligations for R&D and R&D plant are not comparable with totals from earlier years (see below).

The data presented here are from the NSF Survey of Federal Funds for Research and Development: FY 2008–10. Actual data are reported for FY 2008, data for FY 2009 are preliminary, and data for FY 2010 are projected. FY 2000–08 data are not comparable

to FY 2009 and FY 2010 data for two reasons. First, FY 2009 and FY 2010 data include preliminary and projected estimates of R&D and R&D plant funds provided by the American Reinvestment and Recovery Act (ARRA). Agencies were directed to obligate all ARRA funds by FY 2010, with as much as possible being obligated in FY 2009. The FY 2009–10 preliminary and projected data are likely to underestimate actual funding because of partial reporting of ARRA funding or lack of agencies reporting ARRA funding. Future Federal Funds surveys will separately collect ARRA funding, which should correct the underestimate. Second, FY 2009 and FY 2010 development data for the Department of the Air Force do not contain their Operational Systems Development obligations and outlays. As a result, development data collected by the survey that are displayed in table 1 are not discussed in this report.

The preliminary FY 2009 funding in this report is discussed in current dollars; cross-year comparisons in the remainder of this report are discussed in inflation-adjusted constant dollars. Data for FY 2004–08 are used for comparisons because of FY 2004 changes in National Aeronautics and Space Administration (NASA)

accounting procedures (see “Data Sources and Limitations”).

Federal Funding

Total Research

Federal funding obligations for research were estimated to rise in both constant and current dollars for FY 2009. This represents the first constant dollar increase in these obligations since FY 2004. FY 2009 research obligations were estimated to increase by 8.8% over FY 2008. This increase is due to the funds provided by ARRA. Even with the increase provided by ARRA, research obligations for FY 2009 were estimated to be 2.3% less than they were for FY 2004. Projected FY 2010 research obligations declined 2.5% from FY 2009 totals.

On the basis of projected funding, the leading research-funding departments/agencies for FY 2010 are the Department of Health and Human Services (53.4% of total funds obligated for research), Department of Energy (12.0%), Department of Defense (11.0%), NSF (8.3%), Department of Agriculture (3.9%), and NASA (3.2%). Together, these six agencies accounted for 91.8% of the projected FY 2010 federal research dollars (table 2).

TABLE 1. Federal obligations for research and development and R&D plant, by character of work: FY 2000–10

Fiscal year	All R&D and R&D plant	Research			Development	R&D plant
		Total	Basic	Applied		
Current \$millions						
2000	80,403 r	38,471	19,570	18,901	37,440 r	4,493
2001	88,562 r	44,714	21,958	22,756	39,779 r	4,070
2002	98,013 r	48,007	23,668	24,338	45,702 r	4,305
2003	107,794 r	51,072	24,751	26,320	52,455 r	4,267
2004	116,069 r	53,358	26,121	27,237	58,717 r	3,994
2005	122,619 r	53,738	27,140	26,598	65,110 r	3,771
2006	123,855 r	53,536	26,585	26,951	68,194 r	2,125
2007	129,431 r	54,094	26,866	27,228	73,169 r	2,168
2008	129,050	53,894	27,154	26,740	73,212	1,944
2009 preliminary	123,243	59,430	30,935	28,494	60,301	3,512
2010 projected	118,559	58,356	29,848	28,507	57,920	2,285
Constant 2005 \$millions						
2000	90,452	43,279	22,016	21,263	42,119	5,055
2001	97,332	49,142	24,132	25,009	43,718	4,473
2002	105,971	51,905	25,590	26,314	49,413	4,655
2003	114,164	54,090	26,214	27,875	55,555	4,519
2004	119,856	55,099	26,973	28,126	60,633	4,124
2005	122,619	53,738	27,140	26,598	65,110	3,771
2006	119,759	51,766	25,706	26,060	65,939	2,055
2007	121,486	50,773	25,217	25,557	68,677	2,035
2008	118,416	49,453	24,916	24,537	67,179	1,784
2009 preliminary	111,603	53,817	28,013	25,803	54,606	3,180
2010 projected	106,551	52,445	26,825	25,620	52,054	2,054

r = data significantly revised; replaces previously published data.

NOTES: Beginning in FY 2000, Department of the Air Force did not report BA 6.7 Operational Systems Development data because the agency misunderstood reporting requirements. During the Volume 57 data collection cycle, Department of the Air Force edited prior year data from FY 2000 to FY 2007 to include BA 6.7 Operational Systems Development data.

As a result of changes in reporting and accounting, data for FY 2004 and later years may not be directly comparable to data for FY 2003 and earlier years. See Data Sources and Limitations for more detail.

The Department of the Air Force did not include BA 6.7 Operational System Development in their preliminary data for FY 2009 and their projected data for FY 2010; therefore, these data are not comparable to FY 2008 (actual) data.

Gross domestic product implicit price deflators for 2005 were used to convert current to constant dollars. Agencies reported preliminary obligations for FY 2009 and projected obligations for FY 2010 during FY 2009. 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.

Basic Research

Funds obligated for basic research declined by 7.6% between FY 2004 and FY 2008. Between FY 2008 and FY 2009 basic research obligations were expected to rise by 12.4%, mostly as a result of the one-time bump provided by ARRA funds. This is the first increase in basic research since FY 2005. Basic research obligations were projected to drop by 4.2% between FY 2009 and FY 2010 (table 1).

Basic research obligations accounted for 25.2% of total projected R&D and R&D plant in FY 2010; this represents the highest share since 1990.

Applied Research

Federal obligations for applied research declined 4.0% between FY 2007 and FY 2008, and they declined 12.8% between the recent high reported for FY 2004 and FY 2008. Between FY 2008 and FY 2009 applied research

funding was estimated to increase by 5.2%, but it was projected to decline by 0.7% between FY 2009 and FY 2010.

Data Sources and Limitations

The most recent data presented here are from the annual NSF Survey of Federal Funds for Research and Development: FY 2008–10. Definitions of *research*, *development*, and *R&D plant* as used in this InfoBrief are provided in the technical notes section of the full report that contains detailed statistical tables for this survey. For the prior-year report see <http://www.nsf.gov/statistics/nsf10305/>.

The 27 federal agencies that report R&D obligations to the survey submitted actual obligations for FY 2008, preliminary data for FY 2009, and projected data for FY 2010. Data were requested from agencies beginning in late November 2009. Agencies later revise the preliminary data based on actual changes in the funding levels of R&D programs. Further, agencies may provide changes in prior-year data to reflect program reclassifications or other data corrections.

Beginning in FY 2000 the Department of the Air Force (USAF) did not report BA 6.7 Operational Systems Development data because the agency misunderstood reporting requirements. During the Volume 57 (FY 2007–09) data collection cycle, the USAF edited prior year data from FY 2000 to FY 2007 to include BA 6.7 Operational Systems Development data.

The USAF did not include BA 6.7 Operational System Development in its preliminary data for FY 2009 and FY 2010 but did include it in its FY 2008 actual data; therefore, the FY 2009 and FY 2010 preliminary and projected data are not comparable to FY 2000–08 (actual) data. Totals for other agencies, for research, and for R&D plant are not affected.

TABLE 2. Federal obligations for research, by agency in FY 2010 rank order: FY 2000–10

Fiscal year	All agencies	HHS ^a	DOE	DOD	NSF	USDA	NASA ^b	Other
Current \$millions								
2000	38,471	17,913	4,101	4,920	2,726	1,611	3,964	3,235
2001	44,714	20,649	4,593	6,806	3,043	1,804	4,472	3,347
2002	48,007	23,231	5,062	6,265	3,260	1,810	4,839	3,539
2003	51,072	26,288	5,261	5,816	3,609	1,869	4,553	3,677
2004	53,358	27,991	5,498	5,698	3,771	1,919	4,499	3,982
2005	53,738	28,617	5,704	5,931	3,743	2,003	3,729	4,011
2006	53,536	28,680	5,720	5,752	3,791	2,031	3,272	4,291
2007	54,094	29,211	5,857	6,394	3,970	2,068	2,132	4,463
2008	53,894	29,459	6,100	6,581	4,135	2,020	1,406	4,194
2009 preliminary	59,430	30,672	6,480	7,211	6,430	2,263	1,556	4,817
2010 projected	58,355	31,164	7,012	6,408	4,827	2,292	1,860	4,792
Constant 2005 \$millions								
2000	43,279	20,152	4,614	5,535	3,067	1,812	4,459	3,639
2001	49,142	22,694	5,048	7,480	3,344	1,983	4,915	3,678
2002	51,905	25,117	5,473	6,774	3,525	1,957	5,232	3,826
2003	54,090	27,842	5,572	6,160	3,822	1,979	4,822	3,894
2004	55,099	28,904	5,677	5,884	3,894	1,982	4,646	4,112
2005	53,738	28,617	5,704	5,931	3,743	2,003	3,729	4,011
2006	51,766	27,732	5,531	5,562	3,666	1,964	3,164	4,149
2007	50,773	27,418	5,497	6,002	3,726	1,941	2,001	4,189
2008	49,453	27,032	5,597	6,039	3,794	1,854	1,290	3,848
2009 preliminary	53,817	27,775	5,868	6,530	5,823	2,049	1,409	4,362
2010 projected	52,445	28,008	6,302	5,759	4,338	2,060	1,672	4,307

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.

^a Since FY 2000 the National Institutes of Health, part of HHS, has classified all of its development activities as research.

^b Since FY 2000 NASA has classified funding for space station and space station research as R&D plant; previously these funds were reported as R&D. As a result of accounting changes, NASA's data for FY 2004 and later years may not be directly comparable to its data for FY 2003 and earlier years. In FY 2007 NASA excluded projects that were operational in nature that were not excluded in FY 2006, which accounts for \$850 million of NASA's decrease, and there was an overall decrease in obligations between FY 2006 and FY 2007, which accounts for the remainder of NASA's decrease.

NOTES: Gross domestic product implicit price deflators for 2005 were used to convert current to constant dollars. Agencies reported preliminary obligations for FY 2009 and projected obligations for FY 2010 during FY 2009. 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.

NASA reported that the major portion of its decrease (\$850 million) in R&D funding between FY 2006 and FY 2007 resulted from excluding funding for operational projects for FY 2007 that it reported as R&D in FY 2006. A decrease in obligations overall accounted for the remainder. In FY 2006 NASA began reporting funding for Space Operations, the Hubble Space Telescope, Stratospheric Observatory for Infrared Astronomy, and the James Webb Space Telescope as operational costs; previously these had been reported as R&D plant. In FY 2004

NASA implemented a full-cost budget approach, which includes all of the direct and indirect costs for procurement, personnel, travel, and other infrastructure-related expenses relative to a particular program and project. As a result of accounting changes, NASA's data for FY 2004 and later years may not be directly comparable to its data for FY 2003 and earlier years.

The full set of detailed tables from this survey will be available in the report *Federal Funds for Research and Development: Fiscal Years 2008–10*

at <http://www.nsf.gov/statistics/fedfunds/>. Individual detailed tables from the FY 2008–10 survey may be available in advance of the full report. For more information, please contact the author.

Notes

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