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FY 2008 Data Show Downward Trend in Federal R&D Funding

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The most recent data from the National Science Foundation (NSF) show a $3.5 billion decline—from $116.7 billion in FY 2007 to $113.2 billion in FY 2008—in federal funds obligated for research and development and R&D plant (facilities and fixed equipment). Adjusted for inflation, the data reflect a 4.8% decrease in R&D and R&D plant obligations. The expected FY 2008 total is 7.3% lower, in constant dollars, than that recorded in FY 2005. In contrast, during the 4 preceding years (FY 2001–05) total obligations rose 22.2% in real terms (table 1).

Both research and development funding contributed to the downward trend. Research, estimated to total $54.7 billion in FY 2008, and development ($56.6 billion) are expected to be down, in constant dollars, 2.5% and 6.5%, respectively, from their prior-year levels.

FY 2008 funding in this report is discussed in current dollars; cross-year comparisons in the remainder of this report are discussed in constant dollars. Because federal agencies provide projected figures for FY 2008 and preliminary figures for FY 2007, figures based on these data are estimates.

Federal Funding for Research

Obligations for research by all federal agencies declined at an estimated average annual rate of 2.1% between FY 2004 and FY 2008. In contrast, research obligations increased at an average annual rate of 6.9% between FY 1996 and FY 2003 (table 1). These trends are largely driven by funding from the Department of Health and Human Services (HHS), which accounts for more than half (53% in FY 2008) of total federal research support (table 2).

FY 2008 data show that for the first time, the Department of Energy (DOE) research budget is expected to exceed that of the Department of Defense (DOD). In descending order, the leading research-funding departments/agencies are HHS (with $28.8 billion in total FY 2008 research obligations), DOE ($6.5 billion), DOD ($6.1 billion), NSF ($4.4 billion), NASA (National Aeronautics and Space Administration; $3.2 billion), and USDA (U.S. Department of Agriculture; $1.8 billion). Together, these six agencies account for 93% of projected FY 2008 federal research dollars (table 2).

NSF is slated for the largest average annual increase between FY 2006 and FY 2008 (4.8%), followed by DOE at 4.1%. USDA and NASA are expected to have average annual decreases of 7.8% and 3.4%, respectively, for this period (table 2).

Basic Research

The annual level of federal basic research obligations declined at an average annual rate of 1.9% between FY 2005 and FY 2008. This downward trend may be part of a continuing slowdown in basic research funding by the federal government. For example, between FY 1998 and FY 2001 basic research obligations rose at an average annual rate of 10.0%. However, from FY 2001

TABLE 1. Federal obligations for research and development and R&D plant, by character of work: FY 1990–2008

Fiscal year	All R&D and R&D plant	Research			Development	R&D plant
		Total	Basic	Applied		
	Current $millions					
1990	65,831	21,622	11,286	10,337	41,937	2,272
1991	64,148	23,968	12,171	11,798	37,327	2,853
1992	68,577	24,491	12,490	12,001	41,102	2,985
1993	70,415	26,890	13,399	13,491	40,424	3,101
1994	69,451	27,411	13,523	13,888	39,824	2,215
1995	70,443	28,434	13,877	14,557	39,752	2,256
1996	69,399	28,260	14,464	13,796	39,393	1,746
1997	71,753	29,365	14,942	14,423	40,461	1,927
1998	73,914	30,922	15,613	15,309	41,178	1,813
1999	77,386	33,528	17,444	16,084	41,813	2,046
2000[a]	77,356	38,471	19,570	18,901	34,393	4,493
2001	84,003	44,714	21,958	22,756	35,219	4,070
2002	90,158	48,007	23,668	24,338	37,846	4,305
2003	97,928	51,072	24,751	26,320	42,589	4,267
2004	105,371	53,358	26,121	27,237	48,019	3,994
2005	112,995	53,738	27,140	26,598	55,485	3,771
2006[b]	112,271	53,536	26,585	26,951	56,610	2,125
2007 preliminary	116,700	55,075	27,477	27,598	59,427	2,198
2008 projected	113,213	54,709	27,721	26,988	56,637	1,867
	Constant 2000 $millions					
1990	81,023	26,612	13,890	12,722	51,615	2,796
1991	76,095	28,432	14,437	13,995	44,278	3,384
1992	79,353	28,339	14,453	13,887	47,561	3,454
1993	79,673	30,426	15,161	15,265	45,738	3,508
1994	76,928	30,362	14,979	15,383	44,112	2,454
1995	76,419	30,847	15,054	15,792	43,125	2,448
1996	73,868	30,080	15,395	14,684	41,930	1,859
1997	75,064	30,720	15,631	15,089	42,328	2,016
1998	76,397	31,961	16,137	15,824	42,562	1,874
1999	78,950	34,205	17,796	16,409	42,658	2,087
2000[a]	77,356	38,471	19,570	18,901	34,393	4,493
2001	82,066	43,683	21,452	22,231	34,407	3,976
2002	86,424	46,019	22,688	23,330	36,279	4,126
2003	92,012	47,986	23,256	24,730	40,016	4,009
2004	96,493	48,863	23,920	24,942	43,973	3,658
2005	100,261	47,683	24,082	23,601	49,233	3,346
2006[b]	96,428	45,981	22,833	23,148	48,622	1,825
2007 preliminary	97,616	46,068	22,983	23,085	49,709	1,839
2008 projected	92,904	44,895	22,748	22,147	46,477	1,532

[a] In FY 2000 the National Institutes of Health classified all of its development activities as research. Also in FY 2000 the National Aeronautics and Space Administration (NASA) reclassified and transferred funding for Space Station and Space Station Research from R&D to R&D plant. Data for FY 2000 and forward reflect these changes.

[b] 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.

NOTES: Gross domestic product implicit price deflators were used to convert current to constant dollars. Agencies reported preliminary obligations for FY 2007 and projected obligations for FY 2008 during FY 2007. Detail may not sum to total due to rounding.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Federal Funds for Research and Development: FY 2006–08.

TABLE 2. Federal obligations for research, by agency in FY 2008 rank order: FY 1990–2008

Fiscal year	All agencies	HHS[a]	DOE	DOD	NSF	NASA[b]	USDA	Other
				Current $millions				
1990	21,622	7,467	2,570	3,529	1,690	3,061	1,069	2,236
1991	23,968	8,162	3,274	3,718	1,785	3,371	1,175	2,483
1992	24,491	7,946	3,413	4,073	1,868	3,229	1,261	2,700
1993	26,890	9,193	3,440	4,784	1,882	3,549	1,252	2,792
1994	27,411	9,736	3,283	4,241	2,040	3,841	1,323	2,948
1995	28,434	10,076	3,460	4,198	2,149	4,046	1,299	3,206
1996	28,260	10,546	3,362	3,996	2,188	3,878	1,220	3,070
1997	29,365	11,228	3,568	3,810	2,249	4,185	1,290	3,036
1998	30,922	12,019	3,788	3,970	2,289	4,414	1,334	3,109
1999	33,528	13,715	3,920	4,142	2,506	4,358	1,488	3,399
2000	38,471	17,913	4,101	4,920	2,726	3,964	1,612	3,235
2001	44,714	20,649	4,593	6,806	3,044	4,472	1,804	3,347
2002	48,007	23,231	5,062	6,265	3,260	4,839	1,810	3,539
2003	51,072	26,288	5,261	5,816	3,609	4,553	1,869	3,677
2004	53,358	27,991	5,498	5,698	3,771	4,499	1,919	3,982
2005	53,738	28,617	5,704	5,931	3,743	3,729	2,003	4,011
2006	53,536	28,680	5,720	5,752	3,791	3,272	2,031	4,291
2007 preliminary	55,075	28,721	6,055	6,856	4,051	3,261	2,088	4,043
2008 projected	54,709	28,781	6,487	6,083	4,358	3,195	1,807	3,999
				Constant 2000 $millions				
1990	26,612	9,190	3,164	4,344	2,079	3,767	1,316	2,752
1991	28,432	9,683	3,883	4,410	2,118	3,999	1,394	2,945
1992	28,339	9,194	3,949	4,713	2,162	3,737	1,459	3,125
1993	30,426	10,401	3,893	5,412	2,129	4,015	1,416	3,159
1994	30,362	10,785	3,636	4,697	2,260	4,254	1,465	3,266
1995	30,847	10,931	3,753	4,555	2,332	4,389	1,409	3,478
1996	30,080	11,225	3,579	4,253	2,329	4,128	1,299	3,268
1997	30,720	11,746	3,732	3,986	2,352	4,378	1,350	3,176
1998	31,961	12,422	3,915	4,103	2,366	4,562	1,379	3,214
1999	34,205	13,992	3,999	4,226	2,557	4,446	1,518	3,467
2000	38,471	17,913	4,101	4,920	2,726	3,964	1,612	3,235
2001	43,683	20,173	4,487	6,649	2,973	4,369	1,762	3,269
2002	46,019	22,269	4,853	6,006	3,125	4,638	1,735	3,392
2003	47,986	24,700	4,943	5,464	3,391	4,278	1,756	3,454
2004	48,863	25,633	5,035	5,218	3,453	4,120	1,757	3,646
2005	47,683	25,392	5,061	5,263	3,321	3,309	1,777	3,559
2006	45,981	24,632	4,913	4,940	3,256	2,810	1,744	3,685
2007 preliminary	46,068	24,024	5,065	5,735	3,389	2,727	1,746	3,382
2008 projected	44,895	23,618	5,323	4,992	3,576	2,622	1,483	3,281

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.

NOTES: Gross domestic product implicit price deflators for 2000 were used to convert current to constant dollars. Agencies reported preliminary obligations for FY 2007 and projected obligations for FY 2008 during FY 2007. Detail may not sum to total due to rounding.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Federal Funds for Research and Development: FY 2006–08.

to FY 2005 the average annual rate of growth slowed to 2.9%, and federal funding declined 5.2% from FY 2005 to FY 2006. Most recently there has been no real growth (table 1).

Basic research obligations accounted for about one-fourth (24.4%) of total projected R&D and R&D plant in FY 2008, several percentage points higher than levels registered throughout the 1990s but less than the 26.3% share recorded in FY 2002 (table 1).

Applied Research

Federal obligations for applied research show a trend similar to that for basic research. Between FY 1996 and FY 2004 the growth rate averaged 6.8% per year. However, since 2004 applied research obligations have fallen annually at an average rate of 2.9% through FY 2008, according to survey estimates. Applied research obligations have been close to 24% of the total federal R&D and R&D plant budget since FY 2005, down from a peak of 27.1% in 2001 (table 1).

Agencies' Funding for Research

HHS

HHS obligations for research showed annual double-digit percentage increases during the late 1990s and early 2000s, reflecting the government's goal during that period to double the budget of the National Institutes of Health.[2] Because of changing R&D budget priorities, however, those large gains ended in FY 2004. HHS has accounted for more than half of all agency-funded research since FY 2003, up from about one-third in 1990. Nearly all (96.3%) of the HHS research total was slated for the National Institutes of Health (table 3); with 81% ($23.4 billion) of FY 2008 HHS research funding planned in support of the life sciences (table 4).

DOE

Most of the $767 million increase in DOE research obligations between FY 2006 and FY 2008 is attributable to the Office of Science, which is responsible for obligating about half of the DOE research budget (an estimated $3.4 billion of the $6.5 billion DOE total in FY 2008). Approximately one-third ($2.2 billion) of the department's total research obligations is expected to go toward various defense-related programs in FY 2008. In contrast, the DOE Office of Energy Efficiency and Renewable Energy and Office of Fossil Energy together account for less than 10% of the department's research budget. Although the former is expected to have a hefty (percentage) increase between FY 2006 and FY 2008, the latter is not (table 3). Most of DOE research funds were slated to support projects in the physical sciences and in engineering, each having an estimated $2.5 billion in research obligations in FY 2008 (table 4).

DOD

DOD research obligations increased by more than a billion dollars between FY 2006 and FY 2007 and then dropped by about $800 million between FY 2007 and FY 2008, continuing a general pattern of decline that began in FY 2002 (table 3). With an estimated $6.1 billion in total research obligations in FY 2008, DOD's share of total agency-funded research was 11%, down from about 15% in FY 2001.

The Defense Advanced Research Projects Agency accounts for the largest share of the DOD research budget, an estimated 28% in FY 2008, followed by the Department of the Air Force at 23%. The Departments of the Army and Navy each accounted for 19% of the DOD total (table 3). Of total FY 2008 DOD research funding, nearly half ($3.0 billion) was planned in support of engineering (table 4).

Defense-related research (funded by both DOD and DOE) was expected to amount to $8.3 billion, or 15%, of total federal research obligations in FY 2008, down from $8.9 billion (16%) in FY 2007 (table 3).

NASA

Federal funds obligated for research by NASA were expected to decline an average of 3.4% per year between FY 2006 and FY 2008 (table 2). NASA estimated it would provide 87% of its total FY 2008 research funding in support of engineering ($1.2 billion), physical sciences ($854 million), and environmental sciences ($730 million) (table 4).

NSF

Although the NSF research budget was stagnant between FY 2004 and FY 2006, growth resumed after FY 2006 (table 3). Five field categories account for 88% of the FY 2008 NSF research obligations. The

TABLE 3. Federal obligations for research, largest agency funders: FY 2006–08

(Millions of current dollars)

Agency	FY 2006	FY 2007 preliminary	FY 2008 Projected	FY 2008 % distribution
Department of Agriculture	2,031	2,088	1,807	100.0
Agricultural Research Service	1,021	963	919	50.9
Cooperative State Research, Education, and Extension Service	645	743	536	29.7
Forest Service	264	283	245	13.6
Other	100	99	106	5.9
Department of Defense	5,752	6,856	6,083	100.0
Defense Advanced Research Projects Agency	1,185	1,833	1,713	28.2
Department of the Air Force	1,351	1,482	1,389	22.8
Department of the Army	1,453	1,628	1,155	19.0
Department of the Navy	1,208	1,364	1,161	19.1
Other	555	549	666	11.0
Department of Energy	5,720	6,055	6,487	100.0
Energy Efficiency and Renewable Energy	211	343	368	5.7
Fossil Energy	218	207	217	3.3
National Nuclear Security Administration	2,219	2,087	2,204	34.0
Defense Programs	2,076	1,951	2,067	31.9
Nonproliferation and Verification	143	136	136	2.1
Office of Science	2,818	3,257	3,391	52.3
Other	254	161	307	4.7
Department of Health and Human Services	28,680	28,721	28,781	100.0
National Institutes of Health	27,566	27,625	27,708	96.3
Other	1,114	1,096	1,073	3.7
National Aeronautics and Space Administration	3,272	3,261	3,195	100.0
National Science Foundation	3,791	4,051	4,358	100.0

NOTES: Agencies reported preliminary obligations for FY 2007 and projected obligations for FY 2008 during FY 2007. Not all agencies supporting research are listed here. Detail may not sum to total due to rounding.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Federal Funds for Research and Development: FY 2006–08

mathematics and computer sciences category and the physical sciences category are each expected to be 19% of the total, followed by engineering (18%), environmental sciences (17%), and life sciences (15%) (table 4).

Agencies' Funding for Development

Development obligations are expected to total $56.6 billion in FY 2008. After several years of substantial growth in the first half of this decade, estimated obligations for development show an average drop of 1.9% per year between FY 2005 and FY 2008 (table 1).

DOD accounts for most of federal development funding, an estimated 86.2% ($48.8 billion) in FY 2008. Most of those dollars ($44.0 billion) are obligations for major systems development projects. When they are subtracted from the total development figure, what is left is $4.8 billion (for advanced technology development), or 38.3% of the remaining $12.6 billion in FY 2008 federal development obligations. NASA is the second largest supporter of development (an estimated $4.1 billion in FY 2008), followed by DOE ($2.1 billion) (table 5).

Data Collection Notes

Data presented here are from the annual NSF Survey of Federal Funds for Research and Development FY 2006–08. Definitions of *research*, *development*, and *R&D plant* as used in this InfoBrief are provided in the

TABLE 4. Federal obligations for research, by field of science and engineering and agency in rank order: FY 2008 projected

(Millions of current dollars)

Field	All agencies	HHS	DOE	DOD	NSF	NASA	USDA	Other
All fields	54,709	28,781	6,487	6,083	4,358	3,195	1,807	3,999
Environmental sciences	3,408	435	326	326	734	730	16	841
Life sciences	27,533	23,359	320	712	649	184	1,469	840
Mathematics and computer sciences	3,129	184	920	958	849	56	19	144
Physical sciences	5,607	392	2,450	728	829	854	91	262
Psychology	1,758	1,612	0	55	5	12	0	74
Social sciences	1,146	312	0	15	198	1	143	478
Other sciences, nec	2,869	1,550	10	282	304	157	4	562
Engineering	9,258	937	2,461	3,007	789	1,202	64	799

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

NOTES: Agencies reported projected obligations for FY 2008 during FY 2007. Detail may not sum to total due to rounding.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Federal Funds for Research and Development: FY 2006–08.

technical notes section of the detailed statistical tables reports for this survey. For the prior-year report, see http://www.nsf.gov/statistics/nsf09300/.

The 30 federal agencies that report R&D obligations to the NSF Survey of Federal Funds for Research and Development submitted actual obligations for FY 2006 and preliminary data for FY 2007 and FY 2008. Data were requested from agencies beginning in February 2007. Agencies later revise the preliminary data on the basis of 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.

TABLE 5. Federal obligations for development, largest agency funders: FY 2006–08

(Millions of current dollars)

Agency	FY 2006	FY 2007 preliminary	FY 2008 projected
All agencies	56,610	59,427	56,637
Department of Defense major systems	42,669	45,183	44,015
Other development	13,941	14,244	12,622
Department of Defense advanced technology	5,866	6,406	4,834
National Aeronautics and Space Administration	3,939	4,031	4,113
Department of Energy	1,842	1,955	2,103
Department of Homeland Security	1,119	567	419
Department of Transportation	284	271	253
Other	891	1,013	900

NOTES: Agencies reported preliminary obligations for FY 2007 and projected obligations for FY 2008 during FY 2007. Detail may not sum to total due to rounding.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Federal Funds for Research and Development: FY 2006–08.

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. NASA's data for FY 2004 and later years may not be directly comparable to its data for FY 2003 and earlier years. Transition to the new system has delayed NASA's reporting of R&D data to NSF. Revisions in their methods of reporting R&D dollars have also delayed NIH and DOD responses to the survey.

The full set of detailed tables from this survey will be available in the report *Federal Funds for Research and Development: Fiscal Years 2006, 2007, and 2008* at http://www.nsf.gov/statistics/fedfunds/. Individual detailed tables from the FY 2006–08 survey may be available in advance of the full report. For more information, please contact the author.

Notes

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2. See http://www.nsf.gov/statistics/infbrief/nsf02326/.

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