



National Center for Science and  
Engineering Statistics

# National Patterns of R&D Resources: 2021–22 Data Update

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## General Notes

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*National Patterns of R&D Resources* provides current data on the levels and key trends of the performance and funding of research and experimental development (R&D) in the United States. These detailed statistical tables supplement analytical InfoBriefs available at <https://nces.nsf.gov/data-collections/national-patterns/>, from the National Center for Science and Engineering Statistics (NCSES).

The *National Patterns* statistics draw primarily from NCSES's national surveys of the R&D expenditures and funding of the organizations that perform the bulk of U.S. R&D—including businesses, federal and nonfederal government, higher education, and nonprofit organizations. Additional details on levels and trends are provided by type of R&D performed (i.e., basic research, applied research, and experimental development). The *National Patterns* data are reported in both current and inflation-adjusted dollars. These data along with gross domestic product (GDP), also reported in current and inflation-adjusted dollars, are presented back to 1953 to facilitate trend analysis and comparison of growth in R&D to overall U.S. economic growth.

The data for 2022 are estimates based mainly on early findings from the 2021 sectoral R&D expenditure surveys and evident recent trends. Data for 2021 were included in the previous edition (2020–21) of this report series but are now revised to reflect new, nearly final input from the sectoral surveys. The numbers for 1953–2020 reflect largely final survey data and, in general, exhibit minor revisions (if any).

The statistical tables are arranged to exhibit the U.S. R&D data from two differing perspectives. The first perspective ([tables 2–5](#)) is by type of R&D performer, with detailed breakouts by source of funds. The second perspective ([tables 6–9](#)) is by source of funds, with detailed breakouts by type of performer. The data in both groups of tables sum to the same overall U.S. R&D performance totals. [Table 1](#) provides data mainly on the U.S. R&D-to-gross domestic product (GDP) ratio and its components. [Table 10](#) presents state-level breakdowns of the U.S. R&D totals, by performing sector and source of funds, for 2021.

For trend comparisons, use only the historical data from the most recent publication, which incorporates the latest revisions and corrections. Do not use data published earlier.

## Data Tables

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### U.S. gross domestic product and R&D

Table	Title
1	U.S. gross domestic product, R&D, and ratio of R&D to gross domestic product (and components): 1953–2022

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### U.S. R&D expenditures

Table	Title
2	U.S. R&D expenditures, by performing sector and source of funds: 1953–2022
3	U.S. basic research expenditures, by performing sector and source of funds: 1953–2022
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7	U.S. basic research expenditures, by source of funds and performing sector: 1953–2022
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9	U.S. experimental development expenditures, by source of funds and performing sector: 1953–2022

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### U.S. R&D expenditures, by state

Table	Title
10	U.S. R&D expenditures, by state, performing sector, and source of funds: 2021

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TABLE 1

**U.S. gross domestic product, R&D, and ratio of R&D to gross domestic product (and components): 1953–2022**

(Billions of current and of constant 2017 dollars and R&amp;D as a percentage of GDP)

Year	GDP			Total R&D			R&D/GDP (%)						
	Current \$billions	Constant 2017 \$billions	Deflator <sup>a</sup> (2017 = 1.00000)	Current \$billions	Constant 2017 \$billions	Total	R&D, by performer				R&D, by source of funding		
							Business	Federal <sup>b</sup>	Higher education	Other <sup>c</sup>	Business	Federal	Other <sup>d</sup>
1953	389.2	2,894.4	0.13447	5.2	38.4	1.33	0.93	0.29	0.07	0.03	0.58	0.71	0.03
1954	390.5	2,877.7	0.13572	5.6	41.4	1.44	1.04	0.29	0.08	0.03	0.61	0.79	0.04
1955	425.5	3,083.0	0.13801	6.2	44.8	1.45	1.04	0.30	0.08	0.03	0.59	0.82	0.04
1956	449.4	3,148.8	0.14271	8.5	59.6	1.89	1.40	0.38	0.09	0.03	0.74	1.11	0.04
1957	474.0	3,215.1	0.14744	9.9	67.2	2.09	1.55	0.42	0.09	0.04	0.73	1.31	0.04
1958	481.2	3,191.2	0.15080	10.9	72.4	2.27	1.68	0.45	0.10	0.04	0.77	1.45	0.05
1959	521.7	3,412.4	0.15287	12.5	81.7	2.39	1.76	0.47	0.11	0.04	0.78	1.57	0.05
1960	542.4	3,500.3	0.15495	13.7	88.5	2.53	1.85	0.50	0.13	0.05	0.83	1.64	0.05
1961	562.2	3,590.1	0.15660	14.6	93.0	2.59	1.84	0.55	0.15	0.05	0.85	1.69	0.06
1962	603.9	3,810.1	0.15850	15.6	98.6	2.59	1.83	0.54	0.16	0.06	0.85	1.68	0.06
1963	637.5	3,976.1	0.16032	17.5	109.3	2.75	1.92	0.58	0.18	0.06	0.86	1.83	0.07
1964	684.5	4,205.3	0.16276	19.1	117.4	2.79	1.91	0.62	0.20	0.06	0.86	1.86	0.07
1965	742.3	4,478.6	0.16574	20.3	122.2	2.73	1.86	0.59	0.21	0.06	0.88	1.78	0.07
1966	813.4	4,773.9	0.17039	22.1	129.5	2.71	1.87	0.56	0.22	0.07	0.90	1.74	0.07
1967	860.0	4,904.9	0.17533	23.3	133.2	2.71	1.86	0.56	0.24	0.07	0.95	1.69	0.07
1968	940.7	5,145.9	0.18280	24.7	134.9	2.62	1.81	0.52	0.23	0.06	0.96	1.59	0.07
1969	1,017.6	5,306.6	0.19176	26.0	135.6	2.55	1.75	0.51	0.22	0.06	0.98	1.50	0.07
1970	1,073.3	5,316.4	0.20189	26.3	130.1	2.45	1.64	0.52	0.23	0.06	0.97	1.40	0.08
1971	1,164.9	5,491.4	0.21212	27.0	127.1	2.31	1.53	0.50	0.22	0.06	0.93	1.31	0.08
1972	1,279.1	5,780.0	0.22130	28.7	129.9	2.25	1.49	0.49	0.22	0.06	0.92	1.25	0.08
1973	1,425.4	6,106.4	0.23342	31.0	132.6	2.17	1.45	0.45	0.21	0.06	0.93	1.16	0.07
1974	1,545.2	6,073.4	0.25443	33.4	131.1	2.16	1.44	0.45	0.21	0.06	0.96	1.12	0.08
1975	1,684.9	6,060.9	0.27800	35.7	128.3	2.12	1.39	0.45	0.21	0.06	0.94	1.10	0.08
1976	1,873.4	6,387.4	0.29330	39.4	134.5	2.10	1.39	0.44	0.21	0.06	0.94	1.08	0.08
1977	2,081.8	6,682.8	0.31152	43.3	139.1	2.08	1.39	0.43	0.21	0.06	0.94	1.06	0.08
1978	2,351.6	7,052.7	0.33343	48.7	146.1	2.07	1.37	0.43	0.21	0.06	0.95	1.04	0.08
1979	2,627.3	7,276.0	0.36110	55.4	153.4	2.11	1.41	0.42	0.22	0.06	0.99	1.04	0.08
1980	2,857.3	7,257.3	0.39371	63.2	160.6	2.21	1.51	0.42	0.23	0.06	1.08	1.05	0.08
1981	3,207.0	7,441.5	0.43097	72.3	167.7	2.25	1.57	0.41	0.22	0.06	1.12	1.05	0.08
1982	3,343.8	7,307.3	0.45759	80.7	176.5	2.41	1.71	0.42	0.23	0.06	1.22	1.11	0.09
1983	3,634.0	7,642.3	0.47552	89.9	189.2	2.48	1.75	0.44	0.23	0.06	1.25	1.14	0.09
1984	4,037.6	8,195.3	0.49267	102.2	207.5	2.53	1.81	0.43	0.23	0.06	1.29	1.15	0.09
1985	4,339.0	8,537.0	0.50826	114.7	225.6	2.64	1.90	0.44	0.24	0.06	1.34	1.21	0.09
1986	4,579.6	8,832.6	0.51849	120.2	231.9	2.63	1.88	0.43	0.25	0.06	1.33	1.19	0.10

TABLE 1

**U.S. gross domestic product, R&D, and ratio of R&D to gross domestic product (and components): 1953–2022**

(Billions of current and of constant 2017 dollars and R&amp;D as a percentage of GDP)

Year	GDP			Total R&D			R&D/GDP (%)							
	Current \$billions	Constant 2017 \$billions	Deflator <sup>a</sup> (2017 = 1.00000)	Current \$billions	Constant 2017 \$billions	Total	R&D, by performer				R&D, by source of funding			
							Business	Federal <sup>b</sup>	Higher education	Other <sup>c</sup>	Business	Federal	Other <sup>d</sup>	
1987	4,855.2	9,137.7	0.53134	126.4	237.8	2.60	1.86	0.42	0.26	0.06	1.29	1.21	0.11	
1988	5,236.4	9,519.4	0.55008	133.9	243.4	2.56	1.81	0.41	0.27	0.06	1.30	1.15	0.11	
1989	5,641.6	9,869.0	0.57165	141.9	248.2	2.52	1.77	0.40	0.28	0.07	1.33	1.07	0.11	
1990	5,963.1	10,055.1	0.59305	152.0	256.3	2.55	1.80	0.39	0.28	0.07	1.40	1.03	0.12	
1991	6,158.1	10,044.2	0.61310	160.9	262.4	2.61	1.86	0.38	0.30	0.08	1.50	0.99	0.13	
1992	6,520.3	10,398.0	0.62707	165.4	263.7	2.54	1.79	0.37	0.30	0.08	1.48	0.93	0.13	
1993	6,858.6	10,684.2	0.64194	165.7	258.2	2.42	1.68	0.36	0.30	0.08	1.41	0.88	0.13	
1994	7,287.2	11,114.6	0.65564	169.2	258.1	2.32	1.61	0.34	0.30	0.08	1.36	0.83	0.13	
1995	7,639.7	11,413.0	0.66939	183.6	274.3	2.40	1.70	0.33	0.30	0.08	1.45	0.82	0.13	
1996	8,073.1	11,843.6	0.68164	197.3	289.5	2.44	1.76	0.31	0.29	0.08	1.53	0.79	0.13	
1997	8,577.6	12,370.3	0.69340	211.9	305.6	2.47	1.81	0.29	0.29	0.08	1.59	0.75	0.13	
1998	9,062.8	12,924.9	0.70119	225.8	322.0	2.49	1.84	0.29	0.28	0.08	1.63	0.73	0.13	
1999	9,631.2	13,543.8	0.71111	244.5	343.8	2.54	1.89	0.28	0.29	0.08	1.71	0.69	0.14	
2000	10,251.0	14,096.0	0.72722	267.9	368.5	2.61	1.95	0.28	0.29	0.09	1.81	0.66	0.14	
2001	10,581.9	14,230.7	0.74360	278.5	374.6	2.63	1.91	0.31	0.31	0.10	1.78	0.70	0.15	
2002	10,929.1	14,472.7	0.75515	277.9	368.0	2.54	1.77	0.32	0.34	0.11	1.65	0.72	0.17	
2003	11,456.5	14,877.3	0.77006	291.4	378.4	2.54	1.75	0.33	0.35	0.11	1.63	0.74	0.18	
2004	12,217.2	15,449.8	0.79077	302.7	382.8	2.48	1.70	0.31	0.35	0.11	1.57	0.74	0.17	
2005	13,039.2	15,988.0	0.81556	325.3	398.9	2.49	1.73	0.30	0.35	0.11	1.59	0.73	0.17	
2006	13,815.6	16,433.1	0.84071	350.9	417.4	2.54	1.79	0.30	0.34	0.10	1.64	0.72	0.17	
2007	14,474.2	16,762.4	0.86349	377.9	437.6	2.61	1.86	0.30	0.34	0.10	1.71	0.73	0.18	
2008	14,769.9	16,781.5	0.88013	404.8	459.9	2.74	1.97	0.31	0.35	0.11	1.75	0.80	0.20	
2009	14,478.1	16,349.1	0.88556	402.9	455.0	2.78	1.95	0.33	0.38	0.12	1.70	0.87	0.21	
2010	15,049.0	16,789.8	0.89632	406.6	453.6	2.70	1.85	0.34	0.39	0.12	1.65	0.84	0.21	
2011	15,599.7	17,052.4	0.91481	426.2	465.9	2.73	1.89	0.34	0.39	0.12	1.71	0.81	0.21	
2012	16,254.0	17,442.8	0.93185	433.7	465.4	2.67	1.86	0.32	0.37	0.11	1.70	0.76	0.21	
2013	16,880.7	17,812.2	0.94771	454.2	479.3	2.69	1.91	0.30	0.36	0.11	1.76	0.71	0.22	
2014	17,608.1	18,261.7	0.96421	475.9	493.6	2.70	1.94	0.30	0.35	0.11	1.81	0.67	0.22	
2015	18,295.0	18,799.6	0.97316	494.5	508.1	2.70	1.94	0.29	0.35	0.12	1.82	0.65	0.23	
2016	18,804.9	19,141.7	0.98241	521.7	531.0	2.77	2.02	0.27	0.36	0.12	1.92	0.63	0.23	
2017	19,612.1	19,612.1	1.00000	553.6	553.6	2.82	2.07	0.27	0.36	0.12	1.97	0.62	0.23	
2018	20,656.5	20,193.9	1.02291	604.0	590.5	2.92	2.16	0.28	0.36	0.12	2.06	0.63	0.22	
2019	21,521.4	20,692.1	1.04008	665.6	639.9	3.09	2.31	0.29	0.36	0.12	2.24	0.63	0.22	
2020	21,323.0	20,234.1	1.05381	716.9	680.3	3.36	2.55	0.31	0.38	0.13	2.44	0.69	0.23	

TABLE 1

**U.S. gross domestic product, R&D, and ratio of R&D to gross domestic product (and components): 1953–2022**

(Billions of current and of constant 2017 dollars and R&amp;D as a percentage of GDP)

Year	GDP			Total R&D		R&D/GDP (%)							
	Current \$billions	Constant 2017 \$billions	Deflator <sup>a</sup> (2017 = 1.00000)	Current \$billions	Constant 2017 \$billions	Total	R&D, by performer				R&D, by source of funding		
							Business	Federal <sup>b</sup>	Higher education	Other <sup>c</sup>	Business	Federal	Other <sup>d</sup>
2021 <sup>e</sup>	23,594.0	21,407.7	1.10213	789.1	716.0	3.34	2.58	0.28	0.36	0.12	2.50	0.63	0.21
2022 <sup>f</sup>	25,744.1	21,822.0	1.17973	885.6	750.6	3.44	2.69	0.28	0.36	0.11	2.61	0.62	0.21

GDP = gross domestic product.

<sup>a</sup> 2017 = 1.00000 is the implicit price deflator for GDP.<sup>b</sup> Federal includes federal intramural R&D and R&D by federally funded R&D centers.<sup>c</sup> Other R&D performer includes R&D in the United States performed by nonfederal government and nonprofit organizations.<sup>d</sup> Other R&D funding source includes funding for U.S. R&D by nonfederal government, higher education, and nonprofit organizations.<sup>e</sup> Some data for 2021 are preliminary and may be revised later.<sup>f</sup> Data for 2022 include estimates and are likely to be revised later.**Note(s):**

Detail may not add to total because of rounding. For trend comparisons, use only the historical data reported in this table because some back-year data may have been revised.

**Source(s):**GDP data from Bureau of Economic Analysis, National Economic Accounts, Gross Domestic Product, <https://www.bea.gov/national/>, accessed 27 October 2023; R&D data from National Center for Science and Engineering Statistics, National Patterns of R&D Resources (annual series).

TABLE 2

## U.S. R&amp;D expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs <sup>b</sup>		Nonfederal government <sup>c</sup>	Business <sup>d</sup>							Higher education <sup>e</sup>				NPOs <sup>f</sup>					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
Current \$millions																							
1953	5,160	1,146	1,015	131	131	NA	3,630	2,200	1,430	NA	NA	NA	NA	273	149	40	21	37	27	112	58	26	28
1954	5,621	1,127	963	165	165	NA	4,070	2,320	1,750	NA	NA	NA	NA	301	165	45	24	40	29	123	61	31	31
1955	6,185	1,292	973	319	319	NA	4,420	2,460	1,960	NA	NA	NA	NA	342	191	50	27	42	32	132	65	35	32
1956	8,501	1,692	1,131	561	561	NA	6,272	3,277	2,995	NA	NA	NA	NA	391	221	57	32	46	36	146	71	37	38
1957	9,908	1,985	1,297	688	688	NA	7,324	3,396	3,928	NA	NA	NA	NA	433	242	64	37	51	40	167	79	37	51
1958	10,915	2,163	1,507	657	657	NA	8,066	3,630	4,436	NA	NA	NA	NA	491	280	72	39	56	45	195	95	38	62
1959	12,490	2,470	1,681	789	789	NA	9,200	3,983	5,217	NA	NA	NA	NA	586	356	81	40	61	50	234	125	42	67
1960	13,711	2,711	1,801	910	910	NA	10,032	4,428	5,604	NA	NA	NA	NA	705	453	90	40	67	55	264	148	48	68
1961	14,564	3,074	1,987	1,087	1,087	NA	10,353	4,668	5,685	NA	NA	NA	NA	834	557	101	40	75	62	304	169	49	86
1962	15,636	3,244	2,188	1,056	1,056	NA	11,037	5,029	6,008	NA	NA	NA	NA	993	687	112	41	84	70	363	200	54	109
1963	17,519	3,717	2,559	1,159	1,159	NA	12,216	5,360	6,856	NA	NA	NA	NA	1,178	839	125	41	96	78	408	234	55	119
1964	19,103	4,263	2,966	1,297	1,297	NA	13,049	5,792	7,257	NA	NA	NA	NA	1,375	995	138	41	114	88	417	250	55	112
1965	20,253	4,374	3,157	1,218	1,218	NA	13,812	6,445	7,367	NA	NA	NA	NA	1,595	1,167	150	42	136	101	472	286	62	124
1966	22,072	4,525	3,308	1,217	1,217	NA	15,193	7,216	7,977	NA	NA	NA	NA	1,818	1,335	160	45	165	114	537	329	70	138
1967	23,347	4,785	3,445	1,340	1,340	NA	15,966	8,020	7,946	NA	NA	NA	NA	2,035	1,491	168	52	200	126	561	342	74	145
1968	24,667	4,870	3,498	1,372	1,372	NA	17,014	8,869	8,145	NA	NA	NA	NA	2,187	1,586	185	58	221	139	596	364	81	151
1969	25,996	5,230	3,790	1,440	1,440	NA	17,844	9,857	7,987	NA	NA	NA	NA	2,280	1,624	208	61	233	155	642	388	93	161
1970	26,271	5,583	4,154	1,430	1,430	NA	17,594	10,288	7,306	NA	NA	NA	NA	2,418	1,686	237	66	259	171	677	410	95	172
1971	26,952	5,849	4,409	1,441	1,441	NA	17,829	10,654	7,175	NA	NA	NA	NA	2,565	1,760	262	72	290	182	709	427	98	184
1972	28,740	6,209	4,676	1,533	1,533	NA	19,004	11,535	7,469	NA	NA	NA	NA	2,757	1,890	282	79	312	195	771	472	101	198
1973	30,952	6,413	4,837	1,576	1,576	NA	20,704	13,104	7,600	NA	NA	NA	NA	2,954	2,009	301	90	344	210	882	566	105	211
1974	33,359	6,916	5,132	1,784	1,784	NA	22,239	14,667	7,572	NA	NA	NA	NA	3,216	2,160	320	105	394	239	988	639	114	235
1975	35,671	7,580	5,561	2,019	2,019	NA	23,460	15,582	7,878	NA	NA	NA	NA	3,570	2,400	348	118	432	272	1,062	675	124	262
1976	39,435	8,291	5,890	2,401	2,401	NA	26,107	17,436	8,671	NA	NA	NA	NA	3,899	2,619	369	131	480	300	1,139	711	135	292
1977	43,338	8,916	6,211	2,704	2,704	NA	28,863	19,340	9,523	NA	NA	NA	NA	4,346	2,893	394	155	569	337	1,213	740	147	326
1978	48,719	10,148	6,962	3,186	3,186	NA	32,222	22,115	10,107	NA	NA	NA	NA	4,996	3,329	443	182	679	364	1,353	830	160	363
1979	55,379	11,038	7,471	3,567	3,567	NA	37,062	25,708	11,354	NA	NA	NA	NA	5,715	3,848	482	215	785	386	1,564	985	174	405
1980	63,224	11,882	7,831	4,052	4,052	NA	43,228	30,476	12,752	NA	NA	NA	NA	6,455	4,335	519	264	920	419	1,658	1,017	189	452
1981	72,292	12,998	8,605	4,393	4,393	NA	50,425	35,428	14,997	NA	NA	NA	NA	7,085	4,670	581	314	1,058	463	1,784	1,075	206	504
1982	80,748	14,065	9,501	4,563	4,563	NA	57,166	40,105	17,061	NA	NA	NA	NA	7,603	4,879	621	363	1,207	534	1,915	1,129	224	561
1983	89,949	15,840	10,830	5,011	5,011	NA	63,683	44,588	19,095	NA	NA	NA	NA	8,251	5,210	658	432	1,357	595	2,175	1,306	244	626
1984	102,244	17,518	11,916	5,602	5,602	NA	73,061	51,404	21,657	NA	NA	NA	NA	9,154	5,748	721	518	1,514	654	2,511	1,548	265	698

TABLE 2

## U.S. R&amp;D expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs <sup>b</sup>		Nonfederal government <sup>c</sup>	Business <sup>d</sup>							Higher education <sup>e</sup>				NPOs <sup>f</sup>					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
Current \$millions																							
1985	114,671	19,227	13,093	6,134	6,134	NA	82,376	57,043	25,333	NA	NA	NA	NA	10,308	6,388	834	630	1,743	713	2,761	1,694	289	778
1986	120,249	19,909	13,505	6,405	6,405	NA	85,932	59,932	26,000	NA	NA	NA	NA	11,540	7,028	969	745	2,019	780	2,867	1,686	314	867
1987	126,360	20,380	13,588	6,792	6,792	NA	90,160	61,403	28,757	NA	NA	NA	NA	12,807	7,768	1,065	831	2,262	882	3,013	1,704	342	967
1988	133,881	21,555	14,342	7,212	7,212	NA	94,893	66,672	28,221	NA	NA	NA	NA	14,221	8,593	1,165	933	2,527	1,003	3,212	1,762	372	1,078
1989	141,891	22,728	15,231	7,497	7,497	NA	99,860	73,501	26,359	NA	NA	NA	NA	15,634	9,317	1,274	1,061	2,852	1,131	3,669	2,062	405	1,202
1990	151,993	23,524	15,671	7,853	7,853	NA	107,404	81,602	25,802	NA	NA	NA	NA	16,939	9,939	1,399	1,166	3,187	1,249	4,126	2,346	440	1,340
1991	160,876	23,343	15,249	8,093	8,093	NA	114,675	90,580	24,095	NA	NA	NA	NA	18,206	10,667	1,483	1,242	3,458	1,358	4,652	2,679	479	1,494
1992	165,350	24,212	15,853	8,360	8,360	NA	116,757	94,388	22,369	NA	NA	NA	NA	19,388	11,528	1,525	1,320	3,569	1,448	4,993	2,806	521	1,666
1993	165,730	24,534	16,531	8,003	8,003	NA	115,435	94,591	20,844	NA	NA	NA	NA	20,495	12,307	1,557	1,392	3,709	1,531	5,267	2,843	567	1,857
1994	169,207	24,610	16,355	8,254	8,254	NA	117,392	97,131	20,261	NA	NA	NA	NA	21,607	12,996	1,623	1,456	3,938	1,595	5,599	2,911	617	2,071
1995	183,625	25,352	16,904	8,448	8,448	NA	129,830	108,652	21,178	NA	NA	NA	NA	22,617	13,592	1,751	1,548	4,110	1,617	5,827	2,847	671	2,308
1996	197,346	25,049	16,585	8,464	8,464	NA	142,371	121,015	21,356	NA	NA	NA	NA	23,718	14,084	1,861	1,672	4,436	1,666	6,209	2,905	730	2,574
1997	211,894	25,232	16,819	8,413	8,413	NA	155,409	133,611	21,798	NA	NA	NA	NA	24,627	14,317	1,902	1,788	4,852	1,767	6,626	3,014	809	2,804
1998	225,759	25,843	17,362	8,480	8,480	NA	167,102	145,016	22,086	NA	NA	NA	NA	25,583	14,699	1,920	1,898	5,193	1,871	7,232	3,281	859	3,092
1999	244,451	26,846	18,142	8,704	8,704	NA	182,090	161,594	20,496	NA	NA	NA	NA	27,475	15,714	2,036	2,020	5,654	2,050	8,040	3,761	931	3,349
2000	267,950	28,516	19,247	9,269	9,269	NA	199,961	182,844	17,117	NA	NA	NA	NA	29,916	17,095	2,182	2,112	6,270	2,258	9,557	4,510	1,020	4,027
2001	278,539	32,812	22,374	10,438	10,056	NA	202,017	185,118	16,899	NA	NA	NA	NA	32,750	18,976	2,319	2,120	6,874	2,461	10,960	5,488	1,029	4,443
2002	277,911	35,482	23,798	11,684	11,242	NA	193,868	177,467	16,401	NA	NA	NA	NA	36,684	21,655	2,521	2,103	7,673	2,732	11,878	5,778	998	5,102
2003	291,365	37,235	24,982	12,253	11,841	NA	200,724	182,926	17,798	NA	NA	NA	NA	40,577	24,567	2,756	2,090	8,286	2,879	12,829	5,945	1,020	5,864
2004	302,731	37,685	24,898	12,788	12,471	NA	208,301	188,035	20,266	NA	NA	NA	NA	43,296	26,624	2,896	2,148	8,637	2,993	13,448	6,537	1,041	5,870
2005	325,288	39,568	26,322	13,246	12,894	NA	226,159	204,250	21,909	NA	NA	NA	NA	45,490	27,743	2,945	2,279	9,353	3,170	14,072	6,545	1,107	6,420
2006	350,908	41,610	28,240	13,370	12,969	309	247,669	223,365	24,304	NA	NA	NA	NA	47,369	28,277	3,059	2,464	10,176	3,394	13,952	6,044	1,182	6,726
2007	377,890	44,132	29,859	14,273	13,845	388	269,267	242,682	26,585	NA	NA	NA	NA	49,430	28,725	3,308	2,697	10,933	3,767	14,674	5,980	1,257	7,438
2008	404,777	45,649	29,839	15,810	15,369	491	290,680	225,848	36,360	306	12,181	15,533	452	52,054	29,635	3,567	2,954	11,738	4,161	15,903	6,236	1,305	8,362
2009	402,931	47,572	30,560	17,013	16,571	606	282,393	221,104	39,573	195	9,567	11,464	490	54,909	31,740	3,680	3,032	12,057	4,400	17,452	7,097	1,258	9,097
2010	406,599	50,798	31,970	18,828	18,409	691	278,977	218,187	34,199	156	11,013	14,534	888	58,083	34,681	3,674	2,953	12,262	4,515	18,050	7,093	1,266	9,691
2011	426,214	53,524	34,950	18,574	18,176	694	294,092	235,426	31,309	321	11,124	15,349	563	60,087	35,742	3,615	2,999	13,103	4,629	17,817	6,564	1,340	9,913
2012	433,698	52,144	34,017	18,128	17,727	665	302,251	242,674	30,621	157	11,624	16,699	476	60,876	34,967	3,561	3,170	14,282	4,898	17,762	6,239	1,376	10,147
2013	454,232	51,086	33,406	17,680	17,296	620	322,528	259,908	29,362	194	13,450	18,796	818	61,511	33,840	3,643	3,376	15,341	5,313	18,487	5,970	1,464	11,053
2014	475,938	52,687	34,783	17,903	17,523	583	340,728	277,272	26,554	138	13,227	22,544	993	62,318	33,124	3,714	3,602	16,176	5,702	19,622	6,135	1,548	11,939
2015	494,470	52,847	34,199	18,649	18,287	595	355,821	289,892	26,990	127	14,595	23,102	1,115	64,604	33,563	3,782	3,844	17,260	6,156	20,604	6,247	1,605	12,751
2016	521,686	51,187	31,762	19,424	19,059	620	379,529	310,391	24,154	195	14,649	29,017	1,123	67,777	34,687	3,936	4,049	18,399	6,707	22,573	8,257	1,993	11,517



TABLE 2

## U.S. R&amp;D expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs <sup>b</sup>		Nonfederal government <sup>c</sup>	Business <sup>d</sup>							Higher education <sup>e</sup>				NPOs <sup>f</sup>					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
Current \$millions																							
2017	553,612	52,553	32,231	20,322	19,943	632	405,792	324,177	24,974	142	17,729	37,913	856	71,115	36,006	4,057	4,283	19,554	7,217	23,521	9,058	2,226	11,414
2018	604,028	58,356	36,793	21,563	21,163	643	445,563	357,862	25,192	120	19,283	42,057	1,049	74,890	37,745	4,224	4,584	20,667	7,670	24,576	9,937	2,486	11,312
2019	665,557	62,802	39,870	22,932	22,538	675	498,175	405,960	22,653	169	21,673	46,809	911	78,157	39,528	4,363	4,806	21,568	7,893	25,749	10,901	2,778	11,212
2020	716,870	65,093	41,227	23,866	23,478	683	543,220	443,398	29,772	241	21,775	47,051	982	80,823	41,436	4,470	4,838	22,250	7,830	27,053	11,959	3,103	11,112
2021 <sup>g</sup>	789,072	66,786	41,464	25,322	24,873	685	608,625	500,300	24,587	392	26,858	55,507	981	85,787	44,683	4,621	5,080	23,506	7,897	27,190	11,620	3,010	11,958
2022 <sup>h</sup>	885,563	73,338	46,960	26,378	25,819	697	692,748	573,667	27,325	413	28,561	61,740	1,042	91,451	47,738	4,766	5,493	25,236	8,219	27,329	11,679	3,026	12,019
Constant 2017 \$millions																							
1953	38,372	8,522	7,548	974	974	NA	26,994	16,360	10,634	NA	NA	NA	NA	2,026	1,108	294	152	271	201	829	428	193	208
1954	41,414	8,304	7,092	1,212	1,212	NA	29,989	17,095	12,895	NA	NA	NA	NA	2,218	1,212	328	173	291	214	903	446	228	228
1955	44,817	9,358	7,050	2,308	2,308	NA	32,027	17,825	14,202	NA	NA	NA	NA	2,478	1,384	362	196	304	232	953	467	254	232
1956	59,566	11,853	7,922	3,931	3,931	NA	43,950	22,963	20,987	NA	NA	NA	NA	2,740	1,549	396	221	322	252	1,023	498	259	266
1957	67,199	13,459	8,797	4,663	4,663	NA	49,673	23,033	26,641	NA	NA	NA	NA	2,937	1,638	434	248	346	271	1,129	532	251	346
1958	72,382	14,344	9,990	4,354	4,354	NA	53,489	24,072	29,417	NA	NA	NA	NA	3,256	1,857	477	259	368	295	1,293	630	252	411
1959	81,701	16,158	10,996	5,161	5,161	NA	60,182	26,055	34,127	NA	NA	NA	NA	3,833	2,326	527	258	399	324	1,527	814	275	438
1960	88,484	17,492	11,620	5,873	5,873	NA	64,742	28,576	36,166	NA	NA	NA	NA	4,547	2,920	581	258	432	355	1,704	955	310	439
1961	93,001	19,626	12,688	6,938	6,938	NA	66,111	29,808	36,302	NA	NA	NA	NA	5,322	3,554	642	255	476	396	1,941	1,079	313	549
1962	98,647	20,463	13,801	6,662	6,662	NA	69,632	31,728	37,904	NA	NA	NA	NA	6,262	4,331	707	256	530	438	2,290	1,262	341	688
1963	109,276	23,185	15,959	7,226	7,226	NA	76,198	33,433	42,765	NA	NA	NA	NA	7,348	5,230	780	253	599	487	2,545	1,460	343	742
1964	117,368	26,189	18,220	7,969	7,969	NA	80,172	35,586	44,587	NA	NA	NA	NA	8,445	6,113	845	249	697	541	2,562	1,536	338	688
1965	122,192	26,390	19,045	7,346	7,346	NA	83,334	38,886	44,448	NA	NA	NA	NA	9,620	7,041	902	250	821	606	2,848	1,726	374	748
1966	129,541	26,554	19,415	7,140	7,140	NA	89,168	42,351	46,817	NA	NA	NA	NA	10,670	7,835	939	264	965	666	3,149	1,928	411	810
1967	133,162	27,292	19,649	7,643	7,643	NA	91,064	45,743	45,321	NA	NA	NA	NA	11,607	8,501	958	294	1,138	716	3,200	1,951	422	827
1968	134,940	26,639	19,133	7,506	7,506	NA	93,077	48,519	44,558	NA	NA	NA	NA	11,964	8,676	1,009	315	1,206	758	3,260	1,991	443	826
1969	135,560	27,274	19,765	7,509	7,509	NA	93,052	51,402	41,650	NA	NA	NA	NA	11,890	8,466	1,085	315	1,215	808	3,345	2,021	485	840
1970	130,130	27,656	20,575	7,081	7,081	NA	87,148	50,960	36,189	NA	NA	NA	NA	11,975	8,349	1,174	324	1,280	847	3,351	2,028	471	852
1971	127,058	27,575	20,784	6,791	6,791	NA	84,051	50,226	33,825	NA	NA	NA	NA	12,092	8,295	1,235	339	1,365	858	3,340	2,011	462	867
1972	129,871	28,056	21,128	6,927	6,927	NA	85,875	52,124	33,751	NA	NA	NA	NA	12,458	8,541	1,274	357	1,408	879	3,482	2,131	456	895
1973	132,600	27,472	20,720	6,752	6,752	NA	88,697	56,138	32,559	NA	NA	NA	NA	12,653	8,604	1,289	386	1,474	900	3,779	2,425	450	904
1974	131,115	27,184	20,172	7,012	7,012	NA	87,407	57,647	29,761	NA	NA	NA	NA	12,640	8,490	1,256	411	1,547	937	3,883	2,510	449	925
1975	128,316	27,268	20,005	7,263	7,263	NA	84,389	56,051	28,338	NA	NA	NA	NA	12,840	8,633	1,252	424	1,552	978	3,819	2,428	447	943
1976	134,454	28,267	20,083	8,185	8,185	NA	89,012	59,448	29,564	NA	NA	NA	NA	13,292	8,930	1,258	447	1,637	1,021	3,882	2,424	461	997

TABLE 2

## U.S. R&amp;D expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs <sup>b</sup>		Nonfederal government <sup>c</sup>	Business <sup>d</sup>							Higher education <sup>e</sup>				NPOs <sup>f</sup>					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
Current \$millions																							
1977	139,118	28,620	19,939	8,681	8,681	NA	92,652	62,083	30,569	NA	NA	NA	NA	13,951	9,285	1,265	496	1,825	1,080	3,895	2,376	472	1,046
1978	146,114	30,436	20,880	9,555	9,555	NA	96,637	66,325	30,312	NA	NA	NA	NA	14,982	9,983	1,329	544	2,036	1,090	4,059	2,489	480	1,090
1979	153,363	30,568	20,690	9,878	9,878	NA	102,638	71,194	31,443	NA	NA	NA	NA	15,825	10,656	1,333	594	2,174	1,068	4,332	2,728	482	1,122
1980	160,583	30,180	19,889	10,291	10,291	NA	109,795	77,406	32,389	NA	NA	NA	NA	16,395	11,009	1,317	669	2,335	1,064	4,212	2,584	481	1,147
1981	167,744	30,160	19,966	10,194	10,194	NA	117,004	82,206	34,798	NA	NA	NA	NA	16,440	10,835	1,348	729	2,454	1,074	4,140	2,493	478	1,169
1982	176,461	30,736	20,763	9,972	9,972	NA	124,927	87,643	37,284	NA	NA	NA	NA	16,614	10,661	1,357	793	2,637	1,166	4,185	2,467	490	1,227
1983	189,161	33,311	22,774	10,537	10,537	NA	133,923	93,767	40,156	NA	NA	NA	NA	17,352	10,956	1,384	908	2,853	1,250	4,575	2,745	513	1,316
1984	207,528	35,557	24,185	11,371	11,371	NA	148,295	104,337	43,958	NA	NA	NA	NA	18,579	11,666	1,463	1,050	3,073	1,326	5,097	3,141	539	1,417
1985	225,616	37,828	25,760	12,068	12,068	NA	162,076	112,233	49,843	NA	NA	NA	NA	20,280	12,568	1,640	1,240	3,429	1,403	5,431	3,332	568	1,531
1986	231,920	38,399	26,046	12,353	12,353	NA	165,735	115,589	50,145	NA	NA	NA	NA	22,257	13,554	1,869	1,437	3,893	1,504	5,530	3,251	606	1,673
1987	237,816	38,356	25,574	12,782	12,782	NA	169,685	115,563	54,122	NA	NA	NA	NA	24,103	14,620	2,003	1,564	4,257	1,659	5,671	3,208	643	1,820
1988	243,385	39,184	26,073	13,112	13,112	NA	172,508	121,204	51,304	NA	NA	NA	NA	25,853	15,621	2,118	1,696	4,594	1,823	5,840	3,204	676	1,960
1989	248,214	39,759	26,643	13,115	13,115	NA	174,688	128,578	46,111	NA	NA	NA	NA	27,349	16,298	2,229	1,855	4,989	1,978	6,418	3,607	708	2,103
1990	256,292	39,666	26,425	13,241	13,241	NA	181,106	137,598	43,508	NA	NA	NA	NA	28,563	16,759	2,359	1,965	5,373	2,106	6,957	3,955	742	2,260
1991	262,397	38,073	24,872	13,200	13,200	NA	187,041	147,741	39,300	NA	NA	NA	NA	29,695	17,398	2,418	2,025	5,639	2,215	7,588	4,370	781	2,437
1992	263,686	38,612	25,281	13,331	13,331	NA	186,194	150,522	35,672	NA	NA	NA	NA	30,918	18,383	2,432	2,104	5,691	2,308	7,962	4,474	831	2,656
1993	258,173	38,218	25,751	12,467	12,467	NA	179,823	147,353	32,471	NA	NA	NA	NA	31,926	19,172	2,425	2,168	5,777	2,384	8,205	4,429	883	2,893
1994	258,078	37,535	24,945	12,590	12,590	NA	179,049	148,146	30,903	NA	NA	NA	NA	32,955	19,821	2,475	2,221	6,006	2,432	8,539	4,440	941	3,158
1995	274,318	37,873	25,252	12,620	12,620	NA	193,953	162,315	31,638	NA	NA	NA	NA	33,788	20,305	2,616	2,312	6,140	2,415	8,705	4,254	1,003	3,448
1996	289,515	36,747	24,331	12,417	12,417	NA	208,864	177,534	31,330	NA	NA	NA	NA	34,795	20,662	2,730	2,452	6,507	2,443	9,109	4,262	1,071	3,776
1997	305,588	36,389	24,256	12,134	12,134	NA	224,126	192,690	31,436	NA	NA	NA	NA	35,516	20,648	2,743	2,579	6,997	2,549	9,556	4,347	1,166	4,043
1998	321,964	36,855	24,761	12,094	12,094	NA	238,311	206,814	31,498	NA	NA	NA	NA	36,484	20,963	2,739	2,708	7,406	2,669	10,313	4,679	1,225	4,409
1999	343,758	37,752	25,512	12,240	12,240	NA	256,063	227,241	28,822	NA	NA	NA	NA	38,636	22,098	2,864	2,841	7,950	2,883	11,307	5,288	1,309	4,710
2000	368,456	39,212	26,466	12,746	12,746	NA	274,965	251,428	23,538	NA	NA	NA	NA	41,138	23,507	3,001	2,904	8,621	3,105	13,142	6,202	1,402	5,538
2001	374,583	44,126	30,089	14,037	13,523	NA	271,675	248,949	22,726	NA	NA	NA	NA	44,042	25,520	3,119	2,851	9,244	3,310	14,740	7,380	1,384	5,975
2002	368,020	46,986	31,514	15,472	14,887	NA	256,727	235,008	21,719	NA	NA	NA	NA	48,578	28,676	3,338	2,785	10,161	3,618	15,729	7,651	1,322	6,756
2003	378,366	48,354	32,442	15,912	15,377	NA	260,660	237,547	23,112	NA	NA	NA	NA	52,693	31,902	3,578	2,715	10,760	3,738	16,660	7,720	1,325	7,615
2004	382,831	47,657	31,485	16,171	15,770	NA	263,416	237,787	25,628	NA	NA	NA	NA	54,752	33,668	3,662	2,716	10,922	3,784	17,006	8,266	1,317	7,424
2005	398,851	48,516	32,275	16,241	15,810	NA	277,304	250,440	26,864	NA	NA	NA	NA	55,777	34,016	3,611	2,794	11,468	3,887	17,254	8,025	1,357	7,872
2006	417,393	49,493	33,590	15,903	15,426	367	294,594	265,685	28,909	NA	NA	NA	NA	56,343	33,634	3,639	2,930	12,103	4,037	16,596	7,189	1,406	8,001
2007	437,630	51,108	34,579	16,529	16,034	449	311,835	281,047	30,788	NA	NA	NA	NA	57,244	33,266	3,832	3,123	12,661	4,362	16,993	6,925	1,455	8,613
2008	459,907	51,866	33,903	17,963	17,462	558	330,270	256,608	41,312	348	13,840	17,649	514	59,144	33,671	4,053	3,356	13,336	4,728	18,069	7,085	1,483	9,501

TABLE 2

## U.S. R&amp;D expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs <sup>b</sup>		Nonfederal government <sup>c</sup>	Business <sup>d</sup>							Higher education <sup>e</sup>				NPOs <sup>f</sup>					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
Current \$millions																							
2009	455,003	53,720	34,509	19,211	18,712	684	318,887	249,678	44,687	220	10,803	12,946	774	62,005	35,842	4,155	3,424	13,615	4,969	19,707	8,014	1,420	10,273
2010	453,632	56,674	35,668	21,006	20,539	771	311,247	243,426	38,155	174	12,287	16,215	1,165	64,802	38,693	4,098	3,294	13,680	5,037	20,138	7,914	1,412	10,812
2011	465,903	58,508	38,205	20,303	19,868	758	321,478	257,349	34,225	351	12,160	16,778	966	65,682	39,070	3,952	3,278	14,323	5,060	19,476	7,175	1,465	10,836
2012	465,418	55,958	36,504	19,453	19,024	713	324,357	260,423	32,861	168	12,474	17,920	679	65,328	37,524	3,821	3,401	15,326	5,256	19,061	6,695	1,477	10,889
2013	479,297	53,905	35,250	18,656	18,251	654	340,325	274,250	30,982	205	14,192	19,833	1,068	64,905	35,707	3,843	3,562	16,188	5,606	19,507	6,299	1,544	11,663
2014	493,603	54,642	36,074	18,568	18,173	605	353,375	287,564	27,540	143	13,718	23,381	1,173	64,631	34,353	3,852	3,735	16,776	5,914	20,350	6,363	1,605	12,383
2015	508,109	54,305	35,142	19,163	18,791	611	365,635	297,888	27,734	131	14,998	23,739	1,276	66,386	34,489	3,886	3,950	17,736	6,326	21,172	6,420	1,650	13,103
2016	531,028	52,103	32,331	19,772	19,400	631	386,326	315,949	24,587	198	14,912	29,536	1,342	68,991	35,308	4,006	4,121	18,728	6,827	22,977	8,405	2,028	11,723
2017	553,612	52,553	32,231	20,322	19,943	632	405,792	324,177	24,974	142	17,729	37,913	998	71,115	36,006	4,057	4,283	19,554	7,217	23,521	9,058	2,226	11,414
2018	590,500	57,049	35,969	21,080	20,689	629	435,584	349,847	24,628	117	18,851	41,115	1,143	73,212	36,900	4,129	4,481	20,204	7,498	24,026	9,714	2,431	11,059
2019	639,911	60,382	38,334	22,048	21,669	649	478,978	390,317	21,780	162	20,837	45,005	1,038	75,145	38,004	4,195	4,620	20,737	7,588	24,757	10,481	2,671	10,780
2020	680,262	61,769	39,121	22,647	22,279	648	515,480	420,756	28,252	229	20,663	44,649	932	76,695	39,320	4,242	4,590	21,113	7,430	25,671	11,348	2,944	10,544
2021 <sup>g</sup>	715,953	60,597	37,621	22,976	22,568	622	552,227	453,940	22,309	356	24,369	50,363	890	77,838	40,542	4,193	4,609	21,328	7,165	24,670	10,543	2,731	10,850
2022 <sup>h</sup>	750,649	62,165	39,806	22,359	21,886	590	587,209	486,270	23,162	350	24,210	52,334	883	77,519	40,465	4,040	4,656	21,391	6,967	23,165	9,900	2,565	10,188

NA = not available.

FFRDC = federally funded research and development center; NPO = nonprofit organization.

<sup>a</sup> Federal intramural includes expenditures for federal intramural R&D as well as costs associated with administering extramural R&D procurements. Beginning in 2016, the data on federal intramural R&D explicitly exclude expenditures for preproduction development. (Preproduction development is nonexperimental work on a product or system before it goes into full production. For example, activities and programs that are categorized as Operational Systems Development in the Department of Defense's Research, Development, Test and Evaluation [RDT&E] budget activity structure.) This change aligns the federal intramural R&D data with the U.S. Office of Management and Budget's recent clarification of its definition of R&D. In 2016–18, this intramural preproduction development totaled in the range of \$5 billion to \$7 billion each year.

<sup>b</sup> The R&D expenditures of FFRDCs are chiefly federally funded; the small remainder (\$408 million of the \$23.0 billion total in 2021) reflects funding from state or local government, businesses, NPOs, and other sources. Prior to 2001, the data did not distinguish federal and nonfederal funding for FFRDC R&D and are reported as all federal funding; in 2001 and forward, the data provide detail on federal and nonfederal sources of funding (see [table 6](#)). The data for 1953–54 reflect the R&D performance of only university-administered FFRDCs. In 1953–54, the R&D performance and funding of industry-administered FFRDCs were not separately reported but are included instead in the business R&D data for these years. Similarly, in 1953–54, the R&D performance and funding for nonprofit-administered FFRDCs were not separately reported but are included instead in the NPO R&D data for these years.

<sup>c</sup> Nonfederal government is state intramural R&D performance, including state agency and department employees and services performed by others in support of internal R&D projects. Data on state government intramural R&D became available starting in 2006. Funding for this R&D is mainly states' own funds (\$344 million of the \$685 million total in 2021) or from the federal government (\$305 million in 2020), but other sources include other nonfederal governments (\$6 million), businesses (\$16 million), higher education (\$3 million), or NPOs (\$12 million).

<sup>d</sup> Business is R&D performed by companies in the domestic United States. Business R&D data for 2017–20 come from the NCSSES annual Business Enterprise Research and Development (BERD) Survey and its predecessor, the Business Research and Development Survey (BRDS), which cover all publicly or privately held companies with 10 or more employees, plus the Annual Business Survey (ABS), which covers the R&D activities of businesses with 1–9 employees. Data for 2021 are estimates, based on the 2020 data from these surveys. Data for 2008–15 come from the NCSSES annual Business Research and Development and Innovation Survey (BRDIS), which covered all publicly or privately held companies with 5 or more employees. Data for 2016 included the BRDIS data for that year plus the data from the 2016 Business R&D and Innovation Survey–Microbusiness (BRDI-M), which collected statistics on the R&D activities of companies with 1–4 employees. BERD, ABS, BRDIS, BRDS, and BRDI-M distinguish R&D performed and paid for by the company from R&D performed by the company but paid for by one or more others (i.e., the federal government, state or local government, domestic companies, foreign companies, foreign governments, other organizations inside or outside the United States). Prior to 2008, the data collected by the Survey of

Industrial Research and Development distinguished only federally and nonfederally funded business R&D, and, for these years, the own-funding data column includes all nonfederal sources of funding. Some business R&D performance in the United States paid for by foreign businesses includes funding from both parent or unaffiliated businesses outside the United States (\$23.5 billion in 2021) and funding from U.S. businesses' foreign subsidiaries (\$32.1 billion in 2021). Business R&D performance funded by other sources includes state government, foreign government, domestic and foreign academic institutions, and all other sources in the United States and abroad.

<sup>e</sup> Before 2003, higher education R&D covered only science and engineering (S&E) fields; in 2003 and later years, R&D in non-S&E fields is also included. (Non-S&E R&D was \$1.4 billion in FY 2003 and \$5.1 billion in FY 2021.) In 1998 and later years, the higher education R&D data have been adjusted to eliminate double counting of R&D funds passed through from academic institutions to other academic and nonacademic (business, NPO, other) subrecipients. (In FY 1998, the total of pass-through funds reported was \$994 million, with \$479 million to other academic recipients and \$337 million nonacademic recipients. In FY 2020, total pass-through was \$7.577 billion, with \$4.070 billion to other academic recipients and \$3.507 billion to nonacademic recipients.) The nonfederal government funding category includes support from state and local government. The other nonprofit funding category includes support from NPOs and other sources not elsewhere classified (in FY21, \$5.226 billion was from NPOs, and \$2.542 was from these unclassified other sources).

<sup>f</sup> The most recent data on NPO R&D come from two sources: the annual Nonprofit Research Activities (NPRA) modules (2020 and 2021) of the Annual Business Survey and the 2016 NPRA Survey. Data for 2022 are estimated based on the 2021 survey. Data for 2017–2019 are estimated based on the 2016 and 2020 surveys. The 1998–2015 data for NPO R&D funded by the federal government come from the NCSES annual Survey of Federal Funds for Research and Development; NPO R&D funded by businesses and by the nonprofit sector itself for that period are estimated, based on parameters from the 1996–97 Survey of Research and Development Funding and Performance by Nonprofit Organizations.

<sup>g</sup> Some data for 2021 are preliminary and may be revised later.

<sup>h</sup> The data for 2022 include estimates and are likely to be revised later.

**Note(s):**

Detail may not add to total because of rounding. Constant-dollar estimates are derived from unrounded data. For trend comparisons, use only the historical data reported in this table because some back-year data may have been revised. Data are based on reports by performers in the NCSES annual surveys on R&D expenditures: BERD, ABS (which includes modules on micro-BERD and NPRA), Higher Education Research and Development Survey, Survey of Federal Funds for Research and Development, FFRDC Research and Development Survey, and Survey of State Government Research and Development. R&D expenditures by business performers—and, before 2001, also industry-administered FFRDCs—were collected on a calendar year basis. Expenditures for other performers are calendar year approximations based on fiscal year data. For federal performers in 1977 and afterward, the approximation equals 75% of the amount reported in the same fiscal year plus 25% of the amount reported in the subsequent fiscal year. Prior to 1977, the federal fiscal year began on 1 July, not 1 October, and the approximation is 50% of the amount reported in the same fiscal year plus 50% of the amount reported in the subsequent fiscal year. The fiscal year for higher education performers and state government performers generally begins 1 July, and the calendar year approximation is 50% of the amount reported in the same fiscal year plus 50% of the amount reported in the subsequent fiscal year.

**Source(s):**

National Center for Science and Engineering Statistics, National Patterns of R&D Resources (annual series).

TABLE 3

## U.S. basic research expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs <sup>b</sup>		Nonfederal government <sup>c</sup>	Business <sup>d</sup>							Higher education <sup>e</sup>				NPOs <sup>f</sup>					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
Current \$millions																							
1953	460	138	102	36	36	NA	151	132	19	NA	NA	NA	NA	123	82	7	13	6	16	48	27	9	12
1954	509	141	96	45	45	NA	166	143	23	NA	NA	NA	NA	148	97	10	15	8	18	55	31	11	13
1955	570	160	98	62	62	NA	169	162	7	NA	NA	NA	NA	180	117	14	17	12	21	62	35	13	14
1956	718	203	114	89	89	NA	223	216	7	NA	NA	NA	NA	220	143	19	20	15	24	73	41	15	17
1957	813	234	124	110	110	NA	234	230	4	NA	NA	NA	NA	261	167	25	23	20	27	86	48	15	23
1958	943	264	149	115	115	NA	266	252	14	NA	NA	NA	NA	312	202	31	24	24	31	102	58	16	28
1959	1,087	298	165	134	134	NA	282	248	34	NA	NA	NA	NA	388	263	38	24	28	36	119	71	18	30
1960	1,286	334	184	150	150	NA	333	297	36	NA	NA	NA	NA	485	341	45	25	33	41	135	84	21	30
1961	1,511	407	230	177	177	NA	344	314	30	NA	NA	NA	NA	598	432	54	25	40	48	163	104	22	37
1962	1,824	441	252	189	189	NA	449	345	104	NA	NA	NA	NA	737	546	64	25	48	55	198	128	24	46
1963	2,115	501	285	216	216	NA	484	375	109	NA	NA	NA	NA	909	689	75	25	58	63	222	147	25	50
1964	2,396	584	339	245	245	NA	507	384	123	NA	NA	NA	NA	1,071	824	84	25	70	68	235	163	25	47
1965	2,664	625	375	250	250	NA	563	406	157	NA	NA	NA	NA	1,221	944	94	27	86	70	256	175	29	52
1966	2,930	683	410	273	273	NA	593	451	142	NA	NA	NA	NA	1,380	1,066	104	29	106	75	274	184	32	58
1967	3,168	735	434	301	301	NA	595	427	168	NA	NA	NA	NA	1,554	1,188	114	34	136	83	285	190	34	61
1968	3,376	797	482	315	315	NA	607	462	145	NA	NA	NA	NA	1,681	1,265	131	38	156	91	292	192	37	63
1969	3,491	858	545	313	313	NA	581	458	123	NA	NA	NA	NA	1,754	1,288	153	40	171	103	298	188	43	67
1970	3,594	866	562	304	304	NA	566	444	122	NA	NA	NA	NA	1,855	1,323	179	43	196	115	307	191	44	72
1971	3,720	870	581	289	289	NA	557	456	101	NA	NA	NA	NA	1,968	1,385	194	50	214	127	326	204	45	77
1972	3,850	915	603	313	313	NA	554	463	91	NA	NA	NA	NA	2,038	1,437	195	55	216	134	344	213	47	84
1973	4,099	1,034	652	382	382	NA	595	499	96	NA	NA	NA	NA	2,103	1,489	196	59	223	137	368	229	49	90
1974	4,511	1,182	715	467	467	NA	650	536	114	NA	NA	NA	NA	2,282	1,609	204	66	250	153	397	242	54	102
1975	4,875	1,292	760	533	533	NA	677	573	104	NA	NA	NA	NA	2,480	1,768	212	72	264	164	426	251	59	116
1976	5,373	1,479	850	629	629	NA	750	634	116	NA	NA	NA	NA	2,675	1,924	218	75	283	175	470	274	65	131
1977	6,008	1,689	943	746	746	NA	836	701	135	NA	NA	NA	NA	2,967	2,114	232	89	334	198	517	297	72	148
1978	6,959	2,049	1,044	1,005	1,005	NA	941	785	156	NA	NA	NA	NA	3,376	2,399	260	107	398	213	593	346	79	168
1979	7,836	2,272	1,112	1,160	1,160	NA	1,054	893	161	NA	NA	NA	NA	3,828	2,719	286	128	466	229	683	406	87	190
1980	8,747	2,506	1,212	1,294	1,294	NA	1,205	1,035	170	NA	NA	NA	NA	4,315	3,061	307	156	544	248	721	411	95	215
1981	9,658	2,773	1,343	1,430	1,430	NA	1,477	1,313	164	NA	NA	NA	NA	4,737	3,331	338	183	615	269	671	324	105	243
1982	10,651	3,025	1,522	1,503	1,503	NA	1,776	1,523	253	NA	NA	NA	NA	5,091	3,475	368	215	716	317	759	369	115	275
1983	11,880	3,393	1,733	1,661	1,661	NA	2,106	1,760	346	NA	NA	NA	NA	5,518	3,689	396	260	816	358	863	426	127	311
1984	13,332	3,731	1,877	1,854	1,854	NA	2,472	2,132	340	NA	NA	NA	NA	6,145	4,087	436	313	915	395	984	494	139	351

TABLE 3

**U.S. basic research expenditures, by performing sector and source of funds: 1953–2022**

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs <sup>b</sup>		Nonfederal government <sup>c</sup>				Business <sup>d</sup>				Higher education <sup>e</sup>				NPOs <sup>f</sup>					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
1985	14,748	3,884	1,947	1,936	1,936	NA	2,731	2,373	358	NA	NA	NA	NA	7,024	4,606	514	389	1,075	440	1,110	560	153	397
1986	17,154	4,071	2,026	2,045	2,045	NA	3,930	3,496	434	NA	NA	NA	NA	7,943	5,122	606	466	1,262	488	1,210	594	168	449
1987	18,481	4,290	2,047	2,242	2,242	NA	4,181	3,583	598	NA	NA	NA	NA	8,644	5,527	659	514	1,399	545	1,367	675	185	507
1988	19,787	4,749	2,116	2,633	2,633	NA	4,163	3,507	656	NA	NA	NA	NA	9,344	5,937	705	565	1,530	607	1,531	756	203	573
1989	21,891	5,124	2,309	2,815	2,815	NA	4,818	3,832	986	NA	NA	NA	NA	10,219	6,422	766	637	1,714	680	1,730	860	223	647
1990	23,029	5,352	2,319	3,033	3,033	NA	4,629	3,760	869	NA	NA	NA	NA	11,126	6,889	847	705	1,929	756	1,922	947	245	730
1991	27,140	5,573	2,378	3,195	3,195	NA	7,376	6,125	1,251	NA	NA	NA	NA	12,062	7,423	912	764	2,127	836	2,129	1,036	269	825
1992	27,604	5,826	2,419	3,408	3,408	NA	6,528	5,816	712	NA	NA	NA	NA	12,910	8,058	941	814	2,203	893	2,340	1,114	295	931
1993	28,743	6,138	2,621	3,517	3,517	NA	6,427	5,961	466	NA	NA	NA	NA	13,646	8,638	952	851	2,268	936	2,532	1,157	324	1,051
1994	29,651	6,058	2,547	3,512	3,512	NA	6,514	6,078	436	NA	NA	NA	NA	14,401	9,139	992	890	2,406	974	2,678	1,137	356	1,186
1995	29,610	5,996	2,689	3,307	3,307	NA	5,569	5,379	190	NA	NA	NA	NA	15,146	9,634	1,070	945	2,511	987	2,899	1,170	390	1,338
1996	32,799	6,073	2,680	3,393	3,393	NA	7,498	6,848	650	NA	NA	NA	NA	16,042	10,092	1,149	1,032	2,740	1,028	3,187	1,248	428	1,510
1997	36,717	6,150	2,746	3,404	3,404	NA	9,795	8,766	1,029	NA	NA	NA	NA	17,449	10,758	1,233	1,161	3,150	1,147	3,322	1,317	449	1,557
1998	34,842	6,444	3,003	3,441	3,441	NA	5,853	4,851	1,002	NA	NA	NA	NA	18,891	11,567	1,292	1,278	3,495	1,259	3,654	1,461	477	1,717
1999	38,282	7,066	3,347	3,719	3,719	NA	6,645	5,537	1,108	NA	NA	NA	NA	20,462	12,456	1,386	1,375	3,848	1,396	4,110	1,734	517	1,860
2000	42,033	7,801	3,765	4,037	4,037	NA	7,040	6,115	925	NA	NA	NA	NA	22,290	13,469	1,501	1,453	4,314	1,553	4,902	2,099	566	2,236
2001	46,363	8,353	4,260	4,092	3,925	NA	8,053	7,299	754	NA	NA	NA	NA	24,455	14,919	1,606	1,467	4,759	1,704	5,503	2,464	571	2,467
2002	50,400	9,349	4,511	4,839	4,612	NA	7,547	6,659	888	NA	NA	NA	NA	27,543	17,139	1,745	1,456	5,311	1,891	5,962	2,575	554	2,833
2003	54,823	9,739	4,664	5,074	4,858	NA	8,330	6,944	1,386	NA	NA	NA	NA	30,217	19,220	1,893	1,436	5,692	1,978	6,537	2,714	567	3,256
2004	56,379	9,673	4,697	4,976	4,837	NA	7,835	6,763	1,072	NA	NA	NA	NA	32,246	20,730	2,000	1,483	5,965	2,067	6,626	2,788	578	3,259
2005	59,899	9,902	4,770	5,132	4,995	NA	8,667	7,559	1,108	NA	NA	NA	NA	34,248	21,786	2,068	1,600	6,568	2,226	7,082	2,902	614	3,565
2006	61,552	9,938	4,716	5,222	5,074	46	8,384	6,940	1,444	NA	NA	NA	NA	35,944	22,270	2,191	1,765	7,288	2,431	7,240	2,849	656	3,735
2007	66,488	9,938	4,621	5,317	5,166	58	11,268	8,488	2,780	NA	NA	NA	NA	37,568	22,546	2,400	1,956	7,932	2,733	7,656	2,829	698	4,130
2008	70,468	10,459	4,957	5,502	5,336	73	12,369	9,741	1,475	12	484	639	18	39,127	22,954	2,573	2,131	8,467	3,002	8,441	3,073	724	4,643
2009	74,409	11,508	5,441	6,067	5,907	90	14,784	11,999	1,340	13	662	736	34	38,780	23,034	2,457	1,996	8,258	3,035	9,248	3,498	698	5,051
2010	76,475	11,747	5,111	6,637	6,475	103	16,371	13,239	1,406	10	722	935	58	38,756	23,690	2,277	1,785	8,016	2,989	9,498	3,414	703	5,381
2011	73,691	11,522	5,047	6,475	6,333	103	13,020	10,585	677	21	745	954	38	39,717	24,111	2,245	1,807	8,512	3,043	9,329	3,081	744	5,504
2012	73,992	11,150	5,489	5,661	5,530	99	13,294	10,955	644	10	710	946	29	39,959	23,432	2,202	1,869	9,257	3,200	9,490	3,092	764	5,634
2013	79,255	9,519	5,330	4,188	4,085	92	19,508	14,986	1,196	21	1,446	1,771	88	40,156	22,602	2,208	1,979	9,927	3,442	9,981	3,031	813	6,137
2014	82,894	9,875	5,705	4,170	4,077	99	21,936	15,805	2,044	17	1,584	2,367	119	40,406	22,085	2,242	2,091	10,352	3,637	10,579	3,090	859	6,629
2015	84,428	10,017	5,890	4,127	4,043	100	21,792	15,933	2,038	14	1,565	2,123	120	41,514	22,193	2,299	2,211	10,985	3,826	11,005	3,034	891	7,080
2016	87,494	10,315	6,119	4,196	4,112	93	25,053	18,792	2,037	20	1,535	2,551	117	42,897	22,588	2,359	2,295	11,607	4,050	9,135	3,988	716	4,141
2017	90,152	10,388	6,259	4,128	4,054	100	25,617	18,299	1,853	17	2,085	3,260	103	44,815	23,349	2,392	2,417	12,279	4,379	9,234	3,738	846	4,337

TABLE 3

## U.S. basic research expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs <sup>b</sup>		Nonfederal government <sup>c</sup>		Business <sup>d</sup>					Higher education <sup>e</sup>				NPOs <sup>f</sup>						
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
2018	97,885	11,096	6,827	4,269	4,188	107	29,204	21,100	2,535	12	2,069	3,377	112	47,321	24,502	2,454	2,606	13,001	4,760	10,157	4,301	995	4,525
2019	105,011	11,932	7,352	4,580	4,501	120	32,582	24,558	2,349	15	2,062	3,513	86	49,335	25,489	2,535	2,733	13,626	4,953	11,041	4,805	1,167	4,709
2020	111,802	12,105	7,316	4,789	4,714	125	36,371	27,909	2,200	23	2,311	3,827	101	50,837	26,518	2,619	2,747	14,055	4,898	12,364	5,217	1,469	5,262
2021 <sup>g</sup>	118,626	11,688	6,604	5,084	5,006	120	40,845	31,364	2,404	39	2,643	4,297	97	54,047	28,693	2,726	2,885	14,841	4,902	11,926	4,646	1,408	5,591
2022 <sup>h</sup>	129,435	13,202	7,959	5,244	5,159	121	46,287	35,918	2,676	41	2,810	4,738	103	57,838	30,768	2,833	3,128	16,004	5,105	11,987	4,670	1,415	5,620
Constant 2017 \$millions																							
1953	3,417	1,023	755	268	268	NA	1,123	982	141	NA	NA	NA	NA	915	606	48	97	45	119	357	201	67	89
1954	3,747	1,035	707	328	328	NA	1,223	1,054	169	NA	NA	NA	NA	1,087	711	70	111	62	133	402	225	81	96
1955	4,130	1,156	706	449	449	NA	1,224	1,174	51	NA	NA	NA	NA	1,301	844	101	123	84	149	449	254	94	101
1956	5,029	1,419	795	624	624	NA	1,561	1,514	47	NA	NA	NA	NA	1,542	999	133	137	109	165	508	284	105	119
1957	5,517	1,584	841	743	743	NA	1,587	1,560	27	NA	NA	NA	NA	1,767	1,129	168	153	134	183	580	322	102	156
1958	6,254	1,751	988	763	763	NA	1,761	1,671	90	NA	NA	NA	NA	2,069	1,340	206	159	159	206	673	381	106	186
1959	7,110	1,949	1,076	873	873	NA	1,844	1,622	222	NA	NA	NA	NA	2,538	1,717	246	157	186	232	778	464	118	196
1960	8,297	2,152	1,184	968	968	NA	2,146	1,917	230	NA	NA	NA	NA	3,127	2,197	290	158	216	265	871	542	136	194
1961	9,649	2,596	1,466	1,130	1,130	NA	2,200	2,005	195	NA	NA	NA	NA	3,815	2,755	343	160	254	303	1,038	661	140	236
1962	11,509	2,782	1,590	1,192	1,192	NA	2,834	2,177	658	NA	NA	NA	NA	4,647	3,442	402	158	302	344	1,246	804	151	290
1963	13,195	3,122	1,775	1,347	1,347	NA	3,021	2,339	682	NA	NA	NA	NA	5,667	4,298	467	153	359	390	1,385	917	156	312
1964	14,721	3,588	2,083	1,505	1,505	NA	3,115	2,359	756	NA	NA	NA	NA	6,577	5,060	518	154	428	418	1,441	998	154	289
1965	16,073	3,768	2,260	1,508	1,508	NA	3,397	2,450	947	NA	NA	NA	NA	7,364	5,693	570	160	519	422	1,545	1,056	175	314
1966	17,196	4,009	2,406	1,602	1,602	NA	3,480	2,647	833	NA	NA	NA	NA	8,099	6,256	608	170	625	440	1,608	1,080	188	340
1967	18,066	4,189	2,473	1,717	1,717	NA	3,394	2,435	958	NA	NA	NA	NA	8,861	6,773	649	191	774	473	1,623	1,081	194	348
1968	18,469	4,357	2,637	1,720	1,720	NA	3,321	2,527	793	NA	NA	NA	NA	9,193	6,920	715	205	855	498	1,597	1,050	202	345
1969	18,203	4,475	2,843	1,632	1,632	NA	3,030	2,388	641	NA	NA	NA	NA	9,144	6,714	797	206	893	535	1,554	980	224	349
1970	17,802	4,289	2,783	1,506	1,506	NA	2,804	2,199	604	NA	NA	NA	NA	9,188	6,551	888	213	969	567	1,521	946	218	357
1971	17,538	4,100	2,740	1,360	1,360	NA	2,626	2,150	476	NA	NA	NA	NA	9,278	6,527	913	233	1,008	596	1,535	959	212	363
1972	17,397	4,135	2,723	1,412	1,412	NA	2,503	2,092	411	NA	NA	NA	NA	9,207	6,494	883	249	976	606	1,552	960	212	380
1973	17,562	4,430	2,793	1,637	1,637	NA	2,549	2,138	411	NA	NA	NA	NA	9,009	6,377	841	251	956	585	1,574	979	210	386
1974	17,728	4,645	2,809	1,835	1,835	NA	2,555	2,107	448	NA	NA	NA	NA	8,967	6,324	801	259	983	599	1,562	949	212	401
1975	17,535	4,648	2,733	1,915	1,915	NA	2,435	2,061	374	NA	NA	NA	NA	8,919	6,360	764	257	948	590	1,532	903	213	416
1976	18,320	5,043	2,898	2,145	2,145	NA	2,557	2,162	396	NA	NA	NA	NA	9,119	6,560	742	256	966	595	1,601	933	222	446
1977	19,287	5,421	3,027	2,395	2,395	NA	2,684	2,250	433	NA	NA	NA	NA	9,523	6,786	744	286	1,073	634	1,659	953	230	476
1978	20,870	6,146	3,132	3,014	3,014	NA	2,822	2,354	468	NA	NA	NA	NA	10,125	7,195	779	319	1,194	637	1,777	1,038	237	503
1979	21,702	6,293	3,081	3,212	3,212	NA	2,919	2,473	446	NA	NA	NA	NA	10,600	7,530	792	353	1,291	634	1,891	1,125	240	526

TABLE 3

**U.S. basic research expenditures, by performing sector and source of funds: 1953–2022**

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs <sup>b</sup>		Nonfederal government <sup>c</sup>				Business <sup>d</sup>				Higher education <sup>e</sup>				NPOs <sup>f</sup>					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
1980	22,216	6,366	3,079	3,286	3,286	NA	3,061	2,629	432	NA	NA	NA	NA	10,960	7,773	779	396	1,381	630	1,830	1,043	242	545
1981	22,409	6,434	3,116	3,318	3,318	NA	3,427	3,047	381	NA	NA	NA	NA	10,990	7,729	784	424	1,428	625	1,558	751	243	564
1982	23,275	6,610	3,325	3,285	3,285	NA	3,881	3,328	553	NA	NA	NA	NA	11,126	7,593	804	471	1,565	692	1,659	807	252	600
1983	24,983	7,136	3,644	3,492	3,492	NA	4,429	3,701	728	NA	NA	NA	NA	11,604	7,757	832	546	1,716	752	1,815	895	266	653
1984	27,060	7,572	3,809	3,763	3,763	NA	5,018	4,327	690	NA	NA	NA	NA	12,472	8,295	884	635	1,857	801	1,998	1,003	282	713
1985	29,017	7,641	3,831	3,810	3,810	NA	5,373	4,669	704	NA	NA	NA	NA	13,820	9,061	1,012	765	2,116	865	2,183	1,102	301	781
1986	33,084	7,852	3,907	3,945	3,945	NA	7,580	6,743	837	NA	NA	NA	NA	15,318	9,878	1,168	898	2,434	940	2,334	1,145	324	865
1987	34,782	8,073	3,853	4,220	4,220	NA	7,869	6,743	1,125	NA	NA	NA	NA	16,267	10,401	1,239	967	2,634	1,026	2,572	1,271	347	954
1988	35,971	8,633	3,847	4,786	4,786	NA	7,568	6,375	1,193	NA	NA	NA	NA	16,986	10,792	1,282	1,027	2,781	1,104	2,784	1,375	369	1,041
1989	38,294	8,964	4,039	4,925	4,925	NA	8,428	6,703	1,725	NA	NA	NA	NA	17,876	11,234	1,339	1,115	2,999	1,189	3,026	1,505	389	1,131
1990	38,832	9,025	3,910	5,115	5,115	NA	7,805	6,340	1,465	NA	NA	NA	NA	18,761	11,615	1,428	1,190	3,253	1,275	3,241	1,597	412	1,232
1991	44,266	9,090	3,879	5,211	5,211	NA	12,031	9,990	2,040	NA	NA	NA	NA	19,673	12,107	1,487	1,246	3,470	1,363	3,473	1,690	438	1,345
1992	44,020	9,291	3,857	5,434	5,434	NA	10,410	9,275	1,135	NA	NA	NA	NA	20,587	12,850	1,501	1,299	3,513	1,425	3,732	1,777	470	1,485
1993	44,775	9,561	4,083	5,479	5,479	NA	10,012	9,286	726	NA	NA	NA	NA	21,258	13,456	1,484	1,326	3,534	1,458	3,944	1,802	504	1,637
1994	45,225	9,240	3,884	5,356	5,356	NA	9,935	9,270	665	NA	NA	NA	NA	21,964	13,938	1,512	1,357	3,670	1,486	4,085	1,734	542	1,809
1995	44,235	8,958	4,018	4,940	4,940	NA	8,320	8,036	284	NA	NA	NA	NA	22,627	14,391	1,598	1,412	3,751	1,475	4,330	1,748	583	1,999
1996	48,117	8,909	3,931	4,978	4,978	NA	11,000	10,046	954	NA	NA	NA	NA	23,534	14,805	1,686	1,514	4,019	1,509	4,675	1,831	629	2,215
1997	52,952	8,869	3,960	4,909	4,909	NA	14,126	12,642	1,484	NA	NA	NA	NA	25,165	15,515	1,779	1,674	4,542	1,655	4,791	1,899	648	2,245
1998	49,690	9,189	4,282	4,907	4,907	NA	8,347	6,918	1,429	NA	NA	NA	NA	26,941	16,496	1,843	1,822	4,984	1,796	5,212	2,083	680	2,448
1999	53,835	9,936	4,706	5,229	5,229	NA	9,344	7,786	1,558	NA	NA	NA	NA	28,774	17,517	1,949	1,934	5,412	1,963	5,780	2,438	727	2,615
2000	57,800	10,728	5,177	5,551	5,551	NA	9,681	8,409	1,272	NA	NA	NA	NA	30,651	18,521	2,064	1,998	5,932	2,136	6,740	2,887	779	3,075
2001	62,350	11,233	5,729	5,503	5,279	NA	10,830	9,816	1,014	NA	NA	NA	NA	32,888	20,063	2,159	1,973	6,400	2,292	7,400	3,314	768	3,318
2002	66,742	12,380	5,973	6,407	6,108	NA	9,994	8,818	1,176	NA	NA	NA	NA	36,473	22,696	2,311	1,929	7,033	2,504	7,894	3,410	734	3,751
2003	71,193	12,647	6,057	6,589	6,308	NA	10,817	9,017	1,800	NA	NA	NA	NA	39,240	24,958	2,458	1,865	7,391	2,568	8,489	3,525	736	4,228
2004	71,297	12,232	5,940	6,292	6,117	NA	9,908	8,552	1,356	NA	NA	NA	NA	40,778	26,215	2,529	1,876	7,544	2,614	8,379	3,526	731	4,122
2005	73,445	12,142	5,849	6,292	6,124	NA	10,627	9,268	1,359	NA	NA	NA	NA	41,993	26,712	2,536	1,962	8,054	2,730	8,683	3,559	753	4,371
2006	73,214	11,820	5,609	6,211	6,035	55	9,972	8,255	1,718	NA	NA	NA	NA	42,755	26,489	2,606	2,099	8,669	2,891	8,612	3,389	781	4,442
2007	76,999	11,509	5,352	6,157	5,982	67	13,049	9,830	3,219	NA	NA	NA	NA	43,507	26,110	2,780	2,266	9,186	3,165	8,867	3,276	808	4,782
2008	80,066	11,883	5,632	6,251	6,063	83	14,054	11,068	1,676	14	549	727	20	44,456	26,080	2,924	2,421	9,620	3,410	9,591	3,492	823	5,275
2009	84,025	12,995	6,144	6,851	6,671	102	16,695	13,550	1,513	15	747	831	38	43,791	26,011	2,774	2,253	9,326	3,427	10,443	3,950	789	5,704
2010	85,321	13,106	5,702	7,404	7,224	115	18,265	14,771	1,569	11	805	1,044	65	43,239	26,430	2,540	1,991	8,943	3,334	10,597	3,809	784	6,003
2011	80,553	12,595	5,517	7,078	6,922	113	14,232	11,570	740	23	814	1,043	41	43,416	26,356	2,454	1,975	9,304	3,326	10,197	3,368	813	6,017
2012	79,404	11,966	5,890	6,075	5,934	106	14,266	11,756	691	10	762	1,016	31	42,882	25,146	2,363	2,006	9,934	3,434	10,184	3,318	820	6,046



TABLE 3

## U.S. basic research expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs <sup>b</sup>		Nonfederal government <sup>c</sup>	Business <sup>d</sup>							Higher education <sup>e</sup>				NPOs <sup>f</sup>					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
2013	83,628	10,044	5,624	4,419	4,311	97	20,584	15,813	1,262	22	1,526	1,869	93	42,371	23,849	2,329	2,088	10,474	3,631	10,532	3,198	857	6,476
2014	85,971	10,242	5,917	4,325	4,228	102	22,750	16,392	2,120	17	1,643	2,455	123	41,906	22,905	2,325	2,169	10,736	3,771	10,971	3,205	891	6,875
2015	86,757	10,293	6,053	4,240	4,155	103	22,393	16,373	2,094	14	1,608	2,181	123	42,659	22,805	2,362	2,272	11,288	3,932	11,309	3,118	916	7,275
2016	89,061	10,500	6,229	4,271	4,185	95	25,502	19,129	2,074	20	1,562	2,597	119	43,665	22,992	2,401	2,336	11,814	4,122	9,299	4,059	729	4,215
2017	90,152	10,388	6,259	4,128	4,054	100	25,617	18,299	1,853	17	2,085	3,260	103	44,815	23,349	2,392	2,417	12,279	4,379	9,234	3,738	846	4,337
2018	95,692	10,847	6,674	4,173	4,094	104	28,550	20,628	2,479	12	2,022	3,301	109	46,261	23,953	2,399	2,548	12,709	4,653	9,929	4,205	972	4,424
2019	100,965	11,473	7,069	4,404	4,327	116	31,327	23,611	2,258	15	1,982	3,378	83	47,434	24,506	2,437	2,628	13,100	4,762	10,616	4,620	1,122	4,527
2020	106,092	11,487	6,942	4,545	4,473	118	34,514	26,483	2,088	22	2,193	3,631	96	48,240	25,164	2,485	2,607	13,337	4,648	11,733	4,950	1,394	4,993
2021 <sup>g</sup>	107,634	10,605	5,992	4,613	4,542	109	37,060	28,458	2,181	36	2,398	3,899	88	49,038	26,034	2,473	2,618	13,466	4,447	10,821	4,215	1,277	5,073
2022 <sup>h</sup>	109,716	11,191	6,746	4,445	4,373	103	39,235	30,446	2,269	35	2,382	4,016	87	49,026	26,081	2,402	2,651	13,566	4,327	10,161	3,958	1,199	4,764

NA = not available.

FFRDC = federally funded research and development center; NPO = nonprofit organization.

<sup>a</sup> See [table 2](#), footnotes a–f, for details on sectoral R&D.<sup>b</sup> Type-of-R&D data for FFRDC R&D in 1953–63 reflect the R&D performance of only university-administered FFRDCs. In 1953–63, the R&D performance and funding of industry-administered FFRDCs were not separately reported but are included instead in the business R&D data for these years. Similarly, in 1953–63, the R&D performance and funding for nonprofit-administered FFRDCs were not separately reported but are included instead in the NPO R&D data for these years. The data for 1964–80 reflect the R&D performance of only university-administered FFRDCs and industry-administered FFRDCs; the R&D performance for nonprofit-administered FFRDCs is included in the NPO R&D data for these years. Starting in 2001, type-of-R&D data provide detail on federal and nonfederal sources of funding for FFRDC R&D. (See also [table 2](#), footnote b.)<sup>c</sup> Type-of-R&D data for state intramural R&D became available in the 2016 survey. These data prior to 2016 are estimated. (See also [table 2](#), footnote c.)<sup>d</sup> Type-of-R&D data for business R&D in 1998–2007 were revised in response to data quality review considerations and are not directly comparable with the data for 1997 and earlier years. For 2008 and later years, the type-of-R&D splits for other than total, own-funded, and federally funded R&D are estimated. (See also [table 2](#), footnote d.)<sup>e</sup> The type-of-R&D estimation procedure for higher education R&D was revised in 1998 and again in 2010; hence, these data are not directly comparable with data reported for earlier years. The pass-through adjusted data on higher education R&D, applied in 1998 and forward, reflect institution-specific detail on the type-of-R&D performed. Type-of-R&D splits for other than total and federally funded are estimated. (See also [table 2](#), footnote e.)<sup>f</sup> Type-of-R&D data for R&D by NPOs in 1998 and later years are estimated, except for the R&D that is federally funded. (See also [table 2](#), footnote f.)<sup>g</sup> Some data for 2021 are preliminary and may be revised later.<sup>h</sup> The data for 2022 include estimates and are likely to be revised later.**Note(s):**

Detail may not add to total because of rounding. Constant-dollar estimates are derived from unrounded data. For trend comparisons, use only the historical data reported in this table because some back-year data may have been revised. Data are based on reports by performers in the National Center for Science and Engineering Statistics annual surveys on R&D expenditures: Business Enterprise Research and Development Survey, Annual Business Survey, Higher Education Research and Development Survey, Survey of Federal Funds for Research and Development, FFRDC Research and Development Survey, and Survey of State Government Research and Development. R&D expenditures by business performers—and, before 2001, also industry-administered FFRDCs—were collected on a calendar year basis. Expenditures for other performers are calendar year approximations based on fiscal year data. For federal performers in 1977 and afterward, the approximation equals 75% of the amount reported in the same fiscal year plus 25% of the amount reported in the subsequent fiscal year. Prior to 1977, the federal fiscal year began on 1 July, not 1 October, and the approximation is 50% of the amount reported in the same fiscal year plus 50% of the amount reported in the subsequent fiscal year. The fiscal year for higher education performers and state government performers generally begins 1 July, and the calendar year approximation is 50% of the amount reported in the same fiscal year plus 50% of amount reported in the subsequent fiscal year.

**Source(s):**

National Center for Science and Engineering Statistics, National Patterns of R&D Resources (annual series).

TABLE 4

## U.S. applied research expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All per- formers	All federal	Federal intramural <sup>a</sup>	FFRDCs		Nonfederal government	Business							Higher education					NPOs				
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
Current \$millions																							
1953	1,289	395	347	48	48	NA	726	438	288	NA	NA	NA	NA	134	59	30	7	28	10	35	14	11	10
1954	1,378	388	330	59	59	NA	814	492	322	NA	NA	NA	NA	137	60	32	8	28	10	40	16	13	11
1955	1,502	419	333	86	86	NA	899	560	339	NA	NA	NA	NA	142	63	32	9	27	11	43	18	14	11
1956	1,929	511	387	125	125	NA	1,224	794	430	NA	NA	NA	NA	146	65	33	10	27	11	48	20	14	14
1957	2,413	595	446	149	149	NA	1,616	992	624	NA	NA	NA	NA	147	63	34	12	27	11	57	23	14	20
1958	2,759	672	516	156	156	NA	1,868	1,137	731	NA	NA	NA	NA	152	66	35	12	27	12	68	29	14	25
1959	2,940	756	577	179	179	NA	1,935	1,178	757	NA	NA	NA	NA	167	78	37	13	28	12	82	40	15	27
1960	3,065	816	615	201	201	NA	1,965	1,196	769	NA	NA	NA	NA	186	93	39	13	29	12	99	54	17	28
1961	3,123	908	668	240	240	NA	1,903	1,165	738	NA	NA	NA	NA	199	104	40	13	30	13	114	62	17	35
1962	3,698	958	709	249	249	NA	2,392	1,438	954	NA	NA	NA	NA	216	119	41	14	30	13	132	68	19	45
1963	3,864	1,084	809	275	275	NA	2,402	1,450	952	NA	NA	NA	NA	230	128	42	14	32	14	150	82	19	49
1964	4,201	1,260	947	313	313	NA	2,538	1,560	978	NA	NA	NA	NA	256	142	45	14	37	18	148	82	19	47
1965	4,374	1,287	994	294	294	NA	2,612	1,620	992	NA	NA	NA	NA	304	176	46	13	42	27	171	98	21	52
1966	4,653	1,302	1,012	290	290	NA	2,790	1,804	986	NA	NA	NA	NA	351	208	47	14	48	34	210	129	24	57
1967	4,848	1,402	1,069	334	334	NA	2,832	1,849	983	NA	NA	NA	NA	389	238	46	16	54	36	226	141	25	60
1968	5,137	1,446	1,112	334	334	NA	3,037	2,081	956	NA	NA	NA	NA	405	250	46	16	55	39	250	160	28	62
1969	5,454	1,565	1,229	336	336	NA	3,192	2,272	920	NA	NA	NA	NA	417	257	48	16	54	43	281	183	32	66
1970	5,752	1,670	1,334	336	336	NA	3,330	2,378	952	NA	NA	NA	NA	451	280	51	18	56	47	302	199	33	70
1971	5,833	1,666	1,355	312	312	NA	3,348	2,441	907	NA	NA	NA	NA	499	306	61	19	67	47	320	212	34	74
1972	6,147	1,792	1,434	358	358	NA	3,407	2,562	845	NA	NA	NA	NA	619	391	74	21	82	52	330	216	35	79
1973	6,655	1,861	1,527	334	334	NA	3,715	2,832	883	NA	NA	NA	NA	725	450	88	26	100	62	355	236	36	83
1974	7,344	1,987	1,652	335	335	NA	4,168	3,263	905	NA	NA	NA	NA	794	477	96	32	118	72	396	266	39	91
1975	8,091	2,295	1,912	384	384	NA	4,431	3,440	991	NA	NA	NA	NA	934	550	113	39	141	92	431	290	42	100
1976	8,976	2,525	2,068	457	457	NA	4,945	3,912	1,033	NA	NA	NA	NA	1,042	596	127	45	166	109	464	310	45	109
1977	9,662	2,621	2,081	540	540	NA	5,424	4,311	1,113	NA	NA	NA	NA	1,126	626	134	51	194	121	492	324	48	120
1978	10,704	2,838	2,242	597	597	NA	6,065	4,870	1,195	NA	NA	NA	NA	1,247	676	151	61	232	128	554	371	52	132
1979	12,097	3,069	2,415	654	654	NA	6,975	5,670	1,305	NA	NA	NA	NA	1,418	793	161	71	263	129	635	436	55	144
1980	13,729	3,295	2,546	749	749	NA	8,175	6,550	1,625	NA	NA	NA	NA	1,622	912	174	88	308	140	637	420	60	158
1981	16,329	3,520	2,731	788	788	NA	10,401	8,359	2,042	NA	NA	NA	NA	1,781	953	199	108	363	159	628	391	64	173
1982	18,218	3,692	2,802	890	890	NA	11,956	9,363	2,593	NA	NA	NA	NA	1,915	1,007	207	121	402	178	655	398	69	189
1983	20,298	3,956	2,991	965	965	NA	13,513	10,286	3,227	NA	NA	NA	NA	2,116	1,122	215	141	443	194	713	433	74	207
1984	22,451	4,137	2,961	1,176	1,176	NA	15,218	11,541	3,677	NA	NA	NA	NA	2,332	1,226	234	168	491	212	764	459	79	226

TABLE 4

## U.S. applied research expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs		Nonfederal government	Business							Higher education					NPOs				
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
1985	25,401	4,427	3,135	1,292	1,292	NA	17,625	12,908	4,717	NA	NA	NA	NA	2,527	1,296	262	198	547	224	822	490	85	247
1986	27,240	4,462	3,204	1,258	1,258	NA	19,131	15,082	4,049	NA	NA	NA	NA	2,780	1,393	298	229	620	240	867	506	91	270
1987	27,951	4,594	3,366	1,228	1,228	NA	19,190	15,153	4,037	NA	NA	NA	NA	3,219	1,643	333	260	707	276	948	555	98	295
1988	29,528	4,346	3,362	984	984	NA	20,377	16,531	3,846	NA	NA	NA	NA	3,779	1,958	377	302	818	325	1,026	599	105	322
1989	32,277	4,613	3,566	1,047	1,047	NA	22,317	17,993	4,324	NA	NA	NA	NA	4,188	2,121	417	347	933	370	1,159	695	112	352
1990	34,897	4,808	3,652	1,156	1,156	NA	24,399	18,432	5,967	NA	NA	NA	NA	4,406	2,140	453	377	1,031	404	1,284	780	120	384
1991	38,631	5,539	4,093	1,446	1,446	NA	27,013	21,425	5,588	NA	NA	NA	NA	4,611	2,232	468	392	1,091	428	1,468	921	129	419
1992	37,936	5,866	4,337	1,529	1,529	NA	25,660	21,184	4,476	NA	NA	NA	NA	4,882	2,415	479	414	1,120	454	1,528	933	138	456
1993	37,283	6,338	4,838	1,500	1,500	NA	24,251	19,956	4,295	NA	NA	NA	NA	5,149	2,542	496	443	1,181	487	1,544	900	148	497
1994	36,618	6,581	4,985	1,596	1,596	NA	22,988	19,372	3,616	NA	NA	NA	NA	5,390	2,644	517	464	1,256	509	1,659	960	158	541
1995	40,936	6,666	4,952	1,714	1,714	NA	26,919	23,755	3,164	NA	NA	NA	NA	5,659	2,779	559	494	1,311	516	1,692	934	170	589
1996	43,170	6,495	4,872	1,623	1,623	NA	29,010	25,370	3,640	NA	NA	NA	NA	5,885	2,864	584	524	1,390	522	1,781	960	182	640
1997	46,516	6,675	4,997	1,679	1,679	NA	32,430	29,782	2,648	NA	NA	NA	NA	5,485	2,518	548	515	1,396	508	1,926	1,011	205	711
1998	46,247	6,871	5,146	1,725	1,725	NA	32,208	29,576	2,632	NA	NA	NA	NA	5,108	2,189	515	509	1,393	502	2,061	1,060	218	784
1999	51,853	7,181	5,530	1,651	1,651	NA	36,638	33,821	2,817	NA	NA	NA	NA	5,650	2,571	533	529	1,480	537	2,384	1,300	236	849
2000	56,503	7,856	6,105	1,750	1,750	NA	39,176	36,494	2,682	NA	NA	NA	NA	6,361	3,081	558	540	1,604	578	3,110	1,831	258	1,021
2001	64,201	9,766	7,052	2,714	2,564	NA	44,012	40,409	3,603	NA	NA	NA	NA	6,886	3,411	585	535	1,734	621	3,537	2,150	261	1,126
2002	50,540	10,525	7,487	3,038	2,867	NA	28,533	26,081	2,452	NA	NA	NA	NA	7,670	3,877	636	531	1,937	689	3,812	2,267	253	1,293
2003	60,983	10,857	7,672	3,186	3,020	NA	37,334	32,861	4,473	NA	NA	NA	NA	8,560	4,450	708	537	2,127	739	4,232	2,487	259	1,486
2004	69,322	10,779	7,455	3,325	3,180	NA	45,432	40,657	4,775	NA	NA	NA	NA	8,911	4,682	735	545	2,190	759	4,200	2,448	264	1,488
2005	69,768	11,001	7,557	3,444	3,288	NA	45,284	39,995	5,289	NA	NA	NA	NA	9,144	4,810	719	557	2,283	774	4,339	2,432	280	1,627
2006	76,499	10,952	7,435	3,518	3,348	255	51,173	45,033	6,140	NA	NA	NA	NA	9,522	5,080	712	573	2,368	789	4,596	2,592	300	1,705
2007	83,662	11,040	7,222	3,819	3,643	321	57,570	48,625	8,945	NA	NA	NA	NA	9,945	5,284	745	607	2,461	848	4,786	2,583	318	1,885
2008	74,729	11,446	7,316	4,130	3,955	407	46,864	35,382	5,397	71	2,815	3,094	105	10,962	5,840	815	675	2,682	951	5,050	2,600	331	2,119
2009	72,577	12,581	7,874	4,707	4,517	502	41,055	29,264	7,797	38	1,865	1,996	96	12,767	7,161	941	755	2,907	1,003	5,673	3,049	319	2,305
2010	78,885	13,203	8,016	5,187	5,025	572	44,906	34,912	4,705	32	2,256	2,819	182	14,387	8,539	1,000	760	3,060	1,028	5,818	3,041	321	2,456
2011	81,718	13,251	8,024	5,227	5,057	575	47,186	37,047	4,404	70	2,413	3,130	122	15,162	9,031	979	776	3,311	1,066	5,545	2,693	340	2,512
2012	86,627	14,328	8,587	5,741	5,566	550	50,755	38,891	4,137	45	3,336	4,209	137	15,446	8,909	991	856	3,570	1,120	5,549	2,629	349	2,571
2013	87,979	15,132	8,309	6,823	6,639	513	51,013	37,385	6,028	47	3,275	4,078	199	15,684	8,646	1,049	914	3,823	1,253	5,637	2,465	371	2,801
2014	91,601	15,728	8,775	6,952	6,766	471	53,415	38,281	6,445	35	3,331	5,074	250	15,996	8,477	1,073	974	4,098	1,374	5,992	2,574	392	3,026
2015	97,059	16,698	9,347	7,351	7,182	481	56,472	43,330	6,102	24	2,735	4,072	209	16,980	8,838	1,083	1,079	4,425	1,557	6,429	2,791	407	3,231
2016	109,463	17,433	9,805	7,628	7,469	509	62,871	48,543	5,327	45	3,174	5,536	245	18,503	9,520	1,158	1,192	4,836	1,797	10,147	3,749	891	5,147
2017	113,334	18,170	10,124	8,046	7,868	510	64,040	47,727	5,386	33	3,852	6,849	193	19,559	9,987	1,219	1,259	5,184	1,911	11,056	4,692	979	5,022

TABLE 4

U.S. applied research expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All per-formers	All federal	Federal intramural <sup>a</sup>	FFRDCs		Nonfederal government	Business							Higher education					NPOs				
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
2018	118,316	19,704	11,111	8,593	8,407	514	66,587	50,898	5,355	23	3,469	6,651	191	20,563	10,448	1,286	1,353	5,476	2,001	10,947	4,652	1,069	4,864
2019	130,225	20,523	11,264	9,258	9,075	523	76,176	57,549	5,246	42	4,907	8,223	209	21,540	10,965	1,338	1,439	5,732	2,066	11,463	5,375	1,139	4,597
2020	132,524	21,117	11,554	9,563	9,384	514	78,371	58,766	5,906	84	5,135	8,218	262	22,297	11,527	1,360	1,433	5,928	2,050	10,226	4,902	1,094	3,919
2021 <sup>b</sup>	144,037	21,305	11,132	10,173	9,951	521	88,707	66,451	3,491	142	7,556	10,775	292	23,528	12,341	1,391	1,476	6,236	2,085	9,977	5,080	947	3,761
2022 <sup>c</sup>	159,927	24,078	13,299	10,779	10,452	536	100,334	76,060	3,869	149	8,087	11,860	310	24,951	13,103	1,427	1,583	6,656	2,182	10,028	5,106	952	3,780
Constant 2017 \$millions																							
1953	9,586	2,934	2,580	353	353	NA	5,399	3,257	2,142	NA	NA	NA	NA	993	439	224	48	207	74	260	104	82	74
1954	10,154	2,859	2,428	431	431	NA	5,998	3,625	2,373	NA	NA	NA	NA	1,006	438	232	55	206	74	291	114	96	81
1955	10,881	3,036	2,413	623	623	NA	6,512	4,058	2,454	NA	NA	NA	NA	1,025	456	234	62	197	76	308	127	101	80
1956	13,514	3,581	2,708	872	872	NA	8,574	5,564	3,010	NA	NA	NA	NA	1,023	455	232	70	189	77	336	140	98	98
1957	16,367	4,032	3,022	1,011	1,011	NA	10,958	6,728	4,230	NA	NA	NA	NA	994	427	230	78	184	75	383	153	95	136
1958	18,295	4,456	3,422	1,034	1,034	NA	12,387	7,540	4,847	NA	NA	NA	NA	1,005	434	234	80	180	76	448	189	93	166
1959	19,230	4,942	3,771	1,171	1,171	NA	12,659	7,706	4,954	NA	NA	NA	NA	1,092	507	242	82	183	78	536	262	98	177
1960	19,782	5,263	3,966	1,297	1,297	NA	12,684	7,718	4,965	NA	NA	NA	NA	1,197	600	250	84	186	77	639	348	110	181
1961	19,942	5,795	4,266	1,529	1,529	NA	12,152	7,439	4,712	NA	NA	NA	NA	1,268	661	255	83	189	80	728	396	109	223
1962	23,328	6,041	4,470	1,571	1,571	NA	15,092	9,072	6,020	NA	NA	NA	NA	1,363	748	256	85	192	82	833	429	120	284
1963	24,104	6,758	5,046	1,712	1,712	NA	14,981	9,044	5,937	NA	NA	NA	NA	1,432	795	263	87	202	84	933	508	119	306
1964	25,811	7,738	5,815	1,923	1,923	NA	15,593	9,585	6,009	NA	NA	NA	NA	1,570	872	278	83	229	108	909	504	117	289
1965	26,387	7,765	5,994	1,771	1,771	NA	15,759	9,774	5,985	NA	NA	NA	NA	1,831	1,059	280	78	254	160	1,032	591	127	314
1966	27,306	7,641	5,939	1,702	1,702	NA	16,375	10,588	5,787	NA	NA	NA	NA	2,060	1,221	276	82	284	197	1,230	754	141	335
1967	27,651	7,996	6,094	1,902	1,902	NA	16,153	10,546	5,607	NA	NA	NA	NA	2,216	1,355	260	88	307	205	1,286	801	143	342
1968	28,102	7,908	6,081	1,827	1,827	NA	16,614	11,384	5,230	NA	NA	NA	NA	2,216	1,365	252	88	301	211	1,365	873	153	339
1969	28,442	8,160	6,410	1,750	1,750	NA	16,645	11,848	4,798	NA	NA	NA	NA	2,175	1,338	251	83	281	222	1,463	952	167	344
1970	28,494	8,272	6,608	1,664	1,664	NA	16,494	11,779	4,716	NA	NA	NA	NA	2,231	1,384	254	87	276	230	1,496	986	163	347
1971	27,498	7,856	6,388	1,469	1,469	NA	15,783	11,508	4,276	NA	NA	NA	NA	2,352	1,443	285	87	316	222	1,506	997	160	349
1972	27,777	8,097	6,480	1,618	1,618	NA	15,396	11,577	3,818	NA	NA	NA	NA	2,795	1,765	335	93	370	233	1,489	974	158	357
1973	28,512	7,974	6,543	1,431	1,431	NA	15,915	12,132	3,783	NA	NA	NA	NA	3,104	1,926	375	111	428	263	1,519	1,009	154	356
1974	28,865	7,809	6,494	1,315	1,315	NA	16,382	12,825	3,557	NA	NA	NA	NA	3,119	1,873	378	124	463	281	1,555	1,045	152	358
1975	29,105	8,256	6,877	1,380	1,380	NA	15,939	12,374	3,565	NA	NA	NA	NA	3,359	1,977	408	138	505	331	1,550	1,041	150	359
1976	30,606	8,610	7,052	1,558	1,558	NA	16,860	13,338	3,522	NA	NA	NA	NA	3,552	2,030	434	152	564	372	1,583	1,057	152	373
1977	31,017	8,412	6,679	1,733	1,733	NA	17,411	13,839	3,573	NA	NA	NA	NA	3,613	2,008	432	164	623	387	1,580	1,041	154	385
1978	32,104	8,512	6,723	1,789	1,789	NA	18,190	14,606	3,584	NA	NA	NA	NA	3,739	2,027	454	181	695	382	1,663	1,113	155	394
1979	33,500	8,499	6,688	1,811	1,811	NA	19,316	15,702	3,614	NA	NA	NA	NA	3,926	2,195	447	198	729	357	1,759	1,207	153	399

TABLE 4

## U.S. applied research expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All per- formers	All federal	Federal intramural <sup>a</sup>	FFRDCs		Nonfederal government	Business							Higher education					NPOs				
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
1980	34,871	8,369	6,467	1,902	1,902	NA	20,764	16,636	4,127	NA	NA	NA	NA	4,120	2,317	441	224	782	356	1,618	1,066	151	401
1981	37,890	8,167	6,338	1,829	1,829	NA	24,134	19,396	4,738	NA	NA	NA	NA	4,132	2,210	462	250	841	368	1,457	907	148	401
1982	39,813	8,068	6,123	1,946	1,946	NA	26,128	20,461	5,667	NA	NA	NA	NA	4,184	2,200	453	264	878	388	1,432	869	150	413
1983	42,686	8,319	6,290	2,029	2,029	NA	28,417	21,631	6,786	NA	NA	NA	NA	4,449	2,360	452	297	932	408	1,500	910	155	435
1984	45,569	8,397	6,010	2,387	2,387	NA	30,889	23,425	7,463	NA	NA	NA	NA	4,733	2,489	475	341	997	430	1,551	932	160	459
1985	49,976	8,709	6,168	2,541	2,541	NA	34,677	25,397	9,281	NA	NA	NA	NA	4,972	2,551	515	389	1,077	441	1,617	963	167	487
1986	52,536	8,606	6,179	2,426	2,426	NA	36,897	29,088	7,809	NA	NA	NA	NA	5,361	2,686	574	442	1,197	462	1,672	975	176	521
1987	52,605	8,646	6,334	2,312	2,312	NA	36,116	28,519	7,598	NA	NA	NA	NA	6,058	3,092	627	489	1,331	519	1,784	1,045	184	556
1988	53,679	7,900	6,112	1,788	1,788	NA	37,044	30,052	6,992	NA	NA	NA	NA	6,871	3,560	685	549	1,487	590	1,865	1,088	190	586
1989	56,463	8,070	6,239	1,831	1,831	NA	39,040	31,476	7,564	NA	NA	NA	NA	7,326	3,711	729	607	1,632	647	2,027	1,215	196	616
1990	58,843	8,108	6,158	1,949	1,949	NA	41,142	31,080	10,062	NA	NA	NA	NA	7,429	3,609	763	636	1,739	682	2,165	1,314	203	647
1991	63,010	9,035	6,677	2,358	2,358	NA	44,060	34,945	9,114	NA	NA	NA	NA	7,520	3,640	763	639	1,779	699	2,395	1,502	210	683
1992	60,496	9,354	6,916	2,438	2,438	NA	40,920	33,782	7,138	NA	NA	NA	NA	7,786	3,851	763	661	1,786	725	2,436	1,489	220	727
1993	58,078	9,874	7,537	2,336	2,336	NA	37,778	31,087	6,691	NA	NA	NA	NA	8,021	3,959	772	690	1,840	759	2,406	1,401	230	774
1994	55,850	10,037	7,604	2,434	2,434	NA	35,062	29,547	5,515	NA	NA	NA	NA	8,221	4,032	789	708	1,916	776	2,530	1,463	242	825
1995	61,154	9,959	7,398	2,560	2,560	NA	40,214	35,488	4,727	NA	NA	NA	NA	8,454	4,152	835	738	1,959	771	2,528	1,395	253	879
1996	63,332	9,528	7,147	2,380	2,380	NA	42,559	37,219	5,340	NA	NA	NA	NA	8,633	4,201	856	769	2,040	766	2,613	1,408	266	939
1997	67,085	9,627	7,206	2,421	2,421	NA	46,770	42,951	3,819	NA	NA	NA	NA	7,910	3,631	791	742	2,013	733	2,778	1,458	296	1,025
1998	65,955	9,798	7,338	2,460	2,460	NA	45,933	42,180	3,754	NA	NA	NA	NA	7,284	3,122	735	726	1,986	716	2,940	1,512	310	1,118
1999	72,918	10,098	7,776	2,321	2,321	NA	51,522	47,561	3,961	NA	NA	NA	NA	7,946	3,616	750	744	2,081	755	3,353	1,828	332	1,194
2000	77,696	10,802	8,395	2,407	2,407	NA	53,871	50,183	3,688	NA	NA	NA	NA	8,747	4,237	768	743	2,205	794	4,277	2,518	355	1,403
2001	86,338	13,133	9,484	3,649	3,448	NA	59,188	54,343	4,845	NA	NA	NA	NA	9,260	4,588	787	719	2,332	835	4,756	2,891	351	1,514
2002	66,927	13,938	9,915	4,023	3,796	NA	37,784	34,537	3,247	NA	NA	NA	NA	10,156	5,134	842	703	2,565	913	5,049	3,002	335	1,712
2003	79,192	14,099	9,962	4,137	3,921	NA	48,482	42,673	5,809	NA	NA	NA	NA	11,116	5,779	919	697	2,762	960	5,495	3,230	336	1,930
2004	87,664	13,631	9,427	4,205	4,021	NA	57,453	51,414	6,038	NA	NA	NA	NA	11,268	5,921	929	689	2,770	960	5,311	3,096	334	1,881
2005	85,546	13,489	9,266	4,223	4,032	NA	55,525	49,040	6,485	NA	NA	NA	NA	11,212	5,898	882	682	2,799	949	5,320	2,981	344	1,995
2006	90,993	13,027	8,843	4,184	3,983	304	60,868	53,565	7,303	NA	NA	NA	NA	11,327	6,042	847	682	2,816	939	5,467	3,083	356	2,028
2007	96,888	12,786	8,363	4,422	4,219	372	66,671	56,312	10,359	NA	NA	NA	NA	11,517	6,120	862	703	2,850	982	5,543	2,991	369	2,183
2008	84,907	13,005	8,313	4,693	4,494	462	53,247	40,201	6,132	80	3,199	3,516	119	12,455	6,635	926	767	3,047	1,080	5,738	2,954	376	2,408
2009	81,956	14,206	8,892	5,315	5,101	566	46,361	33,046	8,805	43	2,106	2,254	108	14,416	8,086	1,062	853	3,282	1,133	6,406	3,443	360	2,603
2010	88,011	14,730	8,943	5,787	5,606	638	50,100	38,950	5,249	36	2,517	3,146	203	16,051	9,527	1,116	847	3,414	1,147	6,491	3,393	358	2,740
2011	89,328	14,485	8,771	5,713	5,528	628	51,580	40,497	4,814	76	2,638	3,422	133	16,574	9,872	1,070	848	3,619	1,165	6,061	2,944	371	2,746
2012	92,963	15,375	9,215	6,161	5,973	591	54,467	41,735	4,440	48	3,580	4,517	147	16,575	9,561	1,063	918	3,831	1,202	5,955	2,821	374	2,760

TABLE 4

**U.S. applied research expenditures, by performing sector and source of funds: 1953–2022**

(Millions of current and of constant 2017 dollars)

Year	All per- formers	All federal	Federal intramural <sup>a</sup>	FFRDCs		Nonfederal government	Business							Higher education				NPOs					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
2013	92,834	15,967	8,767	7,200	7,005	541	53,828	39,448	6,361	50	3,456	4,303	210	16,549	9,123	1,106	964	4,034	1,322	5,949	2,601	391	2,956
2014	95,001	16,311	9,101	7,210	7,017	489	55,398	39,701	6,684	36	3,454	5,262	259	16,589	8,792	1,113	1,010	4,250	1,425	6,214	2,669	407	3,138
2015	99,736	17,159	9,605	7,553	7,380	494	58,030	44,525	6,270	24	2,811	4,184	215	17,448	9,081	1,112	1,108	4,547	1,599	6,607	2,868	418	3,321
2016	111,423	17,745	9,981	7,765	7,603	518	63,997	49,413	5,422	46	3,231	5,635	250	18,834	9,690	1,179	1,213	4,922	1,829	10,329	3,816	906	5,240
2017	113,334	18,170	10,124	8,046	7,868	510	64,040	47,727	5,386	33	3,852	6,849	193	19,559	9,987	1,219	1,259	5,184	1,911	11,056	4,692	979	5,022
2018	115,666	19,263	10,862	8,401	8,219	502	65,096	49,758	5,236	23	3,392	6,502	186	20,102	10,214	1,257	1,323	5,353	1,956	10,702	4,548	1,045	4,755
2019	125,207	19,732	10,830	8,901	8,725	503	73,241	55,331	5,044	40	4,718	7,906	201	20,709	10,542	1,286	1,384	5,511	1,986	11,022	5,168	1,095	4,420
2020	125,756	20,039	10,964	9,074	8,905	488	74,369	55,765	5,604	79	4,873	7,798	249	21,158	10,938	1,290	1,359	5,625	1,945	9,703	4,652	1,038	3,719
2021 <sup>b</sup>	130,690	19,330	10,100	9,230	9,029	472	80,487	60,293	3,168	129	6,856	9,776	265	21,347	11,197	1,262	1,339	5,658	1,891	9,053	4,609	859	3,413
2022 <sup>c</sup>	135,563	20,410	11,273	9,137	8,860	454	85,049	64,473	3,279	126	6,855	10,053	263	21,150	11,107	1,210	1,342	5,642	1,850	8,500	4,328	807	3,204

NA = not available.

FFRDC = federally funded research and development center; NPO = nonprofit organization.

<sup>a</sup> See [table 2](#), footnotes a–f, for details on sectoral R&D.<sup>b</sup> Some data for 2021 are preliminary and may be revised later.<sup>c</sup> The data for 2022 include estimates and are likely to be revised later.**Note(s):**

For detail on type-of-R&D data, see [table 3](#), footnotes b–f. Detail may not add to total because of rounding. Constant-dollar estimates are derived from unrounded data. For trend comparisons, use only the historical data reported in this table because some back-year data may have been revised. Data are based on reports by performers in the National Center for Science and Engineering Statistics annual surveys on R&D expenditures: Business Enterprise Research and Development Survey, Annual Business Survey, Higher Education Research and Development Survey, Survey of Federal Funds for Research and Development, FFRDC Research and Development Survey, and Survey of State Government Research and Development. R&D expenditures by business performers—and, before 2001, also industry-administered FFRDCs—were collected on a calendar year basis. Expenditures for other performers are calendar year approximations based on fiscal year data. For federal performers in 1977 and afterward, the approximation equals 75% of the amount reported in the same fiscal year plus 25% of the amount reported in the subsequent fiscal year. Prior to 1977, the federal fiscal year began on 1 July, not 1 October, and the approximation is 50% of the amount reported in the same fiscal year plus 50% of the amount reported in the subsequent fiscal year. The fiscal year for higher education performers and state government performers generally begins 1 July, and the calendar year approximation is 50% of the amount reported in the same fiscal year plus 50% of amount reported in the subsequent fiscal year.

**Source(s):**

National Center for Science and Engineering Statistics, National Patterns of R&amp;D Resources (annual series).

TABLE 5

## U.S. experimental development expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs		Nonfederal government	Business							Higher education				NPOs					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
Current \$millions																							
1953	3,412	614	567	48	48	NA	2,753	1,630	1,123	NA	NA	NA	NA	16	9	3	1	3	1	29	17	6	6
1954	3,734	599	537	62	62	NA	3,090	1,685	1,405	NA	NA	NA	NA	17	9	3	1	3	1	29	15	7	7
1955	4,113	713	543	171	171	NA	3,352	1,738	1,614	NA	NA	NA	NA	21	12	4	2	3	1	27	12	8	7
1956	5,854	978	631	348	348	NA	4,826	2,267	2,559	NA	NA	NA	NA	25	14	4	2	4	2	26	11	8	7
1957	6,681	1,157	728	429	429	NA	5,474	2,174	3,300	NA	NA	NA	NA	26	12	5	3	4	2	25	9	8	8
1958	7,213	1,227	842	386	386	NA	5,932	2,241	3,691	NA	NA	NA	NA	28	13	6	3	4	2	26	9	8	9
1959	8,463	1,417	940	477	477	NA	6,983	2,557	4,426	NA	NA	NA	NA	31	16	6	3	5	2	33	14	9	10
1960	9,360	1,562	1,003	559	559	NA	7,734	2,935	4,799	NA	NA	NA	NA	35	19	6	3	5	2	30	10	10	10
1961	9,930	1,760	1,090	670	670	NA	8,106	3,189	4,917	NA	NA	NA	NA	37	22	7	2	5	2	28	4	10	14
1962	10,114	1,845	1,227	618	618	NA	8,196	3,246	4,950	NA	NA	NA	NA	40	23	8	2	6	2	34	5	11	18
1963	11,539	2,133	1,465	668	668	NA	9,330	3,535	5,795	NA	NA	NA	NA	40	22	8	2	6	2	37	6	11	20
1964	12,506	2,419	1,680	739	739	NA	10,004	3,848	6,156	NA	NA	NA	NA	49	30	8	2	7	3	35	6	11	18
1965	13,215	2,463	1,789	674	674	NA	10,637	4,419	6,218	NA	NA	NA	NA	71	48	9	2	8	4	45	13	12	20
1966	14,490	2,540	1,886	654	654	NA	11,810	4,961	6,849	NA	NA	NA	NA	87	61	9	2	10	5	53	16	14	23
1967	15,332	2,649	1,943	706	706	NA	12,539	5,744	6,795	NA	NA	NA	NA	93	66	9	3	10	7	51	12	15	24
1968	16,154	2,628	1,904	724	724	NA	13,370	6,326	7,044	NA	NA	NA	NA	102	72	8	4	9	9	55	13	16	26
1969	17,051	2,807	2,016	792	792	NA	14,071	7,127	6,944	NA	NA	NA	NA	110	80	7	5	8	10	63	17	18	28
1970	16,925	3,047	2,258	790	790	NA	13,698	7,466	6,232	NA	NA	NA	NA	112	84	6	5	7	10	68	20	18	30
1971	17,399	3,313	2,473	841	841	NA	13,924	7,757	6,167	NA	NA	NA	NA	98	69	8	4	9	9	64	12	19	33
1972	18,743	3,502	2,639	863	863	NA	15,043	8,510	6,533	NA	NA	NA	NA	101	63	12	4	14	9	98	44	19	35
1973	20,197	3,517	2,657	860	860	NA	16,394	9,773	6,621	NA	NA	NA	NA	126	71	18	5	20	13	160	102	20	38
1974	21,504	3,748	2,765	983	983	NA	17,421	10,868	6,553	NA	NA	NA	NA	141	75	20	7	25	15	195	131	22	42
1975	22,706	3,993	2,890	1,103	1,103	NA	18,352	11,569	6,783	NA	NA	NA	NA	156	83	22	8	27	16	205	135	23	47
1976	25,085	4,286	2,972	1,315	1,315	NA	20,412	12,890	7,522	NA	NA	NA	NA	182	100	24	12	31	16	205	128	25	52
1977	27,667	4,606	3,188	1,418	1,418	NA	22,603	14,328	8,275	NA	NA	NA	NA	254	153	28	15	40	19	204	119	27	58
1978	31,056	5,261	3,676	1,584	1,584	NA	25,216	16,460	8,756	NA	NA	NA	NA	373	254	32	15	49	24	207	113	30	64
1979	35,445	5,697	3,944	1,753	1,753	NA	29,033	19,145	9,888	NA	NA	NA	NA	469	336	34	16	56	28	246	143	32	71
1980	40,748	6,081	4,072	2,009	2,009	NA	33,848	22,891	10,957	NA	NA	NA	NA	518	362	38	19	68	31	301	187	35	79
1981	46,305	6,705	4,530	2,175	2,175	NA	38,547	25,756	12,791	NA	NA	NA	NA	568	386	44	24	80	35	485	360	37	88
1982	51,879	7,348	5,178	2,170	2,170	NA	43,434	29,219	14,215	NA	NA	NA	NA	597	397	46	27	88	39	500	362	40	98
1983	57,771	8,491	6,106	2,385	2,385	NA	48,064	32,542	15,522	NA	NA	NA	NA	617	399	47	31	97	43	599	447	44	109
1984	66,461	9,651	7,078	2,572	2,572	NA	55,371	37,731	17,640	NA	NA	NA	NA	677	435	51	37	108	47	762	594	47	120



TABLE 5

U.S. experimental development expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs		Nonfederal government		Business				Higher education				NPOs							
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
1985	74,522	10,916	8,011	2,906	2,906	NA	62,020	41,762	20,258	NA	NA	NA	NA	756	486	57	43	120	49	829	644	51	134
1986	75,855	11,376	8,275	3,101	3,101	NA	62,871	41,354	21,517	NA	NA	NA	NA	818	513	65	50	136	53	790	587	55	149
1987	79,929	11,496	8,176	3,321	3,321	NA	66,789	42,667	24,122	NA	NA	NA	NA	945	599	73	57	155	61	698	474	60	165
1988	84,567	12,460	8,864	3,596	3,596	NA	70,353	46,634	23,719	NA	NA	NA	NA	1,098	698	83	66	180	71	655	407	65	183
1989	87,723	12,991	9,355	3,635	3,635	NA	72,725	51,676	21,049	NA	NA	NA	NA	1,227	773	91	76	205	81	780	507	70	203
1990	94,067	13,363	9,700	3,663	3,663	NA	78,376	59,410	18,966	NA	NA	NA	NA	1,407	910	99	83	226	89	920	619	75	226
1991	95,105	12,230	8,778	3,452	3,452	NA	80,286	63,030	17,256	NA	NA	NA	NA	1,534	1,012	103	86	239	94	1,054	722	82	251
1992	99,811	12,521	9,098	3,423	3,423	NA	84,569	67,388	17,181	NA	NA	NA	NA	1,596	1,055	105	91	246	100	1,125	758	88	279
1993	99,705	12,058	9,071	2,986	2,986	NA	84,757	68,674	16,083	NA	NA	NA	NA	1,700	1,127	109	97	259	107	1,191	787	95	309
1994	102,938	11,970	8,823	3,147	3,147	NA	87,890	71,681	16,209	NA	NA	NA	NA	1,816	1,213	114	102	276	112	1,261	815	103	343
1995	113,079	12,689	9,262	3,427	3,427	NA	97,342	79,518	17,824	NA	NA	NA	NA	1,812	1,180	123	108	288	113	1,236	744	111	381
1996	121,377	12,481	9,033	3,448	3,448	NA	105,863	88,797	17,066	NA	NA	NA	NA	1,791	1,128	128	115	305	115	1,241	698	120	423
1997	128,661	12,407	9,077	3,331	3,331	NA	113,184	95,063	18,121	NA	NA	NA	NA	1,693	1,041	120	113	306	112	1,378	687	155	536
1998	144,669	12,528	9,214	3,314	3,314	NA	129,041	110,589	18,452	NA	NA	NA	NA	1,584	943	113	112	306	110	1,516	760	164	592
1999	154,315	12,600	9,265	3,335	3,335	NA	138,807	122,236	16,571	NA	NA	NA	NA	1,362	686	117	116	325	118	1,546	727	178	641
2000	169,414	12,859	9,377	3,482	3,482	NA	153,745	140,235	13,510	NA	NA	NA	NA	1,265	545	123	119	352	127	1,545	580	195	771
2001	167,975	14,693	11,062	3,631	3,566	NA	149,952	137,410	12,542	NA	NA	NA	NA	1,409	646	128	117	381	136	1,921	874	197	850
2002	176,971	15,607	11,800	3,807	3,763	NA	157,788	144,727	13,061	NA	NA	NA	NA	1,472	639	140	116	425	151	2,104	937	191	976
2003	175,559	16,639	12,646	3,993	3,964	NA	155,060	143,121	11,939	NA	NA	NA	NA	1,799	897	155	118	467	162	2,060	743	195	1,122
2004	177,030	17,233	12,746	4,487	4,454	NA	155,034	140,615	14,419	NA	NA	NA	NA	2,140	1,211	161	120	481	167	2,623	1,300	199	1,123
2005	195,621	18,664	13,994	4,670	4,611	NA	172,208	156,696	15,512	NA	NA	NA	NA	2,098	1,146	158	122	501	170	2,651	1,211	212	1,228
2006	212,857	20,720	16,089	4,630	4,547	7	188,112	171,392	16,720	NA	NA	NA	NA	1,902	927	156	126	520	173	2,116	603	226	1,287
2007	227,740	23,154	18,016	5,137	5,037	9	200,429	185,569	14,860	NA	NA	NA	NA	1,917	894	163	133	540	186	2,231	568	240	1,423
2008	259,579	23,743	17,566	6,177	6,078	11	231,447	180,724	29,488	223	8,882	11,799	330	1,965	841	179	148	589	209	2,412	562	250	1,600
2009	255,945	23,484	17,245	6,239	6,147	14	226,554	179,841	30,435	144	7,041	8,732	361	3,362	1,545	283	281	892	362	2,531	550	241	1,740
2010	251,239	25,848	18,844	7,004	6,909	16	217,700	170,036	28,089	114	8,035	10,779	647	4,941	2,452	397	408	1,186	498	2,734	638	242	1,854
2011	270,804	28,751	21,879	6,872	6,786	16	233,886	187,794	26,228	230	7,966	11,264	403	5,208	2,600	392	416	1,280	521	2,943	790	256	1,897
2012	273,078	26,666	19,941	6,725	6,632	15	238,202	192,828	25,840	102	7,578	11,543	310	5,472	2,626	368	445	1,455	579	2,723	518	263	1,941
2013	286,998	26,436	19,767	6,668	6,572	14	252,007	207,537	22,137	126	8,729	12,947	532	5,672	2,592	387	484	1,592	619	2,869	474	280	2,115
2014	301,441	27,084	20,303	6,781	6,681	13	265,377	223,186	18,065	87	8,312	15,103	624	5,916	2,562	400	537	1,726	692	3,052	471	296	2,284
2015	312,982	26,132	18,961	7,171	7,063	14	277,557	230,629	18,850	90	10,295	16,907	786	6,111	2,533	401	554	1,850	774	3,169	422	307	2,440
2016	324,729	23,438	15,838	7,600	7,479	18	291,605	243,056	16,790	129	9,940	20,930	760	6,378	2,580	420	562	1,957	861	3,290	520	386	2,228
2017	350,126	23,995	15,848	8,147	8,021	22	316,136	258,151	17,736	92	11,792	27,805	560	6,742	2,670	447	607	2,091	927	3,231	628	401	2,055

TABLE 5

U.S. experimental development expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs		Nonfederal government				Business				Higher education				NPOs					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
2018	387,827	27,556	18,856	8,701	8,567	23	349,771	285,863	17,301	85	13,745	32,029	748	7,006	2,796	485	625	2,191	910	3,472	983	423	1,923
2019	430,323	30,347	21,253	9,094	8,962	31	389,418	323,854	15,058	112	14,704	35,073	617	7,282	3,074	491	634	2,211	874	3,245	721	472	1,906
2020	472,545	31,870	22,356	9,514	9,379	44	428,479	356,724	21,666	134	14,329	35,007	618	7,690	3,391	492	658	2,267	882	4,463	1,840	539	1,931
2021 <sup>b</sup>	526,408	33,793	23,728	10,065	9,915	44	479,072	402,485	18,690	211	16,658	40,435	592	8,213	3,650	505	719	2,429	911	5,287	1,894	656	2,606
2022 <sup>c</sup>	596,199	36,058	25,703	10,355	10,208	40	546,125	461,689	20,779	223	17,664	45,143	627	8,663	3,867	505	782	2,576	932	5,314	1,904	659	2,619
Constant 2017 \$millions																							
1953	25,370	4,566	4,213	353	353	NA	20,473	12,121	8,351	NA	NA	NA	NA	119	63	21	7	20	7	212	123	45	45
1954	27,513	4,410	3,957	453	453	NA	22,768	12,416	10,353	NA	NA	NA	NA	125	63	25	7	23	7	210	107	52	52
1955	29,806	5,166	3,931	1,235	1,235	NA	24,291	12,594	11,698	NA	NA	NA	NA	152	83	28	11	23	7	196	87	58	51
1956	41,022	6,853	4,418	2,435	2,435	NA	33,815	15,886	17,930	NA	NA	NA	NA	175	95	31	14	25	11	179	74	56	49
1957	45,315	7,844	4,934	2,910	2,910	NA	37,128	14,745	22,384	NA	NA	NA	NA	176	81	36	17	29	14	166	58	54	54
1958	47,832	8,137	5,580	2,556	2,556	NA	39,341	14,861	24,480	NA	NA	NA	NA	182	83	37	20	29	13	172	60	53	60
1959	55,360	9,266	6,149	3,117	3,117	NA	45,678	16,727	28,952	NA	NA	NA	NA	203	101	39	20	30	13	213	88	59	65
1960	60,405	10,077	6,470	3,608	3,608	NA	49,912	18,941	30,971	NA	NA	NA	NA	223	123	41	16	30	13	194	65	65	65
1961	63,410	11,236	6,957	4,278	4,278	NA	51,759	20,364	31,395	NA	NA	NA	NA	239	137	44	13	33	13	176	22	64	89
1962	63,809	11,640	7,741	3,899	3,899	NA	51,706	20,479	31,227	NA	NA	NA	NA	252	142	49	13	36	13	211	28	69	114
1963	71,978	13,305	9,138	4,167	4,167	NA	58,196	22,050	36,146	NA	NA	NA	NA	250	137	49	12	38	12	228	34	69	125
1964	76,836	14,862	10,322	4,540	4,540	NA	61,464	23,642	37,822	NA	NA	NA	NA	298	181	49	12	40	15	212	34	68	111
1965	79,732	14,857	10,791	4,067	4,067	NA	64,178	26,662	37,516	NA	NA	NA	NA	425	290	52	12	47	24	272	78	72	121
1966	85,039	14,904	11,069	3,835	3,835	NA	69,313	29,116	40,197	NA	NA	NA	NA	511	358	55	12	57	29	311	94	82	135
1967	87,445	15,106	11,082	4,024	4,024	NA	71,517	32,761	38,756	NA	NA	NA	NA	530	374	48	14	57	37	291	68	86	137
1968	88,369	14,374	10,416	3,958	3,958	NA	73,142	34,607	38,535	NA	NA	NA	NA	555	391	42	22	51	49	298	68	88	142
1969	88,915	14,639	10,511	4,127	4,127	NA	73,377	37,165	36,211	NA	NA	NA	NA	571	415	37	26	41	52	329	89	94	146
1970	83,834	15,095	11,184	3,911	3,911	NA	67,850	36,981	30,869	NA	NA	NA	NA	555	414	32	25	35	50	334	97	89	149
1971	82,022	15,619	11,656	3,962	3,962	NA	65,642	36,569	29,073	NA	NA	NA	NA	462	325	37	19	41	40	299	54	90	156
1972	84,697	15,824	11,926	3,897	3,897	NA	67,976	38,455	29,521	NA	NA	NA	NA	456	282	56	16	61	41	441	197	86	158
1973	86,524	15,068	11,384	3,684	3,684	NA	70,233	41,868	28,365	NA	NA	NA	NA	538	302	75	21	86	54	685	437	86	163
1974	84,520	14,731	10,869	3,862	3,862	NA	68,471	42,715	25,756	NA	NA	NA	NA	552	293	79	26	96	59	766	515	85	166
1975	81,676	14,363	10,395	3,968	3,968	NA	66,015	41,616	24,400	NA	NA	NA	NA	561	297	80	29	99	58	737	484	84	169
1976	85,529	14,614	10,132	4,482	4,482	NA	69,595	43,949	25,646	NA	NA	NA	NA	621	339	82	39	106	55	698	435	86	178
1977	88,814	14,786	10,233	4,553	4,553	NA	72,557	45,994	26,563	NA	NA	NA	NA	815	491	89	47	129	59	655	382	88	186
1978	93,141	15,777	11,026	4,752	4,752	NA	75,626	49,365	26,260	NA	NA	NA	NA	1,118	761	96	43	147	70	619	338	89	193
1979	98,161	15,776	10,922	4,854	4,854	NA	80,402	53,019	27,383	NA	NA	NA	NA	1,300	932	95	43	154	76	682	396	89	198

TABLE 5

## U.S. experimental development expenditures, by performing sector and source of funds: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs		Nonfederal government	Business							Higher education				NPOs					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
1980	103,496	15,446	10,344	5,103	5,103	NA	85,971	58,141	27,830	NA	NA	NA	NA	1,315	919	97	49	172	78	764	475	88	201
1981	107,445	15,559	10,512	5,047	5,047	NA	89,443	59,763	29,680	NA	NA	NA	NA	1,317	895	101	55	185	81	1,126	835	87	204
1982	113,374	16,058	11,316	4,742	4,742	NA	94,918	63,853	31,065	NA	NA	NA	NA	1,304	869	100	58	193	85	1,094	792	88	214
1983	121,491	17,856	12,840	5,016	5,016	NA	101,077	68,435	32,642	NA	NA	NA	NA	1,298	840	99	65	205	90	1,261	940	92	228
1984	134,899	19,588	14,367	5,221	5,221	NA	112,389	76,584	35,805	NA	NA	NA	NA	1,375	882	104	75	219	94	1,547	1,207	96	245
1985	146,622	21,478	15,761	5,717	5,717	NA	122,025	82,167	39,858	NA	NA	NA	NA	1,488	956	113	85	236	97	1,631	1,267	101	263
1986	146,300	21,941	15,959	5,982	5,982	NA	121,258	79,758	41,499	NA	NA	NA	NA	1,577	990	126	97	263	102	1,524	1,131	107	287
1987	150,429	21,637	15,387	6,250	6,250	NA	125,700	80,301	45,399	NA	NA	NA	NA	1,778	1,127	138	107	292	114	1,315	892	112	311
1988	153,735	22,652	16,114	6,538	6,538	NA	127,896	84,777	43,119	NA	NA	NA	NA	1,996	1,269	150	120	326	130	1,191	741	117	333
1989	153,457	22,725	16,366	6,359	6,359	NA	127,220	90,399	36,822	NA	NA	NA	NA	2,147	1,353	160	133	358	142	1,365	887	122	356
1990	158,617	22,534	16,357	6,177	6,177	NA	132,159	100,178	31,981	NA	NA	NA	NA	2,373	1,534	168	140	382	150	1,552	1,044	127	381
1991	155,121	19,948	14,317	5,631	5,631	NA	130,951	102,805	28,145	NA	NA	NA	NA	2,502	1,650	168	140	391	153	1,720	1,178	133	409
1992	159,169	19,967	14,508	5,459	5,459	NA	134,863	107,464	27,399	NA	NA	NA	NA	2,546	1,682	168	145	392	159	1,794	1,209	140	444
1993	155,320	18,783	14,131	4,652	4,652	NA	132,033	106,980	25,054	NA	NA	NA	NA	2,648	1,756	170	152	404	167	1,856	1,225	148	482
1994	157,003	18,258	13,457	4,800	4,800	NA	134,052	109,329	24,722	NA	NA	NA	NA	2,770	1,850	173	155	420	170	1,924	1,243	157	524
1995	168,928	18,956	13,836	5,120	5,120	NA	145,419	118,792	26,627	NA	NA	NA	NA	2,706	1,762	183	162	430	169	1,847	1,111	166	570
1996	178,065	18,311	13,252	5,059	5,059	NA	155,305	130,269	25,037	NA	NA	NA	NA	2,628	1,655	188	169	448	168	1,821	1,023	176	621
1997	185,552	17,893	13,090	4,803	4,803	NA	163,231	137,097	26,134	NA	NA	NA	NA	2,441	1,502	174	163	442	161	1,987	990	223	774
1998	206,319	17,867	13,141	4,727	4,727	NA	184,031	157,716	26,315	NA	NA	NA	NA	2,259	1,345	161	159	436	157	2,162	1,084	234	844
1999	217,005	17,719	13,029	4,690	4,690	NA	195,196	171,894	23,303	NA	NA	NA	NA	1,916	965	165	163	457	166	2,174	1,022	250	901
2000	232,960	17,682	12,894	4,788	4,788	NA	211,414	192,836	18,578	NA	NA	NA	NA	1,739	749	168	163	484	174	2,125	797	268	1,060
2001	225,895	19,760	14,876	4,883	4,796	NA	201,658	184,791	16,867	NA	NA	NA	NA	1,894	869	173	158	512	183	2,583	1,175	265	1,143
2002	234,351	20,668	15,626	5,042	4,983	NA	208,948	191,653	17,296	NA	NA	NA	NA	1,949	846	185	154	563	200	2,786	1,240	253	1,293
2003	227,981	21,608	16,422	5,185	5,148	NA	201,360	185,857	15,504	NA	NA	NA	NA	2,337	1,165	202	153	606	211	2,676	965	254	1,457
2004	223,870	21,793	16,119	5,674	5,632	NA	196,055	177,820	18,234	NA	NA	NA	NA	2,706	1,532	204	151	608	211	3,317	1,645	252	1,420
2005	239,860	22,885	17,159	5,726	5,654	NA	211,152	192,132	19,020	NA	NA	NA	NA	2,572	1,406	194	150	614	208	3,250	1,484	260	1,506
2006	253,185	24,645	19,138	5,508	5,408	9	223,753	203,865	19,888	NA	NA	NA	NA	2,262	1,102	186	150	618	206	2,517	717	269	1,531
2007	263,743	26,814	20,864	5,950	5,833	10	232,115	214,905	17,209	NA	NA	NA	NA	2,221	1,036	189	154	626	216	2,584	657	278	1,648
2008	294,933	26,977	19,959	7,019	6,906	13	262,970	205,338	33,504	254	10,092	13,406	375	2,233	956	203	168	669	237	2,740	639	284	1,818
2009	289,022	26,519	19,474	7,045	6,941	16	255,832	203,083	34,368	162	7,951	9,861	408	3,797	1,745	319	318	1,007	408	2,858	621	272	1,965
2010	280,300	28,837	21,023	7,814	7,708	18	242,882	189,704	31,338	127	8,965	12,026	722	5,513	2,736	443	455	1,323	556	3,050	711	270	2,069
2011	296,022	31,429	23,917	7,512	7,418	18	255,666	205,282	28,670	251	8,708	12,313	441	5,692	2,842	428	455	1,399	569	3,217	864	280	2,073
2012	293,051	28,617	21,400	7,217	7,117	17	255,624	206,931	27,730	110	8,132	12,388	333	5,872	2,818	395	478	1,561	621	2,922	556	283	2,083

TABLE 5

**U.S. experimental development expenditures, by performing sector and source of funds: 1953–2022**

(Millions of current and of constant 2017 dollars)

Year	All performers	All federal	Federal intramural <sup>a</sup>	FFRDCs		Nonfederal government	Business							Higher education				NPOs					
	All funding sources	Total	Federal	Total	Federal	Total	Total	Own domestic	Federal	Nonfederal government	Other domestic business	Foreign business	Other	Total	Federal	Nonfederal government	Business	Higher education	NPO	Total	Federal	Business	NPO
2013	302,834	27,894	20,858	7,036	6,935	15	265,913	218,988	23,359	133	9,211	13,661	561	5,985	2,735	408	510	1,679	653	3,027	500	295	2,232
2014	312,630	28,089	21,056	7,033	6,929	14	275,227	231,471	18,736	90	8,621	15,663	647	6,136	2,657	414	557	1,790	717	3,165	489	307	2,369
2015	321,615	26,853	19,484	7,369	7,258	14	285,212	236,990	19,370	92	10,579	17,374	808	6,280	2,602	412	569	1,901	795	3,256	434	316	2,507
2016	330,544	23,858	16,122	7,736	7,612	18	296,827	247,409	17,090	132	10,118	21,305	773	6,492	2,626	427	572	1,992	876	3,349	529	392	2,268
2017	350,126	23,995	15,848	8,147	8,021	22	316,136	258,151	17,736	92	11,792	27,805	560	6,742	2,670	447	607	2,091	927	3,231	628	401	2,055
2018	379,141	26,939	18,433	8,506	8,375	22	341,937	279,461	16,914	83	13,437	31,312	731	6,849	2,733	474	611	2,142	889	3,394	961	413	1,880
2019	413,741	29,178	20,434	8,743	8,616	30	374,412	311,375	14,478	107	14,137	33,721	593	7,001	2,956	472	609	2,125	840	3,120	693	454	1,833
2020	448,414	30,243	21,215	9,028	8,900	42	406,598	338,508	20,560	128	13,597	33,219	587	7,297	3,218	467	624	2,151	837	4,235	1,746	512	1,832
2021 <sup>b</sup>	477,628	30,661	21,529	9,132	8,996	40	434,678	365,189	16,958	191	15,115	36,688	537	7,452	3,311	458	652	2,204	827	4,797	1,718	595	2,364
2022 <sup>c</sup>	505,369	30,564	21,787	8,777	8,652	34	462,924	391,352	17,613	189	14,973	38,265	532	7,343	3,278	428	663	2,184	790	4,504	1,614	559	2,220

NA = not available.

FFRDC = federally funded research and development center; NPO = nonprofit organization.

<sup>a</sup> See [table 2](#), footnotes a–f, for details on sectoral R&D.<sup>b</sup> Some data for 2021 are preliminary and may be revised later.<sup>c</sup> The data for 2022 include estimates and are likely to be revised later.**Note(s):**

For detail on type-of-R&D data, see [table 3](#), footnotes b–f. Detail may not add to total because of rounding. Constant-dollar estimates are derived from unrounded data. For trend comparisons, use only the historical data reported in this table because some back-year data may have been revised. Data are based on reports by performers in the National Center for Science and Engineering Statistics annual surveys on R&D expenditures: Business Enterprise Research and Development Survey, Annual Business Survey, Higher Education Research and Development Survey, Survey of Federal Funds for Research and Development, FFRDC Research and Development Survey, and Survey of State Government Research and Development. R&D expenditures by business performers—and, before 2001, also industry-administered FFRDCs—were collected on a calendar year basis. Expenditures for other performers are calendar year approximations based on fiscal year data. For federal performers in 1977 and afterward, the approximation equals 75% of the amount reported in the same fiscal year plus 25% of the amount reported in the subsequent fiscal year. Prior to 1977, the federal fiscal year began on 1 July, not 1 October, and the approximation is 50% of the amount reported in the same fiscal year plus 50% of the amount reported in the subsequent fiscal year. The fiscal year for higher education performers and state government performers generally begins 1 July, and the calendar year approximation is 50% of the amount reported in the same fiscal year plus 50% of amount reported in the subsequent fiscal year.

**Source(s):**

National Center for Science and Engineering Statistics, National Patterns of R&amp;D Resources (annual series).

TABLE 6

## U.S. R&amp;D expenditures, by source of funds and performing sector: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All funding sources		Federal						Nonfederal government					Business					Higher education		NPOs				
	All performers	Total	Federal intramural	FFRDC	Nonfederal government	Business	Higher education	NPO	Total	FFRDC	Nonfederal government	Business	Higher education	Total	FFRDC	Business	Higher education	NPO	Total	Higher education	Total	FFRDC	Business	Higher education	NPO
Current \$millions																									
1953	5,160	2,783	1,015	131	NA	1,430	149	58	40	NA	NA	NA	40	2,247	NA	2,200	21	26	37	37	55	NA	NA	27	28
1954	5,621	3,102	963	165	NA	1,750	165	61	45	NA	NA	NA	45	2,375	NA	2,320	24	31	40	40	60	NA	NA	29	31
1955	6,185	3,507	973	319	NA	1,960	191	65	50	NA	NA	NA	50	2,522	NA	2,460	27	35	42	42	64	NA	NA	32	32
1956	8,501	4,979	1,131	561	NA	2,995	221	71	57	NA	NA	NA	57	3,346	NA	3,277	32	37	46	46	74	NA	NA	36	38
1957	9,908	6,233	1,297	688	NA	3,928	242	79	64	NA	NA	NA	64	3,470	NA	3,396	37	37	51	51	91	NA	NA	40	51
1958	10,915	6,974	1,507	657	NA	4,436	280	95	72	NA	NA	NA	72	3,707	NA	3,630	39	38	56	56	107	NA	NA	45	62
1959	12,490	8,167	1,681	789	NA	5,217	356	125	81	NA	NA	NA	81	4,065	NA	3,983	40	42	61	61	117	NA	NA	50	67
1960	13,711	8,915	1,801	910	NA	5,604	453	148	90	NA	NA	NA	90	4,516	NA	4,428	40	48	67	67	123	NA	NA	55	68
1961	14,564	9,484	1,987	1,087	NA	5,685	557	169	101	NA	NA	NA	101	4,757	NA	4,668	40	49	75	75	148	NA	NA	62	86
1962	15,636	10,138	2,188	1,056	NA	6,008	687	200	112	NA	NA	NA	112	5,124	NA	5,029	41	54	84	84	179	NA	NA	70	109
1963	17,519	11,646	2,559	1,159	NA	6,856	839	234	125	NA	NA	NA	125	5,456	NA	5,360	41	55	96	96	197	NA	NA	78	119
1964	19,103	12,765	2,966	1,297	NA	7,257	995	250	138	NA	NA	NA	138	5,888	NA	5,792	41	55	114	114	200	NA	NA	88	112
1965	20,253	13,194	3,157	1,218	NA	7,367	1,167	286	150	NA	NA	NA	150	6,549	NA	6,445	42	62	136	136	225	NA	NA	101	124
1966	22,072	14,165	3,308	1,217	NA	7,977	1,335	329	160	NA	NA	NA	160	7,331	NA	7,216	45	70	165	165	252	NA	NA	114	138
1967	23,347	14,564	3,445	1,340	NA	7,946	1,491	342	168	NA	NA	NA	168	8,146	NA	8,020	52	74	200	200	271	NA	NA	126	145
1968	24,667	14,965	3,498	1,372	NA	8,145	1,586	364	185	NA	NA	NA	185	9,008	NA	8,869	58	81	221	221	290	NA	NA	139	151
1969	25,996	15,228	3,790	1,440	NA	7,987	1,624	388	208	NA	NA	NA	208	10,011	NA	9,857	61	93	233	233	316	NA	NA	155	161
1970	26,271	14,984	4,154	1,430	NA	7,306	1,686	410	237	NA	NA	NA	237	10,449	NA	10,288	66	95	259	259	343	NA	NA	171	172
1971	26,952	15,210	4,409	1,441	NA	7,175	1,760	427	262	NA	NA	NA	262	10,824	NA	10,654	72	98	290	290	366	NA	NA	182	184
1972	28,740	16,039	4,676	1,533	NA	7,469	1,890	472	282	NA	NA	NA	282	11,715	NA	11,535	79	101	312	312	393	NA	NA	195	198
1973	30,952	16,587	4,837	1,576	NA	7,600	2,009	566	301	NA	NA	NA	301	13,299	NA	13,104	90	105	344	344	421	NA	NA	210	211
1974	33,359	17,287	5,132	1,784	NA	7,572	2,160	639	320	NA	NA	NA	320	14,886	NA	14,667	105	114	394	394	474	NA	NA	239	235
1975	35,671	18,533	5,561	2,019	NA	7,878	2,400	675	348	NA	NA	NA	348	15,824	NA	15,582	118	124	432	432	534	NA	NA	272	262
1976	39,435	20,292	5,890	2,401	NA	8,671	2,619	711	369	NA	NA	NA	369	17,702	NA	17,436	131	135	480	480	592	NA	NA	300	292
1977	43,338	22,071	6,211	2,704	NA	9,523	2,893	740	394	NA	NA	NA	394	19,642	NA	19,340	155	147	569	569	662	NA	NA	337	326
1978	48,719	24,414	6,962	3,186	NA	10,107	3,329	830	443	NA	NA	NA	443	22,457	NA	22,115	182	160	679	679	727	NA	NA	364	363
1979	55,379	27,225	7,471	3,567	NA	11,354	3,848	985	482	NA	NA	NA	482	26,097	NA	25,708	215	174	785	785	791	NA	NA	386	405
1980	63,224	29,986	7,831	4,052	NA	12,752	4,335	1,017	519	NA	NA	NA	519	30,929	NA	30,476	264	189	920	920	871	NA	NA	419	452
1981	72,292	33,739	8,605	4,393	NA	14,997	4,670	1,075	581	NA	NA	NA	581	35,948	NA	35,428	314	206	1,058	1,058	967	NA	NA	463	504
1982	80,748	37,133	9,501	4,563	NA	17,061	4,879	1,129	621	NA	NA	NA	621	40,692	NA	40,105	363	224	1,207	1,207	1,095	NA	NA	534	561
1983	89,949	41,451	10,830	5,011	NA	19,095	5,210	1,306	658	NA	NA	NA	658	45,264	NA	44,588	432	244	1,357	1,357	1,220	NA	NA	595	626
1984	102,244	46,470	11,916	5,602	NA	21,657	5,748	1,548	721	NA	NA	NA	721	52,187	NA	51,404	518	265	1,514	1,514	1,351	NA	NA	654	698
1985	114,671	52,641	13,093	6,134	NA	25,333	6,388	1,694	834	NA	NA	NA	834	57,962	NA	57,043	630	289	1,743	1,743	1,491	NA	NA	713	778









TABLE 6

**U.S. R&D expenditures, by source of funds and performing sector: 1953–2022**

(Millions of current and of constant 2017 dollars)

Year	All funding sources		Federal						Nonfederal government					Business					Higher education		NPOs				
	All performers	Total	Federal intramural	FFRDC	Nonfederal government	Business	Higher education	NPO	Total	FFRDC	Nonfederal government	Business	Higher education	Total	FFRDC	Business	Higher education	NPO	Total	Higher education	Total	FFRDC	Business	Higher education	NPO
2016	531,028	120,290	32,331	19,400	259	24,587	35,308	8,405	5,084	24	372	198	4,006	366,743	196	360,398	4,121	2,028	19,065	18,728	19,846	153	1,143	6,827	11,723
2017	553,612	122,470	32,231	19,943	258	24,974	36,006	9,058	5,076	33	346	142	4,057	386,538	194	379,820	4,283	2,226	19,880	19,554	19,648	152	856	7,217	11,414
2018	590,500	128,162	35,969	20,689	263	24,628	36,900	9,714	5,135	44	334	117	4,129	416,936	189	409,814	4,481	2,431	20,519	20,204	19,748	158	1,026	7,498	11,059
2019	639,911	130,547	38,334	21,669	279	21,780	38,004	10,481	5,263	47	333	162	4,195	463,645	172	456,160	4,620	2,671	21,041	20,737	19,415	160	876	7,588	10,780
2020	680,262	140,602	39,121	22,279	283	28,252	39,320	11,348	5,386	42	330	229	4,242	493,791	170	486,067	4,590	2,944	21,408	21,113	19,076	157	932	7,430	10,544
2021 <sup>a</sup>	715,953	133,860	37,621	22,568	277	22,309	40,542	10,543	5,202	39	317	356	4,193	536,244	217	528,672	4,609	2,731	21,579	21,328	19,069	152	890	7,165	10,850
2022 <sup>b</sup>	750,649	135,482	39,806	21,886	264	23,162	40,465	9,900	5,003	33	301	350	4,040	570,358	310	562,814	4,656	2,565	21,627	21,391	18,179	131	883	6,967	10,188

NA = not available.

FFRDC = federally funded research and development center; NPO = nonprofit organization.

<sup>a</sup> Some data for 2021 are preliminary and may be revised later.<sup>b</sup> The data for 2022 are estimates and are likely to be revised later.**Note(s):**

This table reaggregates the R&D performer data in [table 2](#) according to major categories of R&D funding: federal government, nonfederal government (state and local), business, higher education, and NPOs. Business sources of R&D funding in this table include the own funds of domestic R&D-performing businesses, funds from other domestic businesses, and funds from foreign businesses. For further detail on the R&D performers listed, see [table 2](#), footnotes a–f. For detail on type-of-R&D data, see [table 3](#), footnotes b–f. Detail may not add to total because of rounding. Constant-dollar estimates are derived from unrounded data. For trend comparisons, use only the historical data reported in this table because some back-year data may have been revised. Data are based on reports by performers in the National Center for Science and Engineering Statistics annual surveys on R&D expenditures: Business Enterprise Research and Development Survey, Annual Business Survey, Higher Education Research and Development Survey, Survey of Federal Funds for Research and Development, FFRDC Research and Development Survey, and Survey of State Government Research and Development. R&D expenditures by business performers—and, before 2001, also industry-administered FFRDCs—were collected on a calendar year basis. Expenditures for other performers are calendar year approximations based on fiscal year data. (See [table 2](#), general notes.)

**Source(s):**

National Center for Science and Engineering Statistics, National Patterns of R&amp;D Resources (annual series).

TABLE 7

## U.S. basic research expenditures, by source of funds and performing sector: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All funding sources		Federal						Nonfederal government					Business					Higher education		NPOs				
	All performers	Total	Federal intramural	FFRDC	Non-federal government	Business	Higher education	NPO	Total	FFRDC	Non-federal government	Business	Higher education	Total	FFRDC	Business	Higher education	NPO	Total	Higher education	Total	FFRDC	Business	Higher education	NPO
Current \$millions																									
1953	460	265	102	36	NA	19	82	27	7	NA	NA	NA	7	154	NA	132	13	9	6	6	28	NA	NA	16	12
1954	509	291	96	45	NA	23	97	31	10	NA	NA	NA	10	169	NA	143	15	11	8	8	31	NA	NA	18	13
1955	570	318	98	62	NA	7	117	35	14	NA	NA	NA	14	192	NA	162	17	13	12	12	35	NA	NA	21	14
1956	718	392	114	89	NA	7	143	41	19	NA	NA	NA	19	251	NA	216	20	15	15	15	41	NA	NA	24	17
1957	813	451	124	110	NA	4	167	48	25	NA	NA	NA	25	268	NA	230	23	15	20	20	50	NA	NA	27	23
1958	943	537	149	115	NA	14	202	58	31	NA	NA	NA	31	292	NA	252	24	16	24	24	59	NA	NA	31	28
1959	1,087	665	165	134	NA	34	263	71	38	NA	NA	NA	38	290	NA	248	24	18	28	28	66	NA	NA	36	30
1960	1,286	794	184	150	NA	36	341	84	45	NA	NA	NA	45	343	NA	297	25	21	33	33	71	NA	NA	41	30
1961	1,511	972	230	177	NA	30	432	104	54	NA	NA	NA	54	361	NA	314	25	22	40	40	85	NA	NA	48	37
1962	1,824	1,218	252	189	NA	104	546	128	64	NA	NA	NA	64	394	NA	345	25	24	48	48	101	NA	NA	55	46
1963	2,115	1,446	285	216	NA	109	689	147	75	NA	NA	NA	75	425	NA	375	25	25	58	58	113	NA	NA	63	50
1964	2,396	1,693	339	245	NA	123	824	163	84	NA	NA	NA	84	434	NA	384	25	25	70	70	115	NA	NA	68	47
1965	2,664	1,900	375	250	NA	157	944	175	94	NA	NA	NA	94	462	NA	406	27	29	86	86	122	NA	NA	70	52
1966	2,930	2,075	410	273	NA	142	1,066	184	104	NA	NA	NA	104	512	NA	451	29	32	106	106	133	NA	NA	75	58
1967	3,168	2,280	434	301	NA	168	1,188	190	114	NA	NA	NA	114	495	NA	427	34	34	136	136	144	NA	NA	83	61
1968	3,376	2,399	482	315	NA	145	1,265	192	131	NA	NA	NA	131	537	NA	462	38	37	156	156	154	NA	NA	91	63
1969	3,491	2,457	545	313	NA	123	1,288	188	153	NA	NA	NA	153	541	NA	458	40	43	171	171	170	NA	NA	103	67
1970	3,594	2,501	562	304	NA	122	1,323	191	179	NA	NA	NA	179	531	NA	444	43	44	196	196	187	NA	NA	115	72
1971	3,720	2,559	581	289	NA	101	1,385	204	194	NA	NA	NA	194	551	NA	456	50	45	214	214	204	NA	NA	127	77
1972	3,850	2,656	603	313	NA	91	1,437	213	195	NA	NA	NA	195	565	NA	463	55	47	216	216	218	NA	NA	134	84
1973	4,099	2,847	652	382	NA	96	1,489	229	196	NA	NA	NA	196	607	NA	499	59	49	223	223	227	NA	NA	137	90
1974	4,511	3,146	715	467	NA	114	1,609	242	204	NA	NA	NA	204	656	NA	536	66	54	250	250	254	NA	NA	153	102
1975	4,875	3,415	760	533	NA	104	1,768	251	212	NA	NA	NA	212	704	NA	573	72	59	264	264	280	NA	NA	164	116
1976	5,373	3,793	850	629	NA	116	1,924	274	218	NA	NA	NA	218	774	NA	634	75	65	283	283	305	NA	NA	175	131
1977	6,008	4,235	943	746	NA	135	2,114	297	232	NA	NA	NA	232	862	NA	701	89	72	334	334	346	NA	NA	198	148
1978	6,959	4,950	1,044	1,005	NA	156	2,399	346	260	NA	NA	NA	260	970	NA	785	107	79	398	398	380	NA	NA	213	168
1979	7,836	5,558	1,112	1,160	NA	161	2,719	406	286	NA	NA	NA	286	1,107	NA	893	128	87	466	466	419	NA	NA	229	190
1980	8,747	6,147	1,212	1,294	NA	170	3,061	411	307	NA	NA	NA	307	1,286	NA	1,035	156	95	544	544	463	NA	NA	248	215
1981	9,658	6,591	1,343	1,430	NA	164	3,331	324	338	NA	NA	NA	338	1,600	NA	1,313	183	105	615	615	512	NA	NA	269	243
1982	10,651	7,121	1,522	1,503	NA	253	3,475	369	368	NA	NA	NA	368	1,854	NA	1,523	215	115	716	716	591	NA	NA	317	275
1983	11,880	7,853	1,733	1,661	NA	346	3,689	426	396	NA	NA	NA	396	2,146	NA	1,760	260	127	816	816	668	NA	NA	358	311
1984	13,332	8,651	1,877	1,854	NA	340	4,087	494	436	NA	NA	NA	436	2,584	NA	2,132	313	139	915	915	746	NA	NA	395	351
1985	14,748	9,407	1,947	1,936	NA	358	4,606	560	514	NA	NA	NA	514	2,915	NA	2,373	389	153	1,075	1,075	837	NA	NA	440	397







TABLE 7

**U.S. basic research expenditures, by source of funds and performing sector: 1953–2022**

(Millions of current and of constant 2017 dollars)

Year	All funding sources		Federal						Nonfederal government					Business					Higher education		NPOs				
	All performers	Total	Federal intramural	FFRDC	Non-federal government	Business	Higher education	NPO	Total	FFRDC	Non-federal government	Business	Higher education	Total	FFRDC	Business	Higher education	NPO	Total	Higher education	Total	FFRDC	Business	Higher education	NPO
2016	89,061	39,579	6,229	4,185	39	2,074	22,992	4,059	2,657	5	56	20	2,401	26,399	45	23,288	2,336	729	11,935	11,814	8,492	35	119	4,122	4,215
2017	90,152	39,293	6,259	4,054	41	1,853	23,349	3,738	2,660	6	55	17	2,392	26,947	38	23,644	2,417	846	12,402	12,279	8,850	30	103	4,379	4,337
2018	95,692	41,448	6,674	4,094	44	2,479	23,953	4,205	2,679	9	55	12	2,399	29,513	38	25,951	2,548	972	12,835	12,709	9,219	32	109	4,653	4,424
2019	100,965	42,830	7,069	4,327	50	2,258	24,506	4,620	2,742	10	59	15	2,437	32,759	35	28,971	2,628	1,122	13,227	13,100	9,407	32	83	4,762	4,527
2020	106,092	43,669	6,942	4,473	52	2,088	25,164	4,950	2,832	8	60	22	2,485	36,345	33	32,308	2,607	1,394	13,476	13,337	9,770	30	96	4,648	4,993
2021 <sup>a</sup>	107,634	43,014	5,992	4,542	49	2,181	26,034	4,215	2,711	7	56	36	2,473	38,690	38	34,755	2,618	1,277	13,583	13,466	9,637	27	88	4,447	5,073
2022 <sup>b</sup>	109,716	43,473	6,746	4,373	46	2,269	26,081	3,958	2,625	5	52	35	2,402	40,744	47	36,844	2,651	1,199	13,675	13,566	9,200	20	87	4,327	4,764

NA = not available.

FFRDC = federally funded research and development center; NPO = nonprofit organization.

<sup>a</sup> Some data for 2021 are preliminary and may be revised later.<sup>b</sup> The data for 2022 include estimates and are likely to be revised later.**Note(s):**

This table reaggregates the R&D performer data in [table 3](#) according to major categories of R&D funding: federal government, nonfederal government (state and local), business, higher education, and NPOs. Business sources of R&D funding in this table include the own funds of domestic R&D-performing businesses, funds from other domestic businesses, and funds from foreign businesses. For further detail on the R&D performers listed, see [table 2](#), footnotes a–f. For detail on type-of-R&D data, see [table 3](#), footnotes b–f. Detail may not add to total because of rounding. Constant-dollar estimates are derived from unrounded data. For trend comparisons, use only the historical data reported in this table because some back-year data may have been revised. Data are based on reports by performers in the National Center for Science and Engineering Statistics annual surveys on R&D expenditures: Business Enterprise Research and Development Survey, Annual Business Survey, Higher Education Research and Development Survey, Survey of Federal Funds for Research and Development, FFRDC Research and Development Survey, and Survey of State Government Research and Development. R&D expenditures by business performers—and, before 2001, also industry-administered FFRDCs—were collected on a calendar year basis. Expenditures for other performers are calendar year approximations based on fiscal year data. (See also [table 3](#), general notes.)

**Source(s):**

National Center for Science and Engineering Statistics, National Patterns of R&amp;D Resources (annual series).

TABLE 8

## U.S. applied research expenditures, by source of funds and performing sectors: 1953–2022

(Millions of current and of constant 2017 dollars)

Year	All funding sources		Federal						Nonfederal government					Business					Higher education		NPOs				
	All performers	Total	Federal intramural	FFRDC	Non-federal government	Business	Higher education	NPO	Total	FFRDC	Non-federal government	Business	Higher education	Total	FFRDC	Business	Higher education	NPO	Total	Higher education	Total	FFRDC	Business	Higher education	NPO
Current \$millions																									
1953	1,289	756	347	48	NA	288	59	14	30	NA	NA	NA	30	456	NA	438	7	11	28	28	20	NA	NA	10	10
1954	1,378	785	330	59	NA	322	60	16	32	NA	NA	NA	32	513	NA	492	8	13	28	28	21	NA	NA	10	11
1955	1,502	838	333	86	NA	339	63	18	32	NA	NA	NA	32	583	NA	560	9	14	27	27	22	NA	NA	11	11
1956	1,929	1,026	387	125	NA	430	65	20	33	NA	NA	NA	33	818	NA	794	10	14	27	27	25	NA	NA	11	14
1957	2,413	1,304	446	149	NA	624	63	23	34	NA	NA	NA	34	1,018	NA	992	12	14	27	27	31	NA	NA	11	20
1958	2,759	1,497	516	156	NA	731	66	29	35	NA	NA	NA	35	1,163	NA	1,137	12	14	27	27	37	NA	NA	12	25
1959	2,940	1,630	577	179	NA	757	78	40	37	NA	NA	NA	37	1,206	NA	1,178	13	15	28	28	39	NA	NA	12	27
1960	3,065	1,732	615	201	NA	769	93	54	39	NA	NA	NA	39	1,226	NA	1,196	13	17	29	29	40	NA	NA	12	28
1961	3,123	1,811	668	240	NA	738	104	62	40	NA	NA	NA	40	1,195	NA	1,165	13	17	30	30	48	NA	NA	13	35
1962	3,698	2,098	709	249	NA	954	119	68	41	NA	NA	NA	41	1,471	NA	1,438	14	19	30	30	58	NA	NA	13	45
1963	3,864	2,244	809	275	NA	952	128	82	42	NA	NA	NA	42	1,483	NA	1,450	14	19	32	32	63	NA	NA	14	49
1964	4,201	2,462	947	313	NA	978	142	82	45	NA	NA	NA	45	1,593	NA	1,560	14	19	37	37	65	NA	NA	18	47
1965	4,374	2,553	994	294	NA	992	176	98	46	NA	NA	NA	46	1,654	NA	1,620	13	21	42	42	79	NA	NA	27	52
1966	4,653	2,625	1,012	290	NA	986	208	129	47	NA	NA	NA	47	1,842	NA	1,804	14	24	48	48	91	NA	NA	34	57
1967	4,848	2,763	1,069	334	NA	983	238	141	46	NA	NA	NA	46	1,890	NA	1,849	16	25	54	54	96	NA	NA	36	60
1968	5,137	2,811	1,112	334	NA	956	250	160	46	NA	NA	NA	46	2,125	NA	2,081	16	28	55	55	101	NA	NA	39	62
1969	5,454	2,924	1,229	336	NA	920	257	183	48	NA	NA	NA	48	2,320	NA	2,272	16	32	54	54	109	NA	NA	43	66
1970	5,752	3,100	1,334	336	NA	952	280	199	51	NA	NA	NA	51	2,429	NA	2,378	18	33	56	56	117	NA	NA	47	70
1971	5,833	3,091	1,355	312	NA	907	306	212	61	NA	NA	NA	61	2,494	NA	2,441	19	34	67	67	121	NA	NA	47	74
1972	6,147	3,243	1,434	358	NA	845	391	216	74	NA	NA	NA	74	2,618	NA	2,562	21	35	82	82	131	NA	NA	52	79
1973	6,655	3,429	1,527	334	NA	883	450	236	88	NA	NA	NA	88	2,894	NA	2,832	26	36	100	100	145	NA	NA	62	83
1974	7,344	3,634	1,652	335	NA	905	477	266	96	NA	NA	NA	96	3,333	NA	3,263	32	39	118	118	163	NA	NA	72	91
1975	8,091	4,125	1,912	384	NA	991	550	290	113	NA	NA	NA	113	3,520	NA	3,440	39	42	141	141	192	NA	NA	92	100
1976	8,976	4,464	2,068	457	NA	1,033	596	310	127	NA	NA	NA	127	4,001	NA	3,912	45	45	166	166	218	NA	NA	109	109
1977	9,662	4,683	2,081	540	NA	1,113	626	324	134	NA	NA	NA	134	4,410	NA	4,311	51	48	194	194	241	NA	NA	121	120
1978	10,704	5,080	2,242	597	NA	1,195	676	371	151	NA	NA	NA	151	4,982	NA	4,870	61	52	232	232	259	NA	NA	128	132
1979	12,097	5,602	2,415	654	NA	1,305	793	436	161	NA	NA	NA	161	5,797	NA	5,670	71	55	263	263	273	NA	NA	129	144
1980	13,729	6,252	2,546	749	NA	1,625	912	420	174	NA	NA	NA	174	6,698	NA	6,550	88	60	308	308	298	NA	NA	140	158
1981	16,329	6,905	2,731	788	NA	2,042	953	391	199	NA	NA	NA	199	8,531	NA	8,359	108	64	363	363	332	NA	NA	159	173
1982	18,218	7,689	2,802	890	NA	2,593	1,007	398	207	NA	NA	NA	207	9,553	NA	9,363	121	69	402	402	367	NA	NA	178	189
1983	20,298	8,738	2,991	965	NA	3,227	1,122	433	215	NA	NA	NA	215	10,501	NA	10,286	141	74	443	443	401	NA	NA	194	207
1984	22,451	9,499	2,961	1,176	NA	3,677	1,226	459	234	NA	NA	NA	234	11,788	NA	11,541	168	79	491	491	438	NA	NA	212	226
1985	25,401	10,930	3,135	1,292	NA	4,717	1,296	490	262	NA	NA	NA	262	13,191	NA	12,908	198	85	547	547	471	NA	NA	224	247









TABLE 8

**U.S. applied research expenditures, by source of funds and performing sectors: 1953–2022**

(Millions of current and of constant 2017 dollars)

Year	All funding sources		Federal						Nonfederal government					Business					Higher education		NPOs				
	All performers	Total	Federal intramural	FFRDC	Non-federal government	Business	Higher education	NPO	Total	FFRDC	Non-federal government	Business	Higher education	Total	FFRDC	Business	Higher education	NPO	Total	Higher education	Total	FFRDC	Business	Higher education	NPO
2016	111,423	36,725	9,981	7,603	213	5,422	9,690	3,816	1,757	10	305	46	1,179	60,484	85	58,279	1,213	906	5,073	4,922	7,385	67	250	1,829	5,240
2017	113,334	38,264	10,124	7,868	208	5,386	9,987	4,692	1,765	15	279	33	1,219	60,772	91	58,429	1,259	979	5,328	5,184	7,205	72	193	1,911	5,022
2018	115,666	39,289	10,862	8,219	210	5,236	10,214	4,548	1,786	21	267	23	1,257	62,124	88	59,652	1,323	1,045	5,489	5,353	6,977	73	186	1,956	4,755
2019	125,207	40,527	10,830	8,725	216	5,044	10,542	5,168	1,822	22	258	40	1,286	70,531	80	67,955	1,384	1,095	5,637	5,511	6,690	74	201	1,986	4,420
2020	125,756	41,276	10,964	8,905	213	5,604	10,938	4,652	1,829	19	249	79	1,290	70,926	78	68,436	1,359	1,038	5,730	5,625	5,995	72	249	1,945	3,719
2021 <sup>a</sup>	130,690	38,313	10,100	9,029	210	3,168	11,197	4,609	1,744	19	241	129	1,262	79,242	107	76,926	1,339	859	5,738	5,658	5,652	75	265	1,891	3,413
2022 <sup>b</sup>	135,563	39,049	11,273	8,860	203	3,279	11,107	4,328	1,674	19	231	126	1,210	83,721	181	81,381	1,342	807	5,717	5,642	5,402	77	263	1,850	3,204

NA = not available.

FFRDC = federally funded research and development center; NPO = nonprofit organization.

<sup>a</sup> Some data for 2021 are preliminary and may be revised later.<sup>b</sup> The data for 2022 include estimates and are likely to be revised later.**Note(s):**

This table reaggregates the R&D performer data in [table 4](#) according to major categories of R&D funding: federal government, nonfederal government (state and local), business, higher education, and NPOs. Business sources of R&D funding in this table include the own funds of domestic R&D-performing businesses, funds from other domestic businesses, and funds from foreign businesses. For further detail on the R&D performers listed, see [table 2](#), footnotes a–f. For detail on type-of-R&D data, see [table 3](#), footnotes b–f. Detail may not add to total because of rounding. Constant-dollar estimates are derived from unrounded data. For trend comparisons, use only the historical data reported in this table because some back-year data may have been revised. Data are based on reports by performers in the National Center for Science and Engineering Statistics annual surveys on R&D expenditures: Business Enterprise Research and Development Survey, Annual Business Survey, Higher Education Research and Development Survey, Survey of Federal Funds for Research and Development, FFRDC Research and Development Survey, and Survey of State Government Research and Development. R&D expenditures by business performers—and, before 2001, also industry-administered FFRDCs—were collected on a calendar year basis. Expenditures for other performers are calendar year approximations based on fiscal year data. (See also [table 4](#), general notes.)

**Source(s):**

National Center for Science and Engineering Statistics, National Patterns of R&amp;D Resources (annual series).









TABLE 9

**U.S. experimental development expenditures, by source of funds and performing sector: 1953–2022**

(Millions of current and of constant 2017 dollars)

Year	All funding sources		Federal						Nonfederal government					Business					Higher education		NPOs				
	All performers	Total	Federal intramural	FFRDC	Nonfederal government	Business	Higher education	NPO	Total	FFRDC	Nonfederal government	Business	Higher education	Total	FFRDC	Business	Higher education	NPO	Total	Higher education	Total	FFRDC	Business	Higher education	NPO
2016	330,544	43,987	16,122	7,612	7	17,090	2,626	529	671	8	11	132	427	279,861	65	278,832	572	392	2,057	1,992	3,969	51	773	876	2,268
2017	350,126	44,912	15,848	8,021	9	17,736	2,670	628	651	11	12	92	447	298,820	64	297,747	607	401	2,150	2,091	3,593	51	560	927	2,055
2018	379,141	47,425	18,433	8,375	9	16,914	2,733	961	670	15	12	83	474	325,298	63	324,210	611	413	2,195	2,142	3,553	53	731	889	1,880
2019	413,741	47,190	20,434	8,616	13	14,478	2,956	693	699	16	15	107	472	360,355	57	359,234	609	454	2,177	2,125	3,319	53	593	840	1,833
2020	448,414	55,656	21,215	8,900	18	20,560	3,218	1,746	725	14	21	128	467	386,520	59	385,324	624	512	2,202	2,151	3,312	55	587	837	1,832
2021 <sup>a</sup>	477,628	52,531	21,529	8,996	18	16,958	3,311	1,718	747	13	20	191	458	418,312	72	416,992	652	595	2,258	2,204	3,779	51	537	827	2,364
2022 <sup>b</sup>	505,369	52,959	21,787	8,652	15	17,613	3,278	1,614	704	9	17	189	428	445,894	82	444,590	663	559	2,235	2,184	3,577	35	532	790	2,220

NA = not available.

FFRDC = federally funded research and development center; NPO = nonprofit organization.

<sup>a</sup> Some data for 2021 are preliminary and may be revised later.<sup>b</sup> The data for 2022 include estimates and are likely to be revised later.**Note(s):**

This table reaggregates the R&D performer data in [table 5](#) according to major categories of R&D funding: federal government, nonfederal government (state and local), business, higher education, and NPOs. Business sources of R&D funding in this table include the own funds of domestic R&D-performing businesses, funds from other domestic businesses, and funds from foreign businesses. For further detail on the R&D performers listed, see [table 2](#), footnotes a–f. For detail on type-of-R&D data, see [table 3](#), footnotes b–f. Detail may not add to total because of rounding. Constant-dollar estimates are derived from unrounded data. For trend comparisons, use only the historical data reported in this table because some back-year data may have been revised. Data are based on reports by performers in the National Center for Science and Engineering Statistics annual surveys on R&D expenditures: Business Enterprise Research and Development Survey, Annual Business Survey, Higher Education Research and Development Survey, Survey of Federal Funds for Research and Development, FFRDC Research and Development Survey, and Survey of State Government Research and Development. R&D expenditures by business performers—and, before 2001, also industry-administered FFRDCs—were collected on a calendar year basis. Expenditures for other performers are calendar year approximations based on fiscal year data. (See also [table 5](#), general notes.)

**Source(s):**

National Center for Science and Engineering Statistics, National Patterns of R&amp;D Resources (annual series).



TABLE 10
U.S. R&D expenditures, by state, performing sector, and source of funds: 2021
(Millions of current dollars)

Table with 23 columns: State, R&D Rank, All performers, Federal, FFRDCs, Business, Higher education, NPOs, State internal, GDP, GDP rank, R&D intensity. Rows include U.S. total, States total, and individual states from Alabama to Nevada.

TABLE 10

## U.S. R&amp;D expenditures, by state, performing sector, and source of funds: 2021

(Millions of current dollars)

State	R&D Rank <sup>d</sup>	All performers	Federal	FFRDCs			Business				Higher education <sup>a</sup>						NPOs	State, internal <sup>b</sup>	GDP	GDP rank	R&D intensity <sup>c,d</sup>		
		All funding sources	Federal	Total	Federal	Nonfederal <sup>e</sup>	Total	Own	Paid by others		Total	Federal	Other government	Business	Higher education	NPO	Other	Total			Total	Percent	Rank
									Nonfederal <sup>f</sup>	Federal													
New Hampshire	31	3,701	19	0	0	0	3,183	1,461	332	1,391	499	253	9	13	191	23	10	D	*	99,100	39	3.73	11
New Jersey	6	27,749	1,057	116	114	2	25,049	20,091	4,863	95	1,353	702	108	65	295	120	63	171	3	692,227	9	4.01	10
New Mexico	22	9,748	1,025	6,535	6,476	59	1,693	1,351	28	314	473	333	31	8	78	16	7	21	2	111,731	38	8.72	1
New York	4	38,224	223	638	620	18	26,319	23,939	1,746	634	7,577	4,065	425	498	1,744	542	303	3,207	259	1,911,346	3	2.00	28
North Carolina	11	20,281	384	0	0	0	15,490	9,812	5,537	140	3,504	2,088	175	311	675	208	46	886	17	659,529	11	3.08	14
North Dakota	46	693	42	0	0	0	343	330	10	2	308	101	79	10	110	1	7	D	*	63,209	46	1.10	40
Ohio	12	16,734	1,108	0	0	0	11,545	7,814	2,911	820	2,788	1,595	71	193	766	122	42	1,292	2	759,626	7	2.20	27
Oklahoma	35	2,907	1,139	0	0	0	1,056	969	33	54	623	255	61	37	252	13	4	87	3	217,731	31	1.34	35
Oregon	15	12,570	287	0	0	0	11,292	10,954	230	107	929	627	57	50	129	49	17	45	16	275,444	24	4.56	7
Pennsylvania	9	23,818	442	120	120	0	17,555	14,541	2,725	290	4,935	2,794	105	341	1,327	260	107	758	8	844,392	6	2.82	15
Rhode Island	37	1,715	273	0	0	0	837	689	28	121	426	290	13	7	88	22	4	171	8	67,237	45	2.55	20
South Carolina	34	2,984	148	192	189	2	1,857	1,601	131	125	753	366	38	42	272	24	12	7	28	271,495	25	1.10	39
South Dakota	50	345	24	0	0	0	221	213	7	1	101	47	19	2	20	3	9	0	*	62,607	47	0.55	51
Tennessee	25	7,922	1,124	1,761	1,747	14	2,776	1,802	902	72	1,630	863	35	94	567	56	14	631	1	438,180	17	1.81	31
Texas	5	37,256	900	6	5	0	28,264	24,495	2,735	1,035	6,850	2,872	930	478	1,873	418	279	1,234	3	2,087,491	2	1.78	33
Utah	28	5,196	209	0	0	0	3,962	3,730	170	62	994	635	28	49	235	36	10	26	5	232,125	28	2.24	26
Vermont	48	679	14	0	0	0	456	434	0 - 23	0 - 23	198	106	1	2	74	9	6	10	1	37,594	51	1.81	32
Virginia	13	14,789	2,066	1,728	1,698	29	8,179	6,330	506	1,342	1,942	877	131	83	681	95	75	858	17	613,920	13	2.41	24
Washington	2	53,969	365	1,168	1,143	25	49,083	47,644	1,250	190	1,881	1,243	73	65	220	230	50	1,451	21	688,632	10	7.84	3
West Virginia <sup>j</sup>	45	831	43	9	9	0	522	435	12	74	231	107	13	5	83	7	17	22	3	86,510	42	0.96	44
Wisconsin	23	9,011	64	0	0	0	6,781	5,723	997	61	1,771	831	157	60	529	147	47	390	4	369,032	21	2.44	23
Wyoming	51	238	49	0	0	0	93	88	2	2	93	54	5	6	26	2	0	0	3	42,176	50	0.57	49
U.S. undistributed <sup>k</sup>	na	5,725	4,912	0	0	0	780	712	0 - 68	0 - 68	0	0	0	0	0	0	0	0	0	0	na	na	na
Puerto Rico	na	692	29	0	0	0	539	519	NA	NA	124	85	3	5	30	1	0	0	na	111,067	na	na	na
Other <sup>k</sup>	na	150	117	0	0	0	0	0	0	0	34	28	4	0.17	1	0.31	0	0	na	11,276	na	na	na

\* amount &gt; \$0.5 million; D = suppressed for data quality; na = not applicable; NA = not available.

FFRDC = federally funded R&amp;D center; GDP = gross domestic product; NPO = nonprofit organization.

<sup>a</sup> State-level higher education R&D data have not been adjusted to eliminate the double counting of funds passed through from an academic institution to subrecipients (other academic institutions, businesses, NPOs, and others). At the national level, funds passed through to such subrecipients accounted for 8% of total R&D expenditures reported by higher education institutions in FY 2021.<sup>b</sup> Internal performers include state agency and department employees and services performed by others in support of an internal R&D project.<sup>c</sup> R&D intensity is the ratio of total R&D performed in a state to its state GDP.

<sup>d</sup> Ranks are based on the point estimates for state R&D and do not consider sampling error, suppression, or the undistributed R&D.

<sup>e</sup> Nonfederal sources of R&D expenditures reported by FFRDCs in FY 2021 included state and local governments, business, NPOs, and other sources.

<sup>f</sup> R&D paid for by nonfederal sources included funding from other companies located inside or outside the United States; U.S. state government agencies; U.S. universities, colleges, and academic researchers; foreign universities, colleges, and academic researchers; and organizations located inside or outside the United States.

<sup>g</sup> U.S. R&D totals as reported by the NCSSES *National Patterns of R&D Resources* series, 2021–22 edition. (See tables 1–9 in this report.)

<sup>h</sup> The states totals differ from U.S. totals for several reasons: (1) some R&D expenditures cannot be allocated to any 1 of the 50 states or the District of Columbia; (2) data are not available to allocate the portion of business R&D performed by companies with fewer than 10 employees (\$6.1 billion in 2021) by state; (3) the state-level higher education data have not been adjusted to eliminate the double counting of funds passed through to other performers; (4) state-level R&D data are not converted from fiscal years to calendar years, and (5) State-level data for nonprofit organizations in Delaware, New Hampshire, and North Dakota are suppressed for data quality. The suppressed values of U.S R&D expenditures at nonprofit organizations in these states total \$32 million but are treated as zero in the calculation of the state totals for all performers and all funding sources. Therefore, the overall states' total of U.S R&D expenditures at nonprofit organizations underestimates the U.S. total by this amount. Underestimation for state-level totals of U.S R&D expenditures at nonprofit organizations for each of these three states is less than \$32 million.

<sup>i</sup> Federal total excludes \$31.4 billion in federally funded R&D performed by others.

<sup>j</sup> FFRDC performance in West Virginia represents Green Bank Observatory. While Green Bank Observatory was split from the National Radio Astronomy Observatory on 1 October 2016, with each retaining FFRDC status, Green Bank Observatory was separately measured for the first time in FY 2021.

<sup>k</sup> R&D expenditures that could not be assigned to any of the 50 states or the District of Columbia.

<sup>l</sup> GDP and R&D expenditures reported for outlying areas (Guam, U.S. Virgin Islands, American Samoa) and offices abroad but excluding Puerto Rico.

**Note(s):**

Business R&D data refer to calendar years; the data for the other R&D performers refer to fiscal years but are used here as approximations to calendar year data.

**Source(s):**

National Center for Science and Engineering Statistics, National Patterns of R&D Resources (annual series). State GDP data are from the U.S. Bureau of Economic Analysis, <https://www.bea.gov/data/gdp/gdp-state>, accessed 14 November 2023.

## Technical Notes

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### Overview of 2021–22 Data Update

*National Patterns of R&D Resources* provides current data on the levels and key trends of the performance and funding of R&D in the United States, with comparisons to the historical record (back to 1953). Detail is also provided for the U.S. total and by performer according to the types of R&D conducted (i.e., basic research, applied research, and experimental development).

### Key Information on Publication Series

*Report frequency.* Reports in this series are typically published annually.

*Current reference period.* Data from 1953 to 2022 are provided for almost all variables. The data for 2022 are estimates and not previously reported in this series. The data for 2021 are revised from the previous edition (2020–21) of this series. The data for 1953–2020 reflect final survey data but may still include some further (typically minor) revisions.

### Survey Data Sources for National Patterns

The *National Patterns* statistics draw primarily from NCSES's annual national surveys of the R&D expenditures and funding of the organizations that perform the bulk of U.S. R&D. These organizations include the business sector, federal and nonfederal government, higher education, and nonprofit organizations. Each of these sectors is summarized—including links to other sections of the NCSES website with specifics on survey coverage, variables collected, and survey or sampling implementation—in the sections below.

#### Business Sector

For 2019–21, annual data on the R&D performed in the domestic United States by the business sector come from the NCSES [Business Enterprise Research and Development \(BERD\) Survey](#), covering companies with 10 or more employees, and the [Annual Business Survey \(ABS\)](#), covering companies with 9 or fewer employees. BERD and ABS are conducted for NCSES by the Census Bureau in accordance with an agreement between the two agencies. BERD is a sample survey representing for-profit, publicly or privately held companies with 10 or more employees in the United States that performed or funded R&D either domestically or abroad in the manufacturing, mining, utilities, wholesale trade, transportation, information, or services industries. ABS is a sample survey of for-profit employer companies with a U.S. presence engaged in the mining, utilities, construction, manufacturing, wholesale trade, retail trade, or services industries. For the R&D statistics presented in this report, the ABS covers only businesses in the manufacturing, wholesale, and information sectors and the scientific R&D services industries with 1–9 employees.

For 2017 and 2018, the source of the data for companies with 10 or more employees was the Business R&D Survey (BRDS), a predecessor to the BERD Survey, with similar survey characteristics and coverage. ABS was again the source of data on companies with 9 or fewer employees in both of these years.

From 2008 to 2016, the primary source data on business R&D was the NCSES Business R&D and Innovation Survey (BRDIS), a predecessor of both BERD and BRDS. In a salient difference, BRDIS was designed to be nationally representative of all for-profit companies with 5 or more employees. In 2016, a companion survey, the [Business R&D and Innovation Survey—Microbusiness \(BRDI-M\)](#), provided statistics on the R&D activities that year of businesses with 1–4 employees. Prior to the 2016 data year, statistics on the R&D of these “micro” businesses (\$4 billion–\$5 billion annually) were neither available nor reported in the business R&D totals in *National Patterns*.

As noted, BERD, BRDS, and BRDIS are related surveys. With regard to R&D, the topical coverage has been similar: R&D performance (in the United States and worldwide); total and R&D employment (in the United States and worldwide); sources of R&D funding; type of R&D activities (basic research, applied research, development); type of R&D costs; R&D capital expenditures; R&D application and technology focus areas; geographic location (within the United States and in foreign countries); sales (in the United States and worldwide); and patenting, licensing, other technology transfer activities. The ABS and BRDI-M surveys provided R&D performance and funding data compatible with those for the larger companies.

For 2007 and earlier years, the data come from the NCSES Survey of Industrial Research and Development (SIRD), the predecessor to BRDIS. SIRD was also a sample survey, conducted annually (1953–2007), that provided national estimates of the R&D performed within the United States by industrial firms, whether U.S. or foreign owned. The SIRD target population consisted (same as BRDIS) of all for-profit companies with 5 or more employees, manufacturing and nonmanufacturing, that performed R&D in the United States. Data on the R&D of companies with fewer than 5 employees were not available throughout this period.

(Note: Data on business intramural R&D capital, as reported by BRDIS and its follow-on surveys, are not included as a component in the *National Patterns* total of business intramural R&D.)

## Federal Government

Federal intramural R&D. Data on the intramural R&D performed by the federal government come from the NCSES [Survey of Federal Funds for Research and Development](#) (Federal Funds Survey), which is completed annually by all federal agencies conducting R&D programs (approximately 33 federal departments or independent agencies). The Federal Funds Survey data provide intramural R&D totals as outlays and obligations on a federal fiscal year basis. The obligations data are further detailed by federal agency, performer, type of R&D, geographical area, and field of science and engineering. (Note: Data on federal intramural R&D plant reported by the Federal Funds Survey are not included as a component in the *National Patterns* total of federal intramural R&D.)

Federally funded R&D centers (FFRDCs). The nation's FFRDCs are a second venue of federal R&D performance. (For the 2021–22 edition of *National Patterns*, there were 43 FFRDCs, although the number can change from year to year; NCSES maintains a Master Government List of the population of FFRDCs, which it regularly updates: <https://www.nsf.gov/statistics/ffrdclist/>.) FFRDCs are R&D-performing organizations administered by an industrial firm, a university, a nonprofit institution, or a consortium but that have funding exclusively or substantially from the federal government. An FFRDC is operated to provide R&D capability to serve an agency's mission objectives or, in some cases, to provide major facilities at universities for research and training purposes. Since FY 2001, NCSES's [FFRDC Research and Development Survey](#) (known previously as the Survey of Research and Development Expenditures at FFRDCs) has provided annual data (by federal fiscal year) on the R&D expenditures (with additional detail) of all the nation's FFRDCs. Prior to FY 2001, R&D expenditure data for the FFRDCs were collected as part of the major performer surveys: the Survey of R&D Expenditures at Universities and Colleges (for university-administered FFRDCs), the SIRD (for industry-administered FFRDCs), and the Federal Funds Survey (for nonprofit-administered FFRDCs).

## Nonfederal Government

The category of nonfederal government R&D performance included in *National Patterns* is the intramural R&D of state governments (i.e., the R&D performance of state agency and department employees and the services performed by others in support of internal R&D projects). Data on this state intramural R&D come from the NCSES [Survey of State Government Research and Development](#). This state survey is a comparatively recent NCSES initiative, with the first data year in FY 2006.

In addition, the BERD, FFRDC, and [Higher Education Research and Development \(HERD\)](#) Surveys (see above and below) provide detail on R&D funding by nonfederal governments other than just state governments.

## Higher Education Institutions

For academic FY 2010 and onward, data on the R&D performed in higher education come from the NCSES [HERD Survey](#). HERD is an annual census of universities and colleges that grant a bachelor's degree or higher and expend at least \$150,000 in separately accounted-for R&D during the fiscal year of these academic institutions. The survey collects information on R&D expenditures by field of research, source of funds, and type of R&D, as well as on head counts of R&D personnel.

The HERD Survey replaced the earlier [Survey of Research and Development Expenditures at Universities and Colleges](#). For data years FY 2009 and earlier, the Universities and Colleges Survey provides the data on academic R&D.

## Nonprofit Organizations

This sector refers to R&D performed in the United States by nonprofit organizations other than government or academia. The most recent data on nonprofit organization R&D come from the NCSES FYs 2021–22 [Nonprofit Research Activities \(NPRO\) module of the Annual Business Survey](#) and the 2016 NPRO Survey. Data for 2017–19 are estimated based on the 2016 NPRO Survey and NPRO 2021 Survey revisions to 2020 data. The 1998–2015 data for nonprofit organization R&D funded by the federal government come from the NCSES annual Survey of Federal Funds for Research and Development; data for nonprofit organization R&D funded by businesses and by the nonprofit sector itself for that period are estimated based on parameters from the 1996–97 [Survey of Research and Development Funding and Performance by Nonprofit Organizations](#), which was also conducted in 1973. Data for years prior to 1973 come from earlier *National Patterns* reports (which reflect, in part, surveys in 1957 and 1960).

## Statistics on the U.S. Economy

Some of the trend analyses in *National Patterns* draw on National Income and Product Accounts data (e.g., U.S. gross domestic product [GDP], state domestic product) assembled by the U.S. Bureau of Economic Activity (BEA). For details on this U.S. economic data, see <https://www.bea.gov/data/gdp>.

In keeping with international conventions, U.S. R&D expenditures in current dollars are adjusted for inflation based on BEA's implicit GDP price deflator.

## Methodology

The *National Patterns* statistical picture of the U.S. R&D system is developed from integration of primary data from NCSES sectoral R&D surveys. Adjustments to the primary data are needed in some cases to increase their consistency.

Furthermore, preliminary or otherwise estimated values may be used (and later revised) where final data from one or more of the surveys are not yet available but can reasonably be approximated.

Key features of the methodology include the following:

- Data from the NCSES business R&D surveys (BERD, BRDS, BRDIS, ABS, BRDI-M, SIRD) have been reported on a calendar year basis and are incorporated directly in the *National Patterns* totals. Data from the Federal Funds Survey and the FFRDC Research and Development Survey are reported on a federal fiscal year basis (1 October–30 September the next year) and are adjusted to the calendar year for *National Patterns* integration. The data from the HERD Survey are reported on an academic fiscal year basis (typically, 1 July–30 June the next year) and converted to calendar year. Data from the Survey of State Government R&D are reported according to each state's fiscal year and are also converted to calendar year (presuming that 1 July–30 June the next year is typical).

- NCSES annual surveys of business R&D (particularly BRDIS and SIRD) had long covered the population of private sector companies with 5 or more employees. Inclusion of the BRDI-M data in the *National Patterns* data on business R&D totals in 2016 expanded the covered population to include companies with 1–4 employees, thereby adding \$4.8 billion of R&D to the total reported by BRDIS. BRDS data in 2017 and 2018 and subsequently BERD data from 2019 on covered the population of companies with 10 or more employees. Starting in 2017, ABS data covered companies with 1–9 employees in the *National Patterns* reported business R&D totals, accounting for \$5.7 billion in 2017 and \$6.1 billion in 2021.
- The method for estimating the type of R&D (i.e., basic research, applied research, experimental development) in the business sector was revised for 1998 and later years. This change resulted in a net decrease in the proportion of business R&D classified as basic research. Accordingly, the data for 1998 and later years are not directly comparable with data for 1997 and earlier years. The transition to BRDIS (data series starting in 2008) does not appear to have introduced further discontinuities in the type-of-R&D estimates. For universities and colleges, the type-of-R&D estimation method was revised in 1998 and again in 2010. Hence, the latest data for higher education are also not directly comparable to those reported in earlier years.
- Estimates of the type of R&D by source of funding are based on survey responses for federal funding by type of R&D and modeled using nonfederal funding sources of total R&D and the total nonfederally funded R&D by type. Because of this estimation procedure, comparisons of R&D type by funding source are not supported by statistical testing. *National Patterns* of R&D uses the general term “estimates” to describe survey estimates, modeled estimates, and projections. Results that combine these techniques are also called estimates because survey estimates are their major component.
- The data for higher education in 2003 and later years include both science and engineering (S&E) and non-S&E fields. Prior to 2003, only S&E fields are included. Non-S&E R&D was \$1.4 billion in FY 2003 and \$5.9 billion in FY 2022. Similarly, for the business sector, social science R&D was not included until the 2008 data year, when it was \$0.8 billion of the \$290.7 billion business R&D total.
- The data for higher education R&D have included, since 1998, a net-out adjustment for R&D funds reported by academic institutions as passed through to other academic subrecipients. This adjustment was recently expanded (back to 1998) to also include pass-throughs to all noneducational recipients (i.e., businesses, nonprofit organizations, and others). The effect of this expanded adjustment is that the annual totals of higher education R&D performance are about \$0.4 billion lower in 1998, the first year for this adjustment, to about \$2.5 billion lower annually in 2012–15 than previously have been reported in *National Patterns*. In addition, for the 2010–22 survey years, this more comprehensive pass-through funding adjustment has been further improved by tabulating the adjustments on an institution-by-institution basis, which allows for a more precise estimate of the original nonfederal sources of pass-through funds and better estimation of the type of R&D (basic, applied, or experimental development) being passed through to other R&D performers.
- Data on federally funded R&D discussed in this report were derived from surveys of organizations that perform R&D, such as companies, universities, and FFRDCs. In the past, these amounts differed substantially from the R&D that federal agencies had reported funding. For example, in 2009, federal agencies reported obligating \$141 billion for R&D funding to all R&D performers (including \$53 billion to the business sector), compared with an estimated \$127 billion in federal funding reported by all performers of R&D that year (\$40 billion by businesses). More recently, with improvements in the methods for the survey of federal funding and adoption of revised R&D definitions, this effect has become less apparent.

- From 2016 forward, the data on federal intramural R&D explicitly exclude expenditures for pre-production development. (Pre-production development is nonexperimental work on a product or system before it goes into full production, e.g., activities and programs that are categorized as operational system development in the Department of Defense's Research, Development, Test and Evaluation [RDT&E] budget activity structure.) This change aligns the federal intramural data with a recent change introduced in the definition of R&D by the U.S. Office of Management and Budget. In FYs 2016–18, pre-production development for federal intramural R&D totaled between \$5 billion and \$7 billion each year.

Additional details on methodology and technical issues pertaining to specific variables are provided in the notes on each table. For further information about compiling the *National Patterns* statistics, contact the report's author.

## Definitions

*R&D performers and funders.* The U.S. R&D system consists of the R&D activities of differing performers and sources of funding for these activities. The main categories of R&D performers tracked by NCSES are businesses; federal agencies; FFRDCs (administered by businesses, universities, or nonprofit organizations); nonfederal government agencies (specifically those of the 50 states and the District of Columbia); higher education; and nonprofit organizations. For R&D funding, the main categories are businesses; the federal government; nonfederal government (state, regional, local); higher education; and nonprofit organizations. Organizations that perform R&D often receive significant levels of outside funding; R&D funders may also be significant performers.

*Type of R&D.* As defined by the Organisation for Economic Co-operation and Development's *Frascati Manual* (in seven editions since the early 1960s), R&D spans three main types of activities:

*Basic research:* Experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view.

*Applied research:* Original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific, practical aim or objective.

*Experimental development:* Systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or improving existing products or processes.<sup>1</sup>



## Notes

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1 Organisation for Economic Co-operation and Development (OECD). 2015. *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development*. Page 45. Paris: OECD Publishing. Available at <https://www.oecd.org/publications/frascati-manual-2015-9789264239012-en.htm>.

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