



National Center for Science and  
Engineering Statistics

# Federal R&D Funding, by Budget Function: Fiscal Years 2020–22

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## Errata

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### APRIL 2022

In [table 25](#), data were transposed for the categories “Note: R&D funds” and “Total for all socioeconomic categories” for the years 2020, 2021 preliminary, and 2022 proposed. The table has been corrected.

## General Notes

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This report provides data on the budget authority conferred to U.S. federal agencies to fund the research and development and R&D plant components of their programs in FYs 2020–22. *Budget authority* is the primary source of legal authorization to enter into obligations that result in outlays. Budget authority is most commonly granted in the form of appropriations by the congressional committees assigned to determine the budget for each function. These technical notes cover the main features of the new R&D budget authority data documented in this report.

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TABLE 1

**Federal budget authority for R&D and R&D plant, by budget function, ordered by FY 2020 R&D and R&D plant total: FYs 2020–22**

(Millions of dollars and percent change)

Budget function	2020 actual <sup>a</sup>	2021 preliminary <sup>a</sup>	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	169,901	165,560	179,418	-2.6	8.4
National defense	81,874	79,584	78,704	-2.8	-1.1
Health	44,431	43,471	51,138	-2.2	17.6
Space flight, research, and supporting activities	14,206	12,594	13,842	-11.3	9.9
General science and basic research	13,659	13,800	15,445	1.0	11.9
Energy	4,539	4,537	6,533	-0.0	44.0
Natural resources and environment	2,879	2,899	3,830	0.7	32.1
Agriculture	2,674	2,655	3,245	-0.7	22.2
Transportation	1,712	1,704	1,989	-0.4	16.7
Veterans benefits and services	1,366	1,420	1,498	4.0	5.5
Commerce and housing credit	1,008	1,127	1,300	11.8	15.4
Education, training, employment, and social services	581	767	819	32.0	6.8
Administration of justice	522	567	606	8.5	6.9
International affairs	226	226	226	0.0	0.0
Income security	106	90	90	-15.1	0.0
Community and regional development	97	99	133	2.1	34.3
Medicare	20	20	20	0.0	0.0
R&D	163,875	161,412	174,787	-1.5	8.3
National defense	79,389	78,609	77,762	-1.0	-1.1
Health	43,936	43,199	50,816	-1.7	17.6
Space flight, research, and supporting activities	14,158	12,542	13,794	-11.4	10.0
General science and basic research	11,620	11,683	13,344	0.5	14.2
Energy	4,391	4,433	6,257	0.9	41.1
Natural resources and environment	2,653	2,654	3,339	0.0	25.8
Agriculture	2,332	2,469	3,050	5.9	23.5
Transportation	1,674	1,672	1,951	-0.1	16.7
Veterans benefits and services	1,366	1,420	1,498	4.0	5.5
Commerce and housing credit	858	1,015	1,128	18.3	11.1
Education, training, employment, and social services	527	733	783	39.1	6.8
Administration of justice	522	548	597	4.9	9.0
International affairs	226	226	226	0.0	0.0
Income security	106	90	90	-15.1	0.0
Community and regional development	97	99	133	2.1	34.3
Medicare	20	20	20	0.0	0.0
R&D plant	6,026	4,148	4,632	-31.2	11.7
National defense	2,485	975	942	-60.8	-3.4
Health	495	272	322	-45.1	18.4
Space flight, research, and supporting activities	48	52	48	8.3	-7.7
General science and basic research	2,039	2,116	2,102	3.8	-0.7
Energy	147	104	276	-29.2	164.6
Natural resources and environment	227	246	491	8.4	99.9
Agriculture	343	186	195	-45.8	5.2
Transportation	38	32	38	-16.1	18.8
Veterans benefits and services	0	0	0	-	-
Commerce and housing credit	150	112	172	-25.3	53.6
Education, training, employment, and social services	54	34	36	-37.0	5.9
Administration of justice	0	19	9	-	-52.6

TABLE 1

**Federal budget authority for R&D and R&D plant, by budget function, ordered by FY 2020 R&D and R&D plant total: FYs 2020–22**

(Millions of dollars and percent change)

Budget function	2020 actual <sup>a</sup>	2021 preliminary <sup>a</sup>	2022 proposed	2020–21 (% change)	2021–22 (% change)
International affairs	0	0	0	-	-
Income security	0	0	0	-	-
Community and regional development	0	0	0	-	-
Medicare	0	0	0	-	-

<sup>a</sup> Agencies in several functions received emergency COVID-19 funding for R&D and/or R&D plant in FY 2020 and FY 2021. This funding may be included in the data in this table, although this is not clear in all cases.

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data. The data for each of the years reflects the application of the narrowed definition of development described by the Office of Management and Budget (OMB) in its Circular A-11 of July 2016.

**Source(s):**

Agencies' submissions to OMB per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 2

**Distribution of federal budget authority for R&D and R&D plant, by budget function: FYs 2020–22**

(Percent distribution)

Budget function	2020 actual <sup>a</sup>	2021 preliminary <sup>a</sup>	2022 proposed
R&D and R&D plant	100.0	100.0	100.0
National defense	48.2	48.1	43.9
Health	26.2	26.3	28.5
Space flight, research, and supporting activities	8.4	7.6	7.7
General science and basic research	8.0	8.3	8.6
Energy	2.7	2.7	3.6
Natural resources and environment	1.7	1.8	2.1
Agriculture	1.6	1.6	1.8
Transportation	1.0	1.0	1.1
Veterans benefits and services	0.8	0.9	0.8
Commerce and housing credit	0.6	0.7	0.7
Education, training, employment, and social services	0.3	0.5	0.5
Administration of justice	0.3	0.3	0.3
International affairs	0.1	0.1	0.1
Income security	0.1	0.1	0.1
Community and regional development	0.1	0.1	0.1
Medicare	*	*	*
R&D	100.0	100.0	100.0
National defense	48.4	48.7	44.5
Health	26.8	26.8	29.1
Space flight, research, and supporting activities	8.6	7.8	7.9
General science and basic research	7.1	7.2	7.6
Energy	2.7	2.7	3.6
Natural resources and environment	1.6	1.6	1.9
Agriculture	1.4	1.5	1.7
Transportation	1.0	1.0	1.1
Veterans benefits and services	0.8	0.9	0.9
Commerce and housing credit	0.5	0.6	0.6
Education, training, employment, and social services	0.3	0.5	0.4
Administration of justice	0.3	0.3	0.3
International affairs	0.1	0.1	0.1
Income security	0.1	0.1	0.1
Community and regional development	0.1	0.1	0.1
Medicare	*	*	*
R&D plant	100.0	100.0	100.0
National defense	41.2	23.5	20.3
Health	8.2	6.6	7.0
Space flight, research, and supporting activities	0.8	1.3	1.0
General science and basic research	33.8	51.0	45.4
Energy	2.4	2.5	6.0
Natural resources and environment	3.8	5.9	10.6
Agriculture	5.7	4.5	4.2
Transportation	0.6	0.8	0.8
Veterans benefits and services	0.0	0.0	0.0
Commerce and housing credit	2.5	2.7	3.7
Education, training, employment, and social services	0.9	0.8	0.8
Administration of justice	0.0	0.5	0.2
International affairs	0.0	0.0	0.0
Income security	0.0	0.0	0.0
Community and regional development	0.0	0.0	0.0



TABLE 2

**Distribution of federal budget authority for R&D and R&D plant, by budget function: FYs 2020–22**

(Percent distribution)

Budget function	2020 actual <sup>a</sup>	2021 preliminary <sup>a</sup>	2022 proposed
Medicare	0.0	0.0	0.0

\* = value less than 0.05%.

<sup>a</sup> Agencies in several functions received emergency COVID-19 funding for R&D and/or R&D plant in FY 2020 and FY 2021. This funding may be included in the data in this table, although this is not clear in all cases.

**Note(s):**

Detail may not add to total because of rounding. Budget functions in this table are ordered as the stub entries for R&D and R&D plant in [table 1](#).

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 3

**Federal budget authority for R&D and R&D plant as a percentage of total budget authority, by budget function: FYs 2020–22**

(Percent share)

Budget function	2020 actual <sup>a</sup>	2021 preliminary <sup>a</sup>	2022 proposed
All functions conducting R&D	2.7	3.0	3.9
National defense	10.6	10.6	10.2
Health	4.8	4.8	6.5
Space flight, research, and supporting activities	65.1	56.1	58.0
General science and basic research	87.2	85.2	64.2
Energy	68.4	86.4	12.2
Natural resources and environment	5.3	5.9	4.2
Agriculture	3.8	5.7	12.4
Transportation	1.0	0.8	1.1
Veterans benefits and services	0.6	0.6	0.5
Commerce and housing credit <sup>b</sup>	0.1	-0.5	3.8
Education, training, employment, and social services	0.2	0.2	0.4
Administration of justice	0.7	0.8	0.8
International affairs	0.3	0.3	0.3
Income security	*	*	*
Community and regional development	0.1	0.1	0.2
Medicare	*	*	*

\* = value less than 0.05%.

<sup>a</sup> Agencies in several functions received emergency COVID-19 funding for R&D and/or R&D plant in FY 2020 and FY 2021. This funding may be included in the data in this table, although this is not clear in all cases.

<sup>b</sup> Estimated net budget authority in the Commerce and housing credit function is negative in FY 2021, mainly because of negative balances in federal mortgage and economic recovery programs.

**Note(s):**

Total budget authority includes discretionary and mandatory budget authority, less offsets. Budget functions in this table are ordered as the stub entries for R&D and R&D plant in [table 1](#).

**Source(s):**

Agencies' submissions to the Office of Management and Budget (OMB) per MAX Schedule C, agencies' budget justification documents, supplemental data obtained from agencies' budget offices, and Executive Office of the President, OMB, *Budget of the United States Government, Fiscal Year 2022*, U.S. Government Printing Office (2021).

TABLE 4

**Federal budget authority for basic research, by budget function: FYs 2020–22**

(Millions of dollars and percent change)

Budget function	2020 actual <sup>a</sup>	2021 preliminary <sup>a</sup>	2022 proposed	2020–21 (% change)	2021–22 (% change)
All functions conducting R&D	44,331	42,520	47,399	-4.1	11.5
National defense	2,686	2,819	2,483	5.0	-11.9
Health	21,826	21,872	24,022	0.2	9.8
Space flight, research, and supporting activities	6,655	4,515	5,620	-32.2	24.5
General science and basic research	10,782	10,835	12,298	0.5	13.5
Energy	51	16	17	-67.6	1.7
Natural resources and environment	117	118	209	1.2	76.2
Agriculture	1,028	1,092	1,380	6.2	26.4
Transportation	16	16	16	0.0	0.0
Veterans benefits and services	523	555	584	6.1	5.2
Commerce and housing credit	241	250	320	3.7	28.0
Education, training, employment, and social services	348	366	368	5.2	0.5
Administration of justice	57	63	80	10.5	27.0
International affairs	0	0	0	-	-
Income security	0	0	0	-	-
Community and regional development	2	2	3	0.0	50.0
Medicare	0	0	0	-	-

<sup>a</sup> Agencies in several functions received emergency COVID-19 funding for R&D including basic research in FY 2020 and FY 2021. This funding may be included in the data in this table, although this is not clear in all cases.

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data. Budget functions in this table are ordered as the stub entries for R&D and R&D plant in [table 1](#).

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 5

**Federal budget authority for National defense (050) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	81,874	79,584	78,704	-2.8	-1.1
Department of Defense, military (051)	74,105	71,662	70,974	-3.3	-1.0
R&D within RDT&E accounts <sup>a</sup>	68,679	68,189	69,089	-0.7	1.3
Defense agencies	20,221	19,049	18,642	-5.8	-2.1
Defense Advanced Research Projects Agency	3,571	3,500	3,529	-2.0	0.8
Missile Defense Agency	8,142	7,855	7,161	-3.5	-8.8
Other defense agencies	8,507	7,693	7,952	-9.6	3.4
Department of the Air Force	21,732	15,855	17,061	-27.0	7.6
Space Force	na	5,605	5,527	-	-1.4
Department of the Army	11,033	12,371	11,301	12.1	-8.7
Department of the Navy	15,464	15,051	16,342	-2.7	8.6
Operational Test and Evaluation	228	257	217	12.9	-15.8
Other military funding <sup>b</sup>	5,427	3,474	1,886	-36.0	-45.7
Department of Energy, atomic energy defense activities (053)	7,752	7,910	7,724	2.0	-2.4
Defense environmental cleanup	30	35	28	16.7	-20.0
Naval reactors development	1,365	1,471	1,643	7.8	11.7
Nonproliferation	411	481	501	17.0	4.2
Weapons activities	5,947	5,923	5,552	-0.4	-6.3
Department of Justice, Federal Bureau of Investigation (054)	2	2	2	0.0	0.0
Department of Homeland Security, Cybersecurity and Infrastructure Security Agency (054)	14	9	4	-34.6	-58.3
R&D	79,389	78,609	77,762	-1.0	-1.1
Department of Defense, military (051)	72,251	71,662	70,954	-0.8	-1.0
R&D within RDT&E accounts <sup>a</sup>	68,679	68,189	69,089	-0.7	1.3
Defense agencies	20,221	19,049	18,642	-5.8	-2.1
Defense Advanced Research Projects Agency	3,571	3,500	3,529	-2.0	0.8
Missile Defense Agency	8,142	7,855	7,161	-3.5	-8.8
Other defense agencies	8,507	7,693	7,952	-9.6	3.4
Department of the Air Force	21,732	15,855	17,061	-27.0	7.6
Space Force	na	5,605	5,527	-	-1.4
Department of the Army	11,033	12,371	11,301	12.1	-8.7
Department of the Navy	15,464	15,051	16,342	-2.7	8.6
Operational Test and Evaluation	228	257	217	12.9	-15.8
Other military funding <sup>b</sup>	3,573	3,474	1,866	-2.8	-46.3
Department of Energy, atomic energy defense activities (053)	7,121	6,935	6,802	-2.6	-1.9
Defense environmental cleanup	30	35	28	16.7	-20.0
Naval reactors development	1,112	1,140	1,246	2.5	9.3
Nonproliferation	393	466	486	18.6	4.3
Weapons activities	5,587	5,294	5,042	-5.2	-4.8
Department of Justice, Federal Bureau of Investigation (054)	2	2	2	0.0	0.0
Department of Homeland Security, Cybersecurity and Infrastructure Security Agency (054)	14	9	4	-34.6	-58.3

na = not applicable.

RDT&amp;E = research, development, test, and evaluation.

<sup>a</sup> Totals for development spending across all years do not include Department of Defense (DOD) Budget Activity 7 (BA-7) (Operational Systems Development) due to implementation of the narrowed definition of development described by the Office of Management and Budget (OMB) in its Circular A-11 of July 2016. These BA-7 funds support development efforts to upgrade systems that have been fielded or have received approval for full-rate production and anticipate production funding in the current or subsequent fiscal year.

<sup>b</sup> This item includes appropriate personnel costs in direct support of conduct of R&D, other appropriations funding certain DOD programs, and medical research funded outside RDT&E accounts. Includes \$415 million in emergency RDT&E funding for the coronavirus (COVID-19) activities in FY 2020.

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to OMB per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 6

**Department of Defense, total obligational authority for research, development, test, and evaluation, by DOD budget activity: FYs 2020–22**

(Millions of dollars and percent change)

Funding category and agency	Budget activity	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
RDT&E total budget authority	-	104,964	106,446	111,964	1.4	5.2
R&D budget authority within RDT&E accounts <sup>a</sup>	-	68,679	68,189	69,089	-0.7	1.3
RDT&E total obligational authority <sup>b</sup>	-	106,138	106,791	109,680	0.6	2.7
Basic research		2,522	2,626	2,283	4.1	-13.1
Defense agencies		813	887	717	9.0	-19.2
Department of the Air Force		517	536	491	3.7	-8.5
Space Force	1	na	0	0	-	-
Department of the Army		557	553	473	-0.9	-14.3
Department of the Navy		634	650	602	2.6	-7.4
Applied research		6,059	6,436	5,509	6.2	-14.4
Defense agencies		2,013	1,961	2,130	-2.6	8.6
Department of the Air Force		1,688	1,561	1,312	-7.5	-15.9
Space Force	2	na	217	176	-	-18.9
Department of the Army		1,228	1,519	914	23.7	-39.8
Department of the Navy		1,130	1,179	976	4.3	-17.2
Advanced technology development		7,332	7,754	6,893	5.8	-11.1
Defense agencies		4,044	3,978	4,008	-1.6	0.7
Department of the Air Force		956	1,000	734	4.6	-26.6
Space Force	3	na	0	77	-	-
Department of the Army		1,520	1,940	1,297	27.6	-33.1
Department of the Navy		811	836	778	3.0	-6.9
Advanced component development and prototypes		26,670	27,997	31,255	5.0	11.6
Defense agencies		10,437	10,096	9,854	-3.3	-2.4
Department of the Air Force		8,138	7,428	8,937	-8.7	20.3
Space Force	4	na	1,366	1,579	-	15.6
Department of the Army		2,896	3,577	3,806	23.5	6.4
Department of the Navy		5,199	5,530	7,078	6.4	28.0
System development and demonstration		16,558	15,748	15,761	-4.9	0.1
Defense agencies		922	726	549	-21.2	-24.5
Department of the Air Force		6,521	2,449	2,570	-62.4	4.9
Space Force	5	na	3,749	3,339	-	-10.9
Department of the Army		3,073	2,948	3,392	-4.0	15.1
Department of the Navy		6,042	5,876	5,910	-2.8	0.6
RDT&E management support		9,539	7,627	7,387	-20.0	-3.1
Defense agencies		1,992	1,401	1,384	-29.7	-1.2
Department of the Air Force		3,912	2,880	3,016	-26.4	4.7
Space Force	6	na	274	356	-	30.0
Department of the Army		1,760	1,834	1,417	4.2	-22.8
Department of the Navy		1,648	981	999	-40.5	1.8
Operational test and evaluation		228	257	217	12.9	-15.8
Operational system development		37,459	38,603	40,592	3.1	5.2
Defense agencies		6,458	6,533	6,607	1.1	1.1
Department of the Air Force		24,070	20,506	21,706	-14.8	5.8
Space Force	7	na	4,785	5,585	-	16.7
Department of the Army		1,810	1,717	1,380	-5.1	-19.6
Department of the Navy		5,121	5,062	5,313	-1.1	5.0

TABLE 6

**Department of Defense, total obligational authority for research, development, test, and evaluation, by DOD budget activity: FYs 2020–22**

(Millions of dollars and percent change)

Funding category and agency	Budget activity	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
Adjustment for RDT&E budget authority <sup>c</sup>	-	-1,174	-345	2,284	na	na

na = not applicable.

DOD = Department of Defense; RDT&amp;E = research, development, test, and evaluation.

<sup>a</sup> Totals for development spending across all years do not include DOD Budget Activity 7 (BA-7) (Operational Systems Development) due to implementation of the narrowed definition of development described by the Office of Management and Budget (OMB) in its Circular A-11 of July 2016. These BA-7 funds support development efforts to upgrade systems that have been fielded or have received approval for full-rate production and anticipate production funding in the current or subsequent fiscal year.

<sup>b</sup> RDT&E budget activity codes are broad categories reflecting different types of RDT&E efforts, as specified in the DOD Financial Management Regulation.

<sup>c</sup> Detailed budget information on DOD RDT&E activities is available only in total obligational authority (TOA), which is the sum of new budget authority, unobligated budget authority from previous years, and other authorized credits. The adjustment converts TOA to budget authority by subtracting unobligated budget authority from previous years and other authorized credits from TOA.

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to OMB per MAX Schedule C, agencies' budget justification documents, supplemental data obtained from agencies' budget offices, and Executive Office of the President, OMB, *Budget of the United States Government, Fiscal Year 2021*, U.S. Government Printing Office (2020).

TABLE 7

**Federal budget authority for International affairs (150) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	226	226	226	0.0	0.0
Agency for International Development (151)	156	153	153	-1.9	0.0
Department of State (151)	60	60	60	0.0	0.0
International Security Assistance (152)	10	13	13	30.0	0.0
R&D	226	226	226	0.0	0.0
Agency for International Development (151)	156	153	153	-1.9	0.0
Department of State (151)	60	60	60	0.0	0.0
International Security Assistance (152)	10	13	13	30.0	0.0

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.



TABLE 8

**Federal budget authority for General science and basic research (251) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	13,659	13,800	15,445	1.0	11.9
Department of Energy					
Office of Science <sup>a</sup>	6,923	6,918	7,272	-0.1	5.1
National Science Foundation <sup>b,c</sup>	6,736	6,882	8,173	2.2	18.8
Arctic Research Commission	2	2	2	0.0	3.1
Biological Sciences	828	818	949	-1.2	15.9
Computer and Information Science and Engineering	1,011	1,005	1,116	-0.6	11.0
Education and Human Resources	1,089	1,110	1,287	1.9	15.9
Engineering	769	762	917	-1.0	20.3
Geosciences	994	1,004	1,195	1.1	19.0
Integrative Activities	353	527	505	49.3	-4.2
International Science and Engineering	51	51	75	0.6	46.8
Major Research Equipment and Facilities and Construction	155	241	249	55.6	3.3
Mathematical and Physical Sciences	1,536	1,580	1,691	2.9	7.0
Social, Behavioral and Economic Sciences	290	282	320	-2.7	13.3
Technology, Innovation, and Partnerships	352	365	865	3.6	137.0
Budget authority adjustment <sup>d</sup>	-695	-867	-996	na	na
R&D	11,620	11,683	13,344	0.5	14.2
Department of Energy					
Office of Science <sup>a</sup>	5,325	5,335	5,765	0.2	8.1
National Science Foundation <sup>b,e</sup>	6,294	6,348	7,578	0.9	19.4
Arctic Research Commission	2	2	2	0.0	3.1
Biological Sciences	828	818	949	-1.2	15.9
Computer and Information Science and Engineering	1,011	1,005	1,116	-0.6	11.0
Education and Human Resources	1,089	1,110	1,287	1.9	15.9
Engineering	769	762	917	-1.0	20.3
Geosciences	994	1,004	1,195	1.1	19.0
Integrative Activities	353	527	505	49.3	-4.2
International Science and Engineering	51	51	75	0.6	46.8
Major Research Equipment and Facilities Construction	155	241	249	55.6	3.3
Mathematical and Physical Sciences	1,536	1,580	1,691	2.9	7.0
Social, Behavioral and Economic Sciences	290	282	320	-2.7	13.3
Technology, Innovation, and Partnerships	352	365	865	3.6	137.0
Budget authority adjustment <sup>f</sup>	-1,136	-1,400	-1,591	na	na

na = not applicable.

<sup>a</sup> The Office of Science received \$100 million in emergency spending for COVID-19 response in FY 2020. A portion of this may have funded R&D or R&D plant, although detailed estimates are not available.

<sup>b</sup> These data include \$75 million in emergency COVID-19 R&D received in FY 2020. In addition, the National Science Foundation (NSF) received \$600 million in emergency spending in FY 2021, but data for related R&D or R&D plant expenditures from that emergency spending are not yet available.

<sup>c</sup> The NSF budget shown here includes only R&D and R&D plant; however, subaccount budgets (Arctic Research Commission, Biological Sciences, etc.) include some non-R&D and non-R&D plant funding.

<sup>d</sup> Budget authority adjustment subtracts non-R&D and non-R&D plant spending (such as support and overhead) from subaccount budgets.

<sup>e</sup> The NSF budget shown here includes only R&D; however, subaccount budgets (Arctic Research Commission, Biological Sciences, etc.) include some non-R&D funding.

<sup>f</sup> Budget authority adjustment subtracts non-R&D spending (such as support, overhead, and R&D plant) from subaccount budgets.

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 9

**Federal budget authority for Space flight, research, and supporting activities (252) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	14,206	12,594	13,842	-11.3	9.9
National Aeronautics and Space Administration	14,206	12,594	13,842	-11.3	9.9
Safety, security, and mission services <sup>a</sup>	187	241	241	28.9	0.0
Deep Space Exploration Systems	4,545	2,637	2,856	-42.0	8.3
Science	6,931	7,255	7,876	4.7	8.6
LEO (low earth orbit) and space flight operations	1,471	1,329	1,416	-9.7	6.5
Exploration technology	1,024	1,080	1,405	5.5	30.1
Construction, environmental compliance, and restoration	48	52	48	8.3	-7.7
R&D	14,158	12,542	13,794	-11.4	10.0
National Aeronautics and Space Administration	14,158	12,542	13,794	-11.4	10.0
Safety, security, and mission services <sup>a</sup>	187	241	241	28.9	0.0
Deep Space Exploration Systems	4,545	2,637	2,856	-42.0	8.3
Science	6,931	7,255	7,876	4.7	8.6
LEO (low earth orbit) and space flight operations	1,471	1,329	1,416	-9.7	6.5
Exploration technology	1,024	1,080	1,405	5.5	30.1
Construction, environmental compliance, and restoration	0	0	0	--	--

<sup>a</sup> The National Aeronautics and Space Administration received \$100 million in emergency spending in FY 2020 for mission services and operational adjustments in response to COVID-19. The R&D data presented here may include a portion funded by this emergency spending.

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 10

**Federal budget authority for Energy (270) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	4,539	4,537	6,533	-0.0	44.0
Energy supply (271)	4,470	4,471	6,458	0.0	44.4
Department of Energy	4,462	4,460	6,447	-0.0	44.5
Energy programs	4,070	4,066	5,416	-0.1	33.2
Energy efficiency and renewable energy	2,009	2,043	2,980	1.7	45.8
Fossil energy	709	721	868	1.6	20.5
Nuclear energy	1,161	1,068	1,261	-8.0	18.1
Electricity delivery	155	171	236	10.5	38.0
Cybersecurity, Energy Security, and Emergency Response	36	63	70	76.1	11.5
Advanced Research Projects Agency-Energy (ARPA-E)	390	392	463	0.5	18.1
Advanced Research Projects Agency-Climate (ARPA-C)	na	na	180	-	-
Clean Energy Demonstration	na	na	387	-	-
Bonneville Power Administration Fund	2	2	2	0.0	0.0
Tennessee Valley Authority	8	11	11	37.5	0.0
Energy information, policy, and regulation (276)	69	66	75	-4.3	13.6
Nuclear Regulatory Commission	69	66	75	-4.3	13.6
R&D	4,391	4,433	6,257	0.9	41.1
Energy supply (271)	4,322	4,367	6,182	1.0	41.6
Department of Energy	4,314	4,356	6,171	1.0	41.7
Energy programs	3,922	3,962	5,139	1.0	29.7
Energy efficiency and renewable energy	1,957	2,004	2,898	2.4	44.6
Fossil energy	680	692	822	1.6	18.9
Nuclear energy	1,096	1,057	1,163	-3.5	10.0
Electricity delivery	154	146	186	-5.0	27.5
Cybersecurity, Energy Security, and Emergency Response	36	63	70	76.1	11.5
Advanced Research Projects Agency-Energy (ARPA-E)	390	392	463	0.5	18.1
Advanced Research Projects Agency-Climate (ARPA-C)	na	na	180	-	-
Clean Energy Demonstration	na	na	387	-	-
Bonneville Power Administration Fund	2	2	2	0.0	0.0
Tennessee Valley Authority	8	11	11	37.5	0.0
Energy information, policy, and regulation (271)	69	66	75	-4.3	13.6
Nuclear Regulatory Commission (276)	69	66	75	-4.3	13.6

na = not applicable.

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 11

**Federal budget authority for Natural resources and environment (300) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	2,879	2,899	3,830	0.7	32.1
Conservation and land management (302)	515	477	595	-7.4	24.7
Department of the Interior <sup>a</sup>	201	167	231	-16.9	38.3
Department of Agriculture	314	310	364	-1.3	17.4
Forest Service <sup>b</sup>	314	310	364	-1.3	17.4
Pollution control and abatement (304)	521	527	599	1.1	13.6
Environmental Protection Agency <sup>c</sup>	520	526	598	1.1	13.6
Oil spill response research	1	1	1	-1.6	1.1
Science and technology	489	494	566	1.2	14.4
Superfund	31	31	31	0.2	0.7
Coast Guard (DHS)	1	1	1	0.0	0.0
Recreational resources (303)	28	28	34	0.0	21.4
National Park Service (DOI)	28	28	34	0.0	21.4
Water resources (301)	174	163	152	-6.3	-6.7
Army Corps of Engineers (DOD)	30	30	30	0.0	0.0
Bureau of Reclamation (DOI)	144	133	122	-7.6	-8.3
Other natural resources (306)	1,641	1,704	2,451	3.8	43.8
National Oceanic and Atmospheric Administration (DOC) <sup>d</sup>	976	1,013	1,504	3.7	48.5
Mission Support/ Spectrum	7	15	38	112.8	153.3
National Environmental Satellite, Data, and Information Service	33	29	50	-12.4	73.9
National Marine Fisheries Service	64	64	67	-0.7	5.8
National Ocean Service	103	103	138	-0.0	34.6
National Weather Service	29	24	37	-16.3	51.6
Office of Oceanic and Atmospheric Research	579	573	757	-1.2	32.2
Office of Marine and Aviation Operations	161	206	416	27.9	102.5
Geological Survey (DOI)	665	691	947	4.0	37.0
Land resources	87	na	na	-	-
Core science systems	62	93	169	51.0	81.1
Ecosystems	171	258	356	51.2	38.1
Energy, minerals, and environmental health	101	78	121	-23.0	54.8
Natural hazards	124	128	155	3.1	20.9
Water resources	120	135	147	12.3	9.2
R&D	2,653	2,654	3,339	0.0	25.8
Conservation and land management (302)	508	470	588	-7.5	25.1
Department of the Interior <sup>a</sup>	199	165	229	-17.1	38.8
Department of Agriculture	309	305	359	-1.3	17.7
Forest Service <sup>b</sup>	309	305	359	-1.3	17.7
Pollution control and abatement (304)	518	527	595	1.8	12.9
Environmental Protection Agency <sup>c</sup>	517	526	594	1.8	12.9
Oil spill response research	1	1	1	-1.6	1.1
Science and technology	485	494	562	1.9	13.7
Superfund	31	31	31	0.2	0.7
Coast Guard (DHS)	1	1	1	0.0	0.0
Recreational resources (303)	28	28	34	0.0	21.4
National Park Service (DOI)	28	28	34	0.0	21.4
Water resources (301)	174	163	152	-6.3	-6.7
Army Corps of Engineers (DOD)	30	30	30	0.0	0.0

TABLE 11

**Federal budget authority for Natural resources and environment (300) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
Bureau of Reclamation (DOI)	144	133	122	-7.6	-8.3
Other natural resources (306)	1,425	1,465	1,970	2.8	34.4
National Oceanic and Atmospheric Administration (DOC) <sup>d</sup>	760	774	1,023	1.8	32.1
Mission Support/ Spectrum	0	0	0	-	-
National Environmental Satellite, Data, and Information Service	33	29	50	-12.4	73.9
National Marine Fisheries Service	64	64	67	-0.7	5.8
National Ocean Service	102	103	138	0.8	34.6
National Weather Service	29	23	36	-18.9	53.3
Office of Oceanic and Atmospheric Research	530	521	693	-1.6	33.0
Office of Marine and Aviation Operations	2	34	38	1,456.8	10.9
Geological Survey (DOI)	665	691	947	4.0	37.0
Land resources	87	na	na	-	-
Core science systems	62	93	169	51.0	81.1
Ecosystems	171	258	356	51.2	38.1
Energy, minerals, and environmental health	101	78	121	-23.0	54.8
Natural hazards	124	128	155	3.1	20.9
Water resources	120	135	147	12.3	9.2

na = not applicable.

DHS = Department of Homeland Security; DOC = Department of Commerce; DOD = Department of Defense; DOI = Department of the Interior.

<sup>a</sup> DOI includes Bureau of Land Management, Office of Surface Mining Reclamation and Enforcement, Fish and Wildlife Service, Bureau of Ocean Energy Management, Bureau of Safety and Environmental Enforcement, and Office of Wildland Fire.<sup>b</sup> The Forest Service received \$3 million in emergency COVID-19 funding in FY 2020, and a portion of this may have funded R&D and R&D plant.<sup>c</sup> The Environmental Protection Agency Science & Technology account received \$2 million in emergency COVID-19 funding in FY 2020, and a portion of this may have funded R&D and R&D plant.<sup>d</sup> The National Oceanic and Atmospheric Administration received \$20 million in emergency COVID-19 funding in FY 2020, and a portion of this may have funded R&D and R&D plant.**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 12

**Federal budget authority for Agriculture (350) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	2,674	2,655	3,245	-0.7	22.2
Agricultural research and services (352)					
Department of Agriculture	2,674	2,655	3,245	-0.7	22.2
Agricultural Research Service	1,627	1,566	1,932	-3.7	23.4
Animal and Plant Health Inspection Service	40	42	46	5.0	9.5
Economic Research Service	85	87	91	2.6	4.1
National Agricultural Statistics Service	9	9	11	0.0	22.2
National Institute of Food and Agriculture	914	951	1,165	4.0	22.5
R&D	2,332	2,469	3,050	5.9	23.5
Agricultural research and services (352)					
Department of Agriculture	2,332	2,469	3,050	5.9	23.5
Agricultural Research Service	1,284	1,380	1,737	7.5	25.9
Animal and Plant Health Inspection Service	40	42	46	5.0	9.5
Economic Research Service	85	87	91	2.6	4.1
National Agricultural Statistics Service	9	9	11	0.0	22.2
National Institute of Food and Agriculture	914	951	1,165	4.0	22.5

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 13

**Federal budget authority for Commerce and housing credit (370) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	1,008	1,127	1,300	11.8	15.4
Other advancement of commerce (376)					
Department of Commerce	974	1,095	1,268	12.4	15.8
Census Bureau	153	138	130	-9.8	-5.8
National Institute of Standards and Technology <sup>a</sup>	813	945	1,130	16.2	19.6
Construction of research facilities	118	80	140	-32.2	75.0
Industrial technology services	21	159	162	657.1	1.9
Scientific and technical research and services	674	706	828	4.7	17.3
National Oceanic and Atmospheric Administration	8	12	8	50.0	-33.3
National Marine Fisheries Service	8	12	8	50.0	-33.3
National Telecommunications and Information Administration	8	12	12	50.0	0.0
Postal Service	18	20	20	11.1	0.0
Small Business Administration	8	0	0	-100.0	-
R&D	850	1,003	1,116	18.0	11.3
Other advancement of commerce (376)					
Department of Commerce	858	1,015	1,128	18.3	11.1
Census Bureau	153	138	130	-9.8	-5.8
National Institute of Standards and Technology <sup>a</sup>	663	833	958	25.6	15.0
Construction of research facilities	0	0	0	-	-
Industrial technology services	21	159	162	657.1	1.9
Scientific and technical research and services	642	674	796	5.0	18.1
National Oceanic and Atmospheric Administration	8	12	8	50.0	-33.3
National Marine Fisheries Service	8	12	8	50.0	-33.3
National Telecommunications and Information Administration	8	12	12	50.0	0.0
Postal Service	18	20	20	11.1	0.0
Small Business Administration	8	0	0	-100.0	-

<sup>a</sup> The National Institute of Standards and Technology received \$216 million in emergency COVID-19 spending in FY 2021 and FY 2022. A portion of this likely funded R&D and R&D plant, although detailed estimates are not available.

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.



TABLE 14

**Federal budget authority for Transportation (400) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	1,712	1,704	1,989	-0.4	16.7
Air transportation (402)	1,152	1,140	1,306	-1.0	14.5
Federal Aviation Administration (DOT)	534	479	547	-10.3	14.4
National Aeronautics and Space Administration					
Aeronautics research	595	632	723	6.2	14.4
Transportation Security Administration (DHS)	23	30	36	28.9	20.3
Ground transportation (401) (DOT)	522	512	615	-1.9	20.1
Federal Highway Administration	380	376	420	-1.1	11.7
Federal Motor Carrier Safety Administration	9	9	9	0.0	0.0
Federal Railroad Administration	45	45	55	0.0	22.2
Federal Transit Administration	33	30	60	-9.1	100.0
National Highway Traffic Safety Administration	55	52	71	-5.5	36.5
Water transportation (403)	-1	10	7	1,100.0	-30.0
Coast Guard (DHS)	-1	10	7	1,100.0	-30.0
Other transportation (407) (DOT) <sup>a</sup>	39	42	61	-7.7	45.2
R&D	1,674	1,672	1,951	-0.1	16.7
Air transportation (402)	1,117	1,113	1,273	-0.3	14.4
Federal Aviation Administration (DOT)	499	452	514	-9.4	13.9
National Aeronautics and Space Administration					
Aeronautics research	595	632	723	6.2	14.4
Transportation Security Administration (DHS)	23	30	36	28.9	20.3
Ground transportation (401) (DOT)	519	507	610	-2.3	20.3
Federal Highway Administration	378	373	417	-1.3	11.8
Federal Motor Carrier Safety Administration	9	9	9	0.0	0.0
Federal Railroad Administration	44	43	53	-2.3	23.3
Federal Transit Administration	33	30	60	-9.1	100.0
National Highway Traffic Safety Administration	55	52	71	-5.5	36.5
Water transportation (403)	-1	10	7	1,100.0	-30.0
Coast Guard (DHS)	-1	10	7	1,100.0	-30.0
Other transportation (407) (DOT) <sup>a</sup>	39	42	61	7.7	45.2

DHS = Department of Homeland Security; DOT = Department of Transportation.

<sup>a</sup> Other transportation (407) includes the Office of the Secretary of DOT and the Pipeline and Hazardous Materials Safety Administration.**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 15

**Federal budget authority for Community and regional development (450) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	97	99	133	2.1	34.3
Community development (451)	0	0	5	-	-
Department of Housing and Urban Development	0	0	5	-	-
Area and regional development (452)	97	99	128	2.1	29.3
Department of the Interior	5	5	5	0.0	0.0
Bureau of Indian Affairs and Bureau of Indian Education	5	5	5	0.0	0.0
Appalachian Regional Commission	92	94	123	2.2	30.9
R&D	97	99	133	2.1	34.3
Community development (451)	0	0	5	-	-
Department of Housing and Urban Development	0	0	5	-	-
Area and regional development (452)	97	99	128	2.1	29.3
Department of the Interior	5	5	5	0.0	0.0
Bureau of Indian Affairs and Bureau of Indian Education	5	5	5	0.0	0.0
Appalachian Regional Commission	92	94	123	2.2	30.9

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 16

**Federal budget authority for Education, training, employment, and social services (500) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	581	767	819	32.0	6.8
Research and general education aids (501, 502, 503)	581	767	819	32.0	6.8
Department of Education programs	237	445	473	87.8	6.3
Smithsonian Institution programs	344	322	346	-6.4	7.5
R&D	527	733	783	39.1	6.8
Research and general education aids (501, 502, 503)	527	733	783	39.1	6.8
Department of Education programs	237	445	473	87.8	6.3
Smithsonian Institution programs	290	288	310	-0.7	7.6

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 17

**Federal budget authority for Health (550) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	44,431	43,471	51,138	-2.2	17.6
Consumer and occupational health and safety (554)	507	507	507	0.0	0.0
Consumer Product Safety Commission	1	1	1	0.0	0.0
Food and Drug Administration (HHS)	506	506	506	0.0	0.0
Health care services and health research and training (551, 552) <sup>a</sup>	43,924	42,964	50,631	-2.2	17.8
Department of Health and Human Services <sup>b</sup>	43,924	42,964	50,631	-2.2	17.8
Agency for Healthcare Research and Quality	357	357	398	0.0	11.5
Centers for Disease Control and Prevention <sup>c</sup>	404	605	605	49.8	0.0
Departmental management (other)	18	18	18	0.0	0.0
Health Resources and Services Administration	28	28	28	0.0	0.0
National Institutes of Health <sup>d</sup>	43,117	41,956	49,582	-2.7	18.2
R&D	43,936	43,199	50,816	-1.7	17.6
Consumer and occupational health and safety (554)	465	465	465	0.0	0.0
Consumer Product Safety Commission	1	1	1	0.0	0.0
Food and Drug Administration (HHS)	464	464	464	0.0	0.0
Health care services and health research and training (551, 552) <sup>a</sup>	43,471	42,734	50,351	-1.7	17.8
Department of Health and Human Services <sup>b</sup>	43,471	42,734	50,351	-1.7	17.8
Agency for Healthcare Research and Quality	357	357	398	0.0	11.5
Centers for Disease Control and Prevention <sup>c</sup>	404	605	605	49.8	0.0
Departmental management (other)	18	18	18	0.0	0.0
Health Resources and Services Administration	28	28	28	0.0	0.0
National Institutes of Health <sup>d</sup>	42,664	41,726	49,302	-2.2	18.2

HHS = Department of Health and Human Services.

<sup>a</sup> In previous years, this section included funding data for the Patient-Centered Outcomes Research Trust Fund. This funding was extended through FY 2029 by the Further Consolidated Appropriations Act, 2020, adopted in December 2019. However, R&D funding data for this account are not currently available.

<sup>b</sup> The Biomedical Advanced Research and Development Authority (BARDA), an agency with the HHS, received over \$25 billion in emergency COVID-19 funding across FY 2020 and FY 2021. However, data on R&D budget authority within this spending are not currently available.

<sup>c</sup> The Centers for Disease Control and Prevention received \$28 billion in emergency spending in FY 2020 and FY 2021 for COVID-19 response, some of which may have funded R&D in those years.

<sup>d</sup> The National Institutes of Health received \$4.7 billion in emergency COVID-19 R&D across FY 2020 and FY 2021.

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 18

**National Institutes of Health, federal budget authority for R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Organization and program, by FY 2020 rank order	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	43,117	41,956	49,582	-2.7	18.2
National Cancer Institute	6,315	6,431	6,602	1.8	2.7
National Institute of Allergy and Infectious Diseases	5,778	5,965	6,141	3.2	2.9
National Institute on Aging	3,494	3,837	3,968	9.8	3.4
National Heart, Lung, and Blood Institute	3,486	3,526	3,705	1.2	5.1
National Institute of Neurological Disorders and Stroke	2,401	2,462	2,733	2.6	11.0
Office of the Director	2,382	2,504	2,376	5.1	-5.1
National Institute of Diabetes and Digestive and Kidney Diseases	2,192	2,208	2,283	0.7	3.4
National Institute of Mental Health	1,985	2,044	2,149	3.0	5.1
National Institute of General Medical Sciences	1,654	1,661	1,730	0.4	4.2
National Institute of Child Health and Human Development	1,513	1,543	1,888	2.0	22.3
National Institute on Drug Abuse	1,425	1,445	1,815	1.5	25.6
National Institute of Environmental Health Sciences	862	873	997	1.4	14.2
National Eye Institute	808	820	842	1.5	2.7
National Center for Advancing Translational Sciences	796	820	841	3.1	2.6
National Institute of Arthritis and Musculoskeletal and Skin Diseases	605	614	659	1.5	7.4
National Human Genome Research Institute	588	600	616	1.9	2.7
National Institute on Alcohol Abuse and Alcoholism	529	536	551	1.5	2.8
National Institute on Deafness and Other Communication Disorders	474	479	492	1.0	2.7
National Institute of Dental and Craniofacial Research	461	466	496	1.0	6.5
National Library of Medicine	454	460	472	1.1	2.8
National Institute of Biomedical Imaging and Bioengineering	368	372	383	1.2	2.8
National Institute on Minority Health and Health Disparities	333	389	647	16.6	66.5
National Institute of Nursing Research	164	165	190	1.1	14.7
National Center for Complementary and Integrative Health	147	149	179	1.6	20.1
John E. Fogarty International Center	62	64	75	3.3	18.3
Advanced Research Projects Agency-Health <sup>a</sup>	na	na	6,500	–	–
Buildings and facilities	423	200	250	-52.7	25.0
COVID-19 R&D <sup>b</sup>	3,418	1,322	na	-61.3	-100.0
R&D	42,664	41,726	49,302	-2.2	18.2
National Cancer Institute	6,285	6,401	6,572	1.8	2.7
National Institute of Allergy and Infectious Diseases	5,778	5,965	6,141	3.2	2.9
National Institute on Aging	3,494	3,837	3,968	9.8	3.4
National Heart, Lung, and Blood Institute	3,486	3,526	3,705	1.2	5.1
National Institute of Neurological Disorders and Stroke	2,401	2,462	2,733	2.6	11.0
Office of the Director	2,382	2,504	2,376	5.1	-5.1
National Institute of Diabetes and Digestive and Kidney Diseases	2,192	2,208	2,283	0.7	3.4
National Institute of Mental Health	1,985	2,044	2,149	3.0	5.1
National Institute of General Medical Sciences	1,654	1,661	1,730	0.4	4.2
National Institute of Child Health and Human Development	1,513	1,543	1,888	2.0	22.3
National Institute on Drug Abuse	1,425	1,445	1,815	1.5	25.6
National Institute of Environmental Health Sciences	862	873	997	1.4	14.2

TABLE 18

**National Institutes of Health, federal budget authority for R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Organization and program, by FY 2020 rank order	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
National Eye Institute	808	820	842	1.5	2.7
National Center for Advancing Translational Sciences	796	820	841	3.1	2.6
National Institute of Arthritis and Musculoskeletal and Skin Diseases	605	614	659	1.5	7.4
National Human Genome Research Institute	588	600	616	1.9	2.7
National Institute on Alcohol Abuse and Alcoholism	529	536	551	1.5	2.8
National Institute on Deafness and Other Communication Disorders	474	479	492	1.0	2.7
National Institute of Dental and Craniofacial Research	461	466	496	1.0	6.5
National Library of Medicine	454	460	472	1.1	2.8
National Institute of Biomedical Imaging and Bioengineering	368	372	383	1.2	2.8
National Institute on Minority Health and Health Disparities	333	389	647	16.6	66.5
National Institute of Nursing Research	164	165	190	1.1	14.7
National Center for Complementary and Integrative Health	147	149	179	1.6	20.1
John E. Fogarty International Center	62	64	75	3.3	18.3
Advanced Research Projects Agency-Health <sup>a</sup>	na	na	6,500	-	-
Buildings and facilities	0	0	0	-	-
COVID-19 R&D <sup>b</sup>	3,418	1,322	na	-61.3	-100.0

na = not applicable.

<sup>a</sup> Advanced Research Projects Agency-Health is a new office proposed in the FY 2022 budget request.<sup>b</sup> Funding was provided through multiple emergency spending packages across FY 2020 and FY 2021 and was distributed among several of the institutes shown in this table.**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data. Institute totals exclude non-R&amp;D components of institute budgets.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 19

**Federal budget authority for Medicare (570) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	20	20	20	0.0	0.0
Department of Health and Human Services (571)					
Centers for Medicare and Medicaid Services	20	20	20	0.0	0.0
R&D	20	20	20	0.0	0.0
Department of Health and Human Services (571)					
Centers for Medicare and Medicaid Services	20	20	20	0.0	0.0

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 20

**Federal budget authority for Income security (600) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	106	90	90	-15.1	0.0
Department of Health and Human Services (609)					
Administration for Children and Families	5	4	4	-20.0	0.0
Social Security Administration (609)	101	86	86	-14.9	0.0
R&D	106	90	90	-15.1	0.0
Department of Health and Human Services (609)					
Administration for Children and Families	5	4	4	-20.0	0.0
Social Security Administration (609)	101	86	86	-14.9	0.0

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.



TABLE 21

**Federal budget authority for Veterans benefits and services (700) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary <sup>a</sup>	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	1,366	1,420	1,498	4.0	5.5
Department of Veterans Affairs					
Medical and prosthetic research (703)	750	795	882	6.0	10.9
Medical services (703)	616	625	616	1.5	-1.4
R&D	1,366	1,420	1,498	4.0	5.5
Department of Veterans Affairs					
Medical and prosthetic research (703)	750	795	882	6.0	10.9
Medical services (703)	616	625	616	1.5	-1.4

<sup>a</sup> The Department of Veterans Affairs received \$9 million of funding for COVID-19 related R&D in the American Rescue Plan, enacted in March 2021.

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data. Data include administration and operating expenses related to Department of Veterans Affairs research.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 22

**Federal budget authority for Administration of justice (750) R&D and R&D plant: FYs 2020–22**

(Millions of dollars and percent change)

Budget function and agency	2020 actual	2021 preliminary	2022 proposed	2020–21 (% change)	2021–22 (% change)
R&D and R&D plant	522	567	606	8.5	6.9
Federal law enforcement activities (751)	495	540	579	9.0	7.3
Department of Homeland Security	495	540	579	9.0	7.3
Federal correctional activities (753)	5	5	5	0.0	0.0
Department of Justice	5	5	5	0.0	0.0
Federal Prison System	5	5	5	0.0	0.0
Criminal justice assistance (754)	22	22	22	0.0	0.0
Department of Justice	22	22	22	0.0	0.0
Office of Justice Programs	22	22	22	0.0	0.0
R&D	522	548	597	4.9	9.0
Federal law enforcement activities (751)	495	521	570	5.1	9.5
Department of Homeland Security	495	521	570	5.1	9.5
Federal correctional activities (753)	5	5	5	0.0	0.0
Department of Justice	5	5	5	0.0	0.0
Federal Prison System	5	5	5	0.0	0.0
Criminal justice assistance (754)	22	22	22	0.0	0.0
Department of Justice	22	22	22	0.0	0.0
Office of Justice Programs	22	22	22	0.0	0.0

**Note(s):**

Detail may not add to total because of rounding. Percent change is calculated on unrounded data.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 23

## Federal funding for R&amp;D, R&amp;D plant, and basic research, by budget function: FYs 1955–2022

(Millions of dollars)

Fiscal year	Total for all budget functions	National defense (050)	International affairs (150)	General science and basic research (251)	Space flight, research, and supporting activities (252)	Energy (270)	Natural resources and environment (300)	Agriculture (350)	Commerce and housing credit (370)	Transportation (400)	Community and regional development (450)	Education, training, employment, and social services (500)	Health (550)	Medicare (570)	Income security (600)	Veterans benefits and services (700)	Administration of justice (750)	General government (800)	Other <sup>a</sup>
R&D and R&D plant <sup>b</sup>																			
2000	83,581	43,161	200	5,593	8,437	1,000	2,082	1,561	530	1,664	46	429	18,121	na	25	645	73	14	na
2001	91,505	46,202	252	6,353	8,951	1,320	2,138	1,826	468	1,654	54	424	21,023	na	30	719	88	3	na
2002	103,057	53,731	279	6,605	9,227	1,332	2,175	1,909	549	1,889	50	426	23,998	na	37	756	91	3	na
2003	118,065	63,708	269	6,999	9,677	1,412	2,198	2,042	534	1,888	48	444	27,677	na	38	817	316	0	na
2004	126,270	70,344	264	7,352	9,746	1,369	2,244	1,910	499	1,881	47	469	28,480	na	47	866	752	0	na
2005	131,259	74,641	255	7,477	9,656	1,324	2,245	2,094	475	1,866	45	495	29,129	na	35	742	779	0	na
2006	136,019	78,737	255	7,539	10,401	1,244	2,219	2,118	461	1,730	55	523	28,932	na	27	769	1,008	0	na
2007	141,890	82,658	246	8,712	10,988	1,922	2,096	1,950	516	1,380	49	577	29,581	na	27	820	369	0	na
2008	144,391	85,129	255	9,007	10,672	2,076	2,202	1,997	560	1,413	50	549	29,212	na	27	886	355	0	na
2009 <sup>c</sup>	164,292	85,642	255	14,128	9,060	3,794	2,615	2,249	1,051	1,461	62	553	42,051	30	63	943	335	0	na
Non-ARRA	145,553	85,342	255	9,941	8,374	2,234	2,371	2,073	641	1,357	62	543	30,989	30	63	943	335	0	na
ARRA	18,739	300	0	4,187	686	1,560	244	176	410	104	0	10	11,062	0	0	0	0	0	na
2010	148,962	86,789	194	10,509	8,232	2,570	2,430	2,206	668	1,517	109	581	31,693	36	77	1,034	318	0	na
2011	144,379	83,226	196	10,581	8,658	2,265	2,314	1,768	650	1,420	83	636	30,990	180	68	1,160	184	0	na
2012	143,737	79,875	269	10,536	10,801	2,231	2,300	2,005	698	1,511	58	640	31,411	80	18	1,160	143	1	na
2013	132,477	70,781	350	9,620	10,476	2,289	2,169	1,818	795	1,359	54	572	30,200	72	26	1,164	730	0	na
2014	136,159	70,992	410	10,524	11,228	2,407	2,328	2,077	957	1,278	66	542	31,099	25	58	1,101	1,067	0	na
2015	138,544	72,950	290	11,088	10,928	3,173	2,358	2,149	889	1,389	55	527	30,495	71	55	1,178	949	0	na
2016	150,393	80,202	288	11,328	12,811	3,492	2,471	2,350	1,033	1,361	65	505	32,526	21	105	1,222	613	0	na
2017 <sup>d</sup>	127,306	57,530	289	11,289	10,187	3,544	2,533	2,302	1,036	1,479	71	505	34,393	21	74	1,346	707	0	na
2018	144,460	68,916	238	12,559	10,552	4,233	2,662	2,346	1,184	1,594	144	614	37,316	20	106	1,286	690	0	na
2019	149,971	72,027	235	13,165	10,133	4,473	2,845	2,719	920	1,621	165	587	38,998	20	102	1,370	590	0	na
2020 <sup>e</sup>	169,901	81,874	226	13,659	14,206	4,539	2,879	2,674	1,008	1,712	97	581	44,431	20	106	1,366	522	0	na
2021 preliminary <sup>e</sup>	165,560	79,584	226	13,800	12,594	4,537	2,899	2,655	1,127	1,704	99	767	43,471	20	90	1,420	567	0	na

**TABLE 23**  
**Federal funding for R&D, R&D plant, and basic research, by budget function: FYs 1955–2022**

(Millions of dollars)

Fiscal year	Total for all budget functions	National defense (050)	International affairs (150)	General science and basic research (251)	Space flight, research, and supporting activities (252)	Energy (270)	Natural resources and environment (300)	Agriculture (350)	Commerce and housing credit (370)	Transportation (400)	Community and regional development (450)	Education, training, employment, and social services (500)	Health (550)	Medicare (570)	Income security (600)	Veterans benefits and services (700)	Administration of justice (750)	General government (800)	Other <sup>a</sup>	
2022 proposed	179,418	78,704	226	15,445	13,842	6,533	3,830	3,245	1,300	1,989	133	819	51,138	20	90	1,498	606	0	na	
R&D																				
1955	2,533	2,151	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	67	na	NA	NA	NA	NA	NA	315
1956	2,988	2,535	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	83	na	NA	NA	NA	NA	NA	370
1957	3,932	3,327	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	140	na	NA	NA	NA	NA	NA	465
1958	4,570	3,801	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	177	na	NA	NA	NA	NA	NA	592
1959	6,694	5,556	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	233	na	NA	NA	NA	NA	NA	904
1960	7,552	6,107	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	305	na	NA	NA	NA	NA	NA	1,140
1961	9,059	7,005	NA	137	777	373	73	125	NA	55	NA	NA	405	na	NA	NA	NA	NA	NA	108
1962	10,290	7,238	NA	187	1,413	448	108	136	NA	101	NA	NA	551	na	NA	NA	NA	NA	NA	107
1963	12,495	7,764	NA	246	2,812	515	120	146	NA	142	NA	NA	626	na	NA	NA	NA	NA	NA	125
1964	14,225	7,829	NA	277	4,241	571	134	165	NA	122	NA	NA	728	na	NA	NA	NA	NA	NA	160
1965	14,614	7,342	NA	304	4,887	585	159	195	NA	147	NA	NA	792	na	NA	NA	NA	NA	NA	203
1966	15,320	7,536	NA	377	4,976	575	189	201	NA	251	NA	NA	900	na	NA	NA	NA	NA	NA	315
1967	16,529	8,566	18	409	4,778	600	320	218	43	380	37	154	915	na	48	41	*	3	na	
1968	15,921	8,275	17	437	4,304	657	331	217	48	304	44	166	1,021	na	50	45	1	5	na	
1969	15,641	8,356	26	433	3,799	597	323	221	54	404	32	169	1,088	na	78	50	5	5	na	
1970	15,339	7,981	32	452	3,606	574	340	238	79	535	47	164	1,084	na	136	59	9	6	na	
1971	15,543	8,110	32	513	3,048	556	416	259	90	728	65	215	1,288	na	145	63	10	7	na	
1972	16,496	8,902	29	625	2,932	574	479	294	50	558	66	235	1,547	na	106	69	23	8	na	
1973	16,800	9,002	28	658	2,824	630	554	308	50	572	78	290	1,585	na	106	74	33	7	na	
1974	17,410	9,016	24	749	2,702	759	516	313	51	693	82	236	2,069	na	71	85	35	9	na	
1975	19,039	9,679	29	813	2,764	1,363	624	342	65	635	93	239	2,170	na	72	95	44	12	na	
1976	20,780	10,430	42	858	3,130	1,649	683	383	69	631	109	255	2,351	na	48	98	35	12	na	
1977	23,450	11,864	66	974	2,832	2,562	753	457	71	708	101	230	2,629	na	55	107	30	13	na	
1978	25,976	12,899	57	1,050	2,939	3,134	904	501	77	768	92	345	2,968	na	67	111	44	20	na	

TABLE 23

## Federal funding for R&amp;D, R&amp;D plant, and basic research, by budget function: FYs 1955–2022

(Millions of dollars)

Fiscal year	Total for all budget functions	National defense (050)	International affairs (150)	General science and basic research (251)	Space flight, research, and supporting activities (252)	Energy (270)	Natural resources and environment (300)	Agriculture (350)	Commerce and housing credit (370)	Transportation (400)	Community and regional development (450)	Education, training, employment, and social services (500)	Health (550)	Medicare (570)	Income security (600)	Veterans benefits and services (700)	Administration of justice (750)	General government (800)	Other <sup>a</sup>
1979	28,208	13,791	117	1,119	3,136	3,461	1,010	552	93	798	127	354	3,401	na	57	123	47	23	na
1980	29,739	14,946	125	1,233	2,738	3,603	999	585	101	887	119	468	3,694	na	47	126	45	22	na
1981	33,735	18,413	160	1,340	3,111	3,501	1,061	659	106	869	104	298	3,871	na	43	143	34	22	na
1982	36,115	22,070	165	1,359	2,584	3,012	965	693	104	791	63	228	3,869	na	32	139	31	10	na
1983	38,768	24,936	177	1,502	2,134	2,578	952	745	107	876	44	189	4,298	na	32	157	37	6	na
1984	44,214	29,287	192	1,676	2,300	2,581	963	762	110	1,040	46	200	4,779	na	26	218	24	8	na
1985	49,887	33,698	210	1,862	2,725	2,389	1,059	836	114	1,030	50	220	5,418	na	21	193	47	17	na
1986	53,249	36,926	211	1,873	2,894	2,286	1,062	815	111	917	88	248	5,565	na	14	183	41	14	na
1987	57,069	39,152	223	2,042	3,398	2,053	1,133	822	110	908	99	267	6,556	na	25	215	49	17	na
1988	59,106	40,099	224	2,160	3,683	2,126	1,160	882	122	896	108	285	7,076	na	23	195	51	17	na
1989	62,115	40,642	279	2,373	4,555	2,419	1,255	907	128	1,064	74	347	7,773	na	27	212	45	15	na
1990	63,781	39,925	375	2,410	5,765	2,726	1,386	950	140	1,045	67	374	8,308	na	33	216	44	17	na
1991	65,898	39,328	378	2,635	6,511	2,953	1,582	1,052	178	1,231	88	433	9,226	na	30	219	51	4	na
1992	68,398	40,083	371	2,659	6,744	3,099	1,688	1,155	192	1,523	127	365	10,055	na	37	245	51	4	na
1993	69,884	41,249	382	2,691	6,988	2,677	1,802	1,152	220	1,703	57	348	10,280	na	36	250	49	*	na
1994	68,331	37,764	254	2,712	7,414	2,873	2,062	1,193	380	1,888	68	373	10,993	na	45	265	46	0	na
1995	68,791	37,204	287	2,794	7,916	2,844	1,988	1,194	525	1,833	70	369	11,407	na	43	257	59	1	na
1996	69,049	37,801	252	2,846	7,844	2,521	1,802	1,176	432	1,795	50	331	11,867	na	16	259	56	2	na
1997	71,653	39,591	190	2,944	7,844	2,372	1,886	1,203	409	1,785	48	373	12,670	na	9	267	59	2	na
1998	73,569	39,823	163	4,360	8,198	948	1,855	1,249	398	1,833	42	444	13,576	na	18	587	72	2	na
1999	77,637	41,306	190	4,690	8,245	1,131	1,842	1,288	432	1,725	59	403	15,553	na	38	644	88	3	na
2000	78,664	42,580	200	4,977	5,363	996	1,999	1,426	406	1,636	46	418	17,869	na	25	645	73	6	na
2001	86,756	45,713	252	5,468	6,126	1,314	2,096	1,657	429	1,640	54	411	20,758	na	30	719	88	3	na
2002	97,624	53,016	279	5,753	6,270	1,327	2,160	1,606	467	1,838	50	411	23,560	na	37	756	91	3	na
2003	112,544	63,048	269	6,129	7,355	1,403	2,151	1,708	463	1,869	48	430	26,517	na	38	817	299	0	na
2004	121,867	69,593	264	6,466	7,612	1,343	2,168	1,750	454	1,863	47	459	28,251	na	47	866	684	0	na

TABLE 23

## Federal funding for R&amp;D, R&amp;D plant, and basic research, by budget function: FYs 1955–2022

(Millions of dollars)

Fiscal year	Total for all budget functions	National defense (050)	International affairs (150)	General science and basic research (251)	Space flight, research, and supporting activities (252)	Energy (270)	Natural resources and environment (300)	Agriculture (350)	Commerce and housing credit (370)	Transportation (400)	Community and regional development (450)	Education, training, employment, and social services (500)	Health (550)	Medicare (570)	Income security (600)	Veterans benefits and services (700)	Administration of justice (750)	General government (800)	Other <sup>a</sup>
2005	126,601	74,047	255	6,570	7,300	1,296	2,168	1,820	423	1,847	45	470	28,824	na	35	742	758	0	na
2006	131,624	78,037	255	6,691	8,204	1,195	2,120	1,869	390	1,711	55	495	28,797	na	27	769	1,008	0	na
2007	138,087	82,272	246	7,809	9,024	1,893	1,936	1,857	428	1,361	49	536	29,461	na	27	819	369	0	na
2008	140,113	84,713	255	8,234	8,323	1,896	2,106	1,864	450	1,394	50	497	29,063	na	27	886	355	0	na
2009 <sup>c</sup>	156,009	85,166	255	11,840	6,891	3,318	2,245	1,935	618	1,440	62	479	40,389	30	63	943	335	0	na
Non-ARRA	140,903	84,866	255	8,885	6,205	2,014	2,171	1,935	507	1,336	62	469	30,827	30	63	943	335	0	na
ARRA	15,106	300	0	2,955	686	1,304	74	0	111	104	0	10	9,562	0	0	0	0	0	na
2010	146,596	86,517	194	9,280	8,232	2,455	2,237	2,043	550	1,496	109	535	31,488	36	77	1,034	313	0	na
2011	142,457	82,972	196	9,483	8,398	2,233	2,171	1,916	548	1,420	83	578	30,903	180	68	1,160	172	0	na
2012	141,450	79,559	269	9,304	10,661	2,197	2,147	1,920	607	1,486	58	597	31,243	80	18	1,160	143	1	na
2013	130,861	70,620	350	8,802	10,476	2,269	2,020	1,753	719	1,337	54	536	30,044	72	26	1,164	618	0	na
2014	133,547	70,611	410	9,482	11,055	2,387	2,172	1,967	877	1,261	66	515	30,927	25	58	1,101	634	0	na
2015	136,090	72,560	290	10,068	10,875	3,153	2,161	1,989	809	1,363	55	491	30,331	71	55	1,178	639	0	na
2016	147,813	79,828	288	10,042	12,789	3,473	2,294	2,030	887	1,326	65	474	32,365	21	105	1,222	605	0	na
2017 <sup>d</sup>	124,710	57,055	289	9,947	10,134	3,519	2,378	2,090	901	1,444	71	478	34,255	21	74	1,346	707	0	na
2018	140,701	68,325	238	10,692	10,455	4,212	2,383	2,074	840	1,551	144	534	37,151	20	106	1,286	690	0	na
2019	145,615	71,396	235	10,961	10,016	4,433	2,486	2,205	783	1,582	165	517	38,755	20	102	1,370	590	0	na
2020 <sup>e</sup>	163,875	79,389	226	11,620	14,158	4,391	2,653	2,332	858	1,674	97	527	43,936	20	106	1,366	522	0	na
2021 preliminary <sup>e</sup>	161,412	78,609	226	11,683	12,542	4,433	2,654	2,469	1,015	1,672	99	733	43,199	20	90	1,420	548	0	na
2022 proposed	174,787	77,762	226	13,344	13,794	6,257	3,339	3,050	1,128	1,951	133	783	50,816	20	90	1,498	597	0	na
Basic research <sup>f</sup>																			
1978	3,665	320	*	962	412	157	207	197	9	70	8	57	1,246	0	2	9	10	0	na
1979	4,108	365	0	1,026	440	172	131	222	10	75	8	59	1,579	0	1	10	10	*	na
1980	4,716	552	0	1,152	482	200	136	246	15	79	8	61	1,761	0	1	14	9	*	na
1981	5,107	610	12	1,256	445	220	131	281	17	89	5	66	1,951	0	3	15	5	3	na

TABLE 23

## Federal funding for R&amp;D, R&amp;D plant, and basic research, by budget function: FYs 1955–2022

(Millions of dollars)

Fiscal year	Total for all budget functions	National defense (050)	International affairs (150)	General science and basic research (251)	Space flight, research, and supporting activities (252)	Energy (270)	Natural resources and environment (300)	Agriculture (350)	Commerce and housing credit (370)	Transportation (400)	Community and regional development (450)	Education, training, employment, and social services (500)	Health (550)	Medicare (570)	Income security (600)	Veterans benefits and services (700)	Administration of justice (750)	General government (800)	Other <sup>a</sup>
1982	5,305	696	10	1,296	434	260	139	295	17	102	7	78	1,953	0	0	13	4	2	na
1983	6,247	788	10	1,439	501	320	156	326	19	117	6	70	2,475	0	0	14	4	3	na
1984	7,072	845	3	1,606	646	365	192	353	20	125	5	77	2,813	0	0	15	5	3	na
1985	7,810	856	4	1,779	498	428	206	406	23	255	6	86	3,243	0	0	15	4	4	na
1986	8,193	960	5	1,795	737	456	204	390	26	184	6	83	3,324	0	0	15	5	5	na
1987	9,021	900	3	1,942	843	511	206	397	26	231	4	78	3,851	0	0	17	8	4	na
1988	9,553	905	3	2,061	944	571	210	428	28	197	7	83	4,087	0	0	17	8	5	na
1989	10,648	965	3	2,265	1,099	703	331	433	29	287	3	92	4,413	0	0	16	7	3	na
1990	11,288	964	4	2,306	1,389	761	336	456	31	242	3	106	4,661	0	0	16	9	3	na
1991	12,405	1,188	6	2,526	1,479	878	389	486	39	246	10	115	5,021	0	0	16	6	0	na
1992	12,973	1,147	6	2,532	1,499	921	383	528	35	266	11	118	5,506	0	0	16	5	0	na
1993	13,440	1,323	8	2,553	1,588	917	376	553	34	238	10	121	5,700	0	0	16	5	0	na
1994	13,552	1,174	6	2,542	1,796	921	224	567	38	220	9	145	5,889	0	0	16	5	0	na
1995	13,772	1,181	0	2,622	1,614	930	187	565	35	389	3	153	6,068	0	0	16	9	0	na
1996	14,442	1,165	2	2,662	1,685	1,182	147	547	37	456	0	140	6,395	0	0	13	12	0	na
1997	14,961	1,090	2	2,753	1,653	1,288	153	548	34	420	0	142	6,852	0	0	14	13	0	na
1998	15,523	1,067	1	4,121	1,610	34	145	571	35	411	0	133	7,356	0	0	23	16	0	na
1999	17,433	1,110	0	4,464	1,667	36	142	602	41	358	0	99	8,634	0	0	263	18	0	na
2000	19,470	1,184	42	4,722	1,616	36	146	651	39	542	0	107	10,099	0	0	266	20	0	na
2001	21,376	1,303	50	5,187	1,695	40	215	749	50	17	0	112	11,642	0	0	289	27	0	na
2002	23,848	1,404	53	5,561	1,912	45	471	762	56	17	0	115	12,957	0	0	465	30	0	na
2003	25,323	1,409	18	5,907	2,206	40	185	824	53	23	1	125	14,162	0	0	327	42	0	na
2004	26,529	1,380	18	6,198	2,473	32	201	780	46	20	0	125	14,850	0	0	347	58	0	na
2005	27,678	1,508	18	6,238	2,486	31	195	789	53	65	0	130	15,826	0	0	297	42	0	na
2006	27,336	1,490	18	6,406	2,299	8	195	805	66	0	0	131	15,532	0	0	318	68	0	na
2007	28,166	1,533	18	6,887	2,318	7	260	821	92	2	0	149	15,637	0	0	335	106	0	na

TABLE 23

## Federal funding for R&amp;D, R&amp;D plant, and basic research, by budget function: FYs 1955–2022

(Millions of dollars)

Fiscal year	Total for all budget functions	National defense (050)	International affairs (150)	General science and basic research (251)	Space flight, research, and supporting activities (252)	Energy (270)	Natural resources and environment (300)	Agriculture (350)	Commerce and housing credit (370)	Transportation (400)	Community and regional development (450)	Education, training, employment, and social services (500)	Health (550)	Medicare (570)	Income security (600)	Veterans benefits and services (700)	Administration of justice (750)	General government (800)	Other <sup>a</sup>
2008	28,740	1,631	18	7,260	2,183	16	210	790	98	0	0	146	15,909	0	0	354	125	0	na
2009 <sup>c</sup>	36,400	1,772	18	10,727	932	28	219	799	152	0	0	155	21,108	0	0	375	115	0	na
Non-ARRA	28,161	1,769	18	7,913	900	28	219	799	112	0	0	145	15,767	0	0	375	115	0	na
ARRA	8,240	3	0	2,814	32	0	0	0	40	0	0	10	5,341	0	0	0	0	0	na
2010	29,614	1,849	0	8,578	1,109	57	223	881	131	0	0	174	16,125	0	0	413	74	0	na
2011	29,888	1,940	0	8,738	1,199	47	218	823	154	0	0	207	16,002	0	0	438	122	0	na
2012	31,846	2,066	0	8,491	3,181	57	135	847	163	0	0	206	16,196	0	0	470	33	0	na
2013	30,202	1,950	0	8,147	2,950	17	120	762	192	0	0	208	15,317	0	0	476	63	0	na
2014	32,086	2,167	0	8,739	3,320	16	252	790	213	0	0	227	15,853	0	0	451	58	0	na
2015	31,821	2,213	1	9,308	3,210	55	254	793	214	0	0	217	15,014	0	0	484	58	0	na
2016	32,821	2,335	1	9,282	3,578	51	257	829	235	0	0	244	15,565	0	0	386	58	0	na
2017 <sup>d</sup>	34,061	2,304	0	9,168	3,606	21	268	903	234	0	0	258	16,701	0	0	538	59	0	na
2018	36,208	2,381	0	9,932	3,281	50	255	909	222	0	1	335	18,255	0	0	530	57	0	na
2019	39,352	2,613	0	10,177	4,948	49	330	965	233	0	2	329	19,056	0	0	600	52	0	na
2020 <sup>e</sup>	44,331	2,686	0	10,782	6,655	51	117	1,028	241	16	2	348	21,826	0	0	523	57	0	na
2021 preliminary <sup>e</sup>	42,520	2,819	0	10,835	4,515	16	118	1,092	250	16	2	366	21,872	0	0	555	63	0	na
2022 proposed	47,399	2,483	0	12,298	5,620	17	209	1,380	320	16	3	368	24,022	0	0	584	80	0	na

\* = amount less than \$500,000. na = not applicable. NA = not available; data were not collected for all budget functions in all years.

ARRA = American Recovery and Reinvestment Act of 2009.

<sup>a</sup> Other includes amounts not explicitly tallied in one of the separately identified categories.

<sup>b</sup> Data on budget authority for R&D plant were not tabulated before FY 2000.

<sup>c</sup> Total for FY 2009 is the sum of non-ARRA and ARRA funds.

<sup>d</sup> The data for FY 2017 and onward reflect application of the narrowed definition of *development* described by the Office of Management and Budget (OMB) in its Circular A-11 of July 2016. The previous years' numbers reflect use of the former *development* definition.



<sup>e</sup> Agencies in several functions received emergency COVID-19 funding for R&D and/or R&D plant in FY 2020 and FY 2021. This funding may be included in the data in this table, although this is not clear in all cases.

<sup>f</sup> Not all basic research funded by the federal government falls into the General science and basic research (251) category. Federal funding for basic research arises in other functional categories—such as National defense or Health—and is included in the category funding totals there.

**Note(s):**

Detail may not add to total because of rounding. In FY 2007, the Department of Homeland Security (DHS) changed its R&D portfolio to reclassify funding in National defense and most Administration of justice as General science and basic research; in FY 2013, this was reclassified back to Administration of justice. In FY 2004, DHS changed its R&D portfolio to reclassify funding in General science and basic research and in Agriculture as Administration of justice. In FY 2000, the National Aeronautics and Space Administration (NASA) transferred funding for the International Space Station program from R&D to R&D plant; the change is reflected in the budget authority for Space flight, research, and supporting activities. In FYs 2009 and 2012, NASA revised the classification of its R&D and non-R&D funding. In FY 2000, the National Institutes of Health in the Department of Health and Human Services classified all of its previous development activities as basic research or applied research, with a resulting increase in Health basic research. In FY 1998, many Department of Energy programs were reclassified from Energy to General science and basic research. In FY 1998, the Department of Veterans Affairs began reporting medical care support funds as a part of its total research budgetary resources; the change is reflected in the budget authority for Veterans benefits and services.

**Source(s):**

Data from FYs 1955–94 are from agencies' submissions to OMB, Circular A-11, exhibit 44A, "Research and development activities," and from supplemental data obtained from agencies' budget offices. Data from FYs 1995–2021 are from agencies' submissions to OMB per MAX Schedule C, budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 24

**Federal funding for R&D and R&D plant for national defense and civilian functions: FYs 1955–2022**

(Millions of current dollars and percent distribution)

Fiscal year	Current \$millions			% distribution		
	Total	National defense	Civilian functions	Total	National defense	Civilian functions
<b>R&amp;D obligations</b>						
1955	2,533	2,151	382	100.0	84.9	15.1
1956	2,988	2,535	453	100.0	84.8	15.2
1957	3,932	3,327	605	100.0	84.6	15.4
1958	4,570	3,801	769	100.0	83.2	16.8
1959	6,694	5,556	1,138	100.0	83.0	17.0
1960	7,552	6,107	1,445	100.0	80.9	19.1
1961	9,059	7,005	2,054	100.0	77.3	22.7
1962	10,290	7,238	3,052	100.0	70.3	29.7
1963	12,495	7,764	4,731	100.0	62.1	37.9
1964	14,225	7,829	6,396	100.0	55.0	45.0
1965	14,614	7,342	7,272	100.0	50.2	49.8
1966	15,320	7,536	7,784	100.0	49.2	50.8
1967	16,529	8,566	7,963	100.0	51.8	48.2
1968	15,921	8,275	7,646	100.0	52.0	48.0
1969	15,641	8,356	7,285	100.0	53.4	46.6
1970	15,339	7,981	7,358	100.0	52.0	48.0
1971	15,543	8,110	7,433	100.0	52.2	47.8
1972	16,496	8,902	7,594	100.0	54.0	46.0
1973	16,800	9,002	7,798	100.0	53.6	46.4
1974	17,410	9,016	8,394	100.0	51.8	48.2
1975	19,039	9,679	9,360	100.0	50.8	49.2
1976	20,780	10,430	10,350	100.0	50.2	49.8
1977	23,450	11,864	11,586	100.0	50.6	49.4
<b>R&amp;D budget authority</b>						
1978	25,976	12,899	13,077	100.0	49.7	50.3
1979	28,208	13,791	14,417	100.0	48.9	51.1
1980	29,739	14,946	14,793	100.0	50.3	49.7
1981	33,735	18,413	15,322	100.0	54.6	45.4
1982	36,115	22,070	14,045	100.0	61.1	38.9
1983	38,768	24,936	13,832	100.0	64.3	35.7
1984	44,214	29,287	14,927	100.0	66.2	33.8
1985	49,887	33,698	16,189	100.0	67.5	32.5
1986	53,249	36,926	16,323	100.0	69.3	30.7
1987	57,069	39,152	17,917	100.0	68.6	31.4
1988	59,106	40,099	19,007	100.0	67.8	32.2
1989	62,115	40,642	21,473	100.0	65.5	34.5
1990	63,781	39,925	23,856	100.0	62.6	37.4
1991	65,898	39,328	26,570	100.0	59.7	40.3
1992	68,398	40,083	28,315	100.0	58.6	41.4
1993	69,884	41,249	28,635	100.0	59.0	41.0
1994	68,331	37,764	30,566	100.0	55.3	44.7
1995	68,791	37,204	31,587	100.0	54.1	45.9
1996	69,049	37,801	31,248	100.0	54.7	45.3
1997	71,653	39,591	32,062	100.0	55.3	44.7
1998	73,569	39,823	33,746	100.0	54.1	45.9
1999	77,637	41,306	36,332	100.0	53.2	46.8
<b>R&amp;D and R&amp;D plant budget authority</b>						
2000	83,581	43,161	40,420	100.0	51.6	48.4

TABLE 24

**Federal funding for R&D and R&D plant for national defense and civilian functions: FYs 1955–2022**

(Millions of current dollars and percent distribution)

Fiscal year	Current \$millions			% distribution		
	Total	National defense	Civilian functions	Total	National defense	Civilian functions
2001	91,505	46,202	45,303	100.0	50.5	49.5
2002	103,057	53,731	49,326	100.0	52.1	47.9
2003	118,065	63,708	54,357	100.0	54.0	46.0
2004	126,270	70,344	55,926	100.0	55.7	44.3
2005	131,259	74,641	56,618	100.0	56.9	43.1
2006	136,019	78,737	57,282	100.0	57.9	42.1
2007	141,890	82,658	59,232	100.0	58.3	41.7
2008	144,391	85,129	59,262	100.0	59.0	41.0
2009 <sup>a</sup>	164,292	85,642	78,650	100.0	52.1	47.9
Non-ARRA	145,553	85,342	60,211	100.0	58.6	41.4
ARRA	18,739	300	18,439	100.0	1.6	98.4
2010	148,962	86,789	62,173	100.0	58.3	41.7
2011	144,379	83,226	61,153	100.0	57.6	42.4
2012	143,737	79,875	63,862	100.0	55.6	44.4
2013	132,477	70,781	61,696	100.0	53.4	46.6
2014	136,159	70,992	65,167	100.0	52.1	47.9
2015	138,544	72,950	65,594	100.0	52.7	47.3
2016	150,393	80,202	70,191	100.0	53.3	46.7
2017 <sup>b</sup>	127,306	57,530	69,776	100.0	45.2	54.8
2018	144,459	68,916	75,543	100.0	47.7	52.3
2019	149,971	72,027	77,944	100.0	48.0	52.0
2020 <sup>c</sup>	169,901	81,874	88,027	100.0	48.2	51.8
2021 preliminary <sup>c</sup>	165,560	79,584	85,976	100.0	48.1	51.9
2022 proposed	179,418	78,704	100,714	100.0	43.9	56.1

ARRA = American Recovery and Reinvestment Act of 2009.

<sup>a</sup> The total for FY 2009 is the sum of non-ARRA and ARRA funds.<sup>b</sup> The application of a narrowed *development* definition (by the Office of Management and Budget [OMB]) is shown starting in FY 2017. The previous years' numbers reflect use of the former *development* definition.<sup>c</sup> Agencies in several functions received emergency COVID-19 funding for R&D and/or R&D plant in FY 2020 and FY 2021. This funding may be included in the data in this table, although this is not clear in all cases.**Note(s):**

The National defense function includes Department of Defense military activities and Department of Energy atomic energy defense programs; some years also include defense-related R&amp;D in the Department of Homeland Security and the Department of Justice. Civilian functions include all other federally funded R&amp;D activities.

**Source(s):**

Agencies' submissions to OMB per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

TABLE 25

## Federal funding for R&amp;D plus capital R&amp;D, by GBARD socioeconomic objectives: FYs 2000–22

(Millions of dollars)

Fiscal year	Note: R&D funds	Note: Capital R&D funds	Total for all socioeconomic categories	1. Exploration and exploitation of the Earth	2. Environment	3. Exploration and exploitation of space	4. Transport, telecommunication, and other infrastructures	5. Energy	6. Industrial production and technology	7. Health	8. Agriculture	9. Education	10. Culture, recreation, religion, and mass media	11. Political and social systems, structures, and processes	12. General advancement of knowledge: R&D financed from GUF <sup>a</sup>	13. General advancement of knowledge: R&D financed from sources other than GUF	14. Defense
2000	67,764	4,917	72,681	868	537	8,437	1,710	1,031	530	18,766	2,155	NA	NA	NA	0	5,593	32,261
2001	73,789	4,749	78,538	896	574	8,951	1,708	1,320	468	21,741	2,452	NA	NA	NA	0	6,353	33,235
2002	83,232	5,433	88,665	997	592	9,227	1,939	1,332	549	24,754	2,494	NA	NA	NA	0	6,605	39,339
2003	93,246	5,521	98,767	989	567	9,677	1,917	1,403	463	27,335	2,303	NA	NA	NA	0	6,129	46,949
2004	101,843	4,403	106,246	1,027	662	9,746	1,948	1,370	479	29,346	2,466	NA	NA	NA	0	7,352	50,320
2005	106,674	4,658	111,332	1,053	641	9,656	1,918	1,324	468	29,871	2,646	NA	NA	NA	0	7,477	54,714
2006	110,047	4,395	114,442	1,045	622	10,401	1,787	1,244	459	29,702	2,670	NA	NA	NA	0	7,539	57,160
2007	113,888	3,803	117,691	965	738	10,988	1,436	1,922	487	31,080	2,325	449	19	769	0	8,712	57,802
2008	112,432	4,278	116,710	1,300	548	10,672	1,475	2,076	518	31,054	2,332	428	19	756	0	9,007	56,493
2009	128,316	8,283	136,599	1,677	565	9,060	1,536	3,794	963	43,926	2,629	464	25	754	0	14,128	57,046
2010	117,016	2,366	119,382	867	599	8,232	1,640	2,570	1,105	34,206	2,628	491	34	468	0	10,776	55,765
2011	111,464	1,922	113,386	1,315	584	8,658	1,518	2,265	532	33,536	2,211	546	27	585	0	10,581	51,027
2012	114,509	2,287	116,796	1,325	569	10,801	1,591	2,231	557	33,924	2,386	565	26	562	0	10,536	51,662
2013	107,992	1,616	109,608	1,282	540	10,476	1,439	2,289	596	32,454	2,160	486	25	1,283	0	9,620	46,894
2014	109,890	2,612	112,502	1,403	545	11,228	1,364	2,407	655	33,451	2,442	469	27	1,867	0	10,524	46,109
2015	112,766	2,454	115,220	1,444	528	10,928	1,479	3,173	669	33,443	2,540	525	27	1,436	0	11,088	47,927
2016	123,514	2,579	126,093	1,565	520	12,811	1,451	3,492	762	35,891	2,738	505	27	1,219	0	11,328	53,782
2017	124,709	2,597	127,306	1,653	505	10,187	1,586	3,544	750	37,862	2,668	505	27	1,289	0	11,289	55,441
2018	140,700	3,759	144,459	1,688	537	10,552	1,861	4,233	973	40,660	2,698	614	26	564	0	12,559	67,494
2019	145,615	4,356	149,971	1,799	521	10,133	1,895	4,473	763	42,568	3,086	587	27	593	0	13,165	70,361
2020	163,875	6,026	169,901	1,778	556	14,206	1,926	4,539	821	48,055	3,061	581	28	596	0	13,659	80,095
2021 preliminary	161,412	4,148	165,560	1,807	567	12,594	1,909	4,537	945	46,992	3,040	767	28	564	0	13,800	78,009
2022 proposed	174,787	4,631	179,418	2,614	632	13,842	2,182	6,533	1,130	53,077	3,684	819	34	585	0	15,445	78,841

NA = not available.

GBARD = government budget allocations for R&D; GUF = general university funds.

<sup>a</sup> Unlike many other countries, the United States does not support R&D by higher education institutions through large block grants to cover administrative, teaching, and research costs. Accordingly, the data entries for the United States in this column are always zero.

**Note(s):**

Detail may not add to total because of rounding. The data in this table reflect an estimated adjustment to the previously published 2000–16 time series totals (in tables 23 and 24) applying the narrowed definition of *development* described by the Office of Management and Budget in its Circular A-11 of July 2016. The 14 socioeconomic objectives categories listed are those identified by the European Union in the 2007 edition of its *Nomenclature for the Analysis and Comparison of Scientific Programmes and Budgets* (NABS). The NABS categories are the basis of the GBARD indicators that the Organisation for Economic Co-operation and Development reports for member countries and selected others in its twice-yearly *Main Science and Technology Indicators* reports. U.S. data for objectives 9, 10, and 11 are not reported for 2000–06 because the NABS category revisions of 2007 and equivalent data for these earlier years were not available. The lack of availability of details for these objectives is the main reason that the sum of the reported details for 2000-06 do not add to the "R&D plus capital R&D" totals.

**Source(s):**

Data in this table are reclassified from the R&D funding presented in previous tables of this report and according to the NABS category definitions.

## Technical Notes

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### Overview

All activities covered by the federal budget, including R&D, are classified into 20 broad functional categories (see section [Budget Functions and Classifying R&D](#)). R&D activities currently are in 16 of the 20 categories.

The tables in this report provide R&D budget authority detail for FYs 2020–22 by agency and major programs for each of the categories in which R&D is present. Several concluding tables also show budget authority data for R&D in FY 2019 and earlier years.

The data for FY 2020 are the *actual* budget authorities received by federal agencies for R&D that year. These numbers update the preliminary data for FY 2020 published in the previous edition (FYs 2019–21) of this report series.

The data for FY 2021 are *preliminary*. These preliminary numbers are normally agency estimates based on final congressional appropriations for the fiscal year. However, considerable delay arose in the Congress and with the administration in completing the final spending legislation for FY 2021, which had already formally started on 1 October 2020. Initial FY 2021 funding for the government came in the form of five temporary continuing resolutions covering 1 October through 28 December. The final funding levels were passed as a consolidated spending bill on 27 December 2020: the Consolidated Appropriations Act, 2021 (H.R. 133).

The data for FY 2022 are the funding levels *proposed* by the president’s *Budget of the United States Government, Fiscal Year 2022* (released 28 May 2021). At the time of this report, the funding levels for FY 2022 remain the subject of ongoing legislation by Congress.

Congress took a number of legislative steps from March 2020 through March 2021 to provide added appropriations in response to the COVID-19 pandemic, some of which provided increased funding for related R&D. Included here are the Coronavirus Preparedness and Response Supplemental Appropriations Act, 2020 (H.R. 6074, 6 March 2020); the Families First Coronavirus Response Act (H.R. 6201, 18 March 2020); the Coronavirus Aid, Relief, and Economic Security Act (H.R. 748, 27 March 2020); and the Paycheck Protection Program and Health Care Enhancement Act (H.R. 266, 24 April 2020). Additional funding for R&D related to COVID-19 was also provided by the aforementioned Consolidated Appropriations Act, 2021 (H.R. 133, 27 December 2020) and by the American Rescue Plan Act of 2021 (H.R. 1319, 10 March 2021).

The data throughout this report reflect agency documents and other Office of Management and Budget (OMB) data available through October 2021. Data reported here as “preliminary” or “proposed” will be revised in subsequent editions of this report series to reflect the eventual congressional appropriation actions and agency program funding decisions.

In general, the agencies’ estimates of funding for R&D in both FYs 2020 and 2021 stemming from the congressional appropriations in both these years in response to the COVID-19 pandemic continue to be unevenly and incompletely documented. Notes accompanying many of the tables indicate the extent to which funding from these supplementary appropriations are recognized in the reported data.

This report edition includes a new table ([table 25](#)) documenting the FY 2000–22 time series of yearly federal R&D appropriations reclassified according to the 14 socioeconomic objectives used by the Organisation for Economic Co-operation and Development (OECD) in reporting Government Budget Allocations for R&D (GBARD) indicators for member and other countries in its periodic *Main Science and Technology Indicators* reports (<https://www.oecd.org/sti/msti.htm>). The GBARD indicators are widely recognized around the world as a basis for comparing countries’ priorities for government R&D funding.

## Definitions

### Research, Development, and R&D Plant

In this report, R&D refers to basic research, applied research, and experimental development activities in science and engineering.

*Research and experimental development* is creative and systematic work undertaken in order to increase the stock of knowledge—including knowledge of people, culture, and society—and to devise new applications using available knowledge.

*R&D* includes administrative expenses, such as the operating costs of research facilities and equipment and other overhead costs. It also includes funds for the purchase of minor equipment—such as personal computers, standard microscopes, and simple spectrometers.

*Basic research* is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts. Basic research may include activities with broad or general applications in mind, such as the study of how plant genomes change, but should exclude research directed toward a specific application or requirement, such as the optimization of the genome of a specific crop species.

*Applied research* is original investigation undertaken in order to acquire new knowledge. Applied research is, however, directed primarily toward a specific, practical aim or objective.

*Experimental development* is creative and systematic work, drawing on knowledge gained from research and practical experience, which is directed at producing new products or processes or improving existing products or processes. Like research, experimental development will result in gaining additional knowledge.

Experimental development activities include (1) the production of materials, devices, and systems or methods, including the design, construction, and testing of experimental prototypes; and (2) technology demonstrations, where a system or component is being demonstrated at scale for the first time and it is realistic to expect additional refinements to the design (feedback R&D) following the demonstration.

Before the publication of OMB's revised guidance in Circular A-11 of July 2016, a more expansive definition of "development" was the basis for agency R&D reporting. The present guidance now identifies several specific exclusions. Experimental development does *not* include (1) *user demonstrations*, where the cost and benefits of a system are being validated for a specific use case (e.g., low-rate initial production activities); or (2) *preproduction development*, which is defined as nonexperimental work on a product or system before it goes into full production, including activities such as tooling and development of production facilities. 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 are no longer included as R&D. Activities and programs of that type generally are now reported as investments in other major non-R&D equipment.

*R&D plant* includes facilities and major equipment necessary for the execution of an R&D program. It includes the purchase, construction, manufacture, rehabilitation, or major improvement of physical assets such as land, major fixed equipment, and supporting infrastructure like a sewer line or housing at a remote location. It also includes the acquisition, design, or production of major movable equipment, such as mass spectrometers, research vessels, DNA sequencers, and other movable major instruments for use in R&D activities.

The data in this report exclude (1) all non-R&D activities performed within budget functions that conduct R&D and (2) all functions in which no R&D is conducted. [Table 6](#) is an exception, however; it continues to report RDT&E totals that previously would have been classified as R&D. In part, this table provides a gauge of the impact of the narrowed definition of development (as detailed earlier) on defense R&D totals.

## Budget Authority, Obligations, and Outlays

The federal R&D funding data presented here (with only a few noted exceptions) are provided in terms of *budget authority*. Budget authority is used because it is the initial budget stage for congressional action on the president's proposed budget. Budget authority imposes a ceiling on obligations and outlays; obligations and outlays flow from budget authority.

*Budget authority* is the primary source of legal authorization to enter into obligations that will result in outlays. Budget authority is most commonly granted in the form of appropriations by the congressional committees assigned to determine the budget for each function.

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

*Outlays* represent the amounts for checks issued and cash payments made during a given period, regardless of when the funds were appropriated or obligated.

## Budget Functions and Classifying R&D

The federal budget total is the sum of funding across the 20 broad functional categories. These categories are National defense (function 050); International affairs (150); General science, space, and technology (250); Energy (270); Natural resources and environment (300); Agriculture (350); Commerce and housing credit (370); Transportation (400); Community and regional development (450); Education, training, employment, and social services (500); Health (550); Medicare (570); Income security (600); Social security (650); Veterans benefits and services (700); Administration of justice (750); General government (800); Net interest (900); Allowances (920); and Undistributed offsetting receipts (950).

R&D has never been reported in 4 of these 20 functions: Social security (650), Net interest (900), Allowances (920), and Undistributed offsetting receipts (950). As such, these categories are not present in this report's data—except indirectly, where R&D is described as a proportion of total federal budget authority.

Small amounts of R&D had been reported in the General government (800) category up through FY 2002 but turned to zero thereafter. A small amount of R&D was again reported in FY 2012 but has been zero throughout the FY 2020–22 period covered in this report.

To better highlight R&D areas of high interest, the tables in this report split the General science, space, and technology (250) category into its two subfunctions: General science and basic research (251) and Space flight, research, and supporting activities (252).

Overall, this report's tables separately cover 16 functional categories: 14 at the broad functional category level and 2 at the subcategory level.

Each R&D activity is assigned to only one functional category—which is consistent with the official codes used in budget documents, even though the R&D activity may address the objectives of several functions. For example, all R&D activities sponsored by the Department of Defense (except for those of the U.S. Army Corps of Engineers) are classified as National defense (050), even though some of these have secondary objectives, such as Space flight, research, and supporting activities (252) or Health (550). Nonetheless, an agency's overall R&D effort can involve multiple activities spread across several functional categories, which means that a functional category can show the presence of several agencies.



Finally, not all federally sponsored basic research is categorized in the General science and basic research (251) subfunction. Some basic research is included in many of the other functional categories. Also, not all the R&D included in the General science and basic research (251) subfunction is basic research—some is applied research.

**Technical table A-1** maps the mix of agency funding of R&D activities in FYs 2020–22 across the budget function categories.

## Data Sources

The federal budget does not include a separately identified R&D account. Furthermore, most appropriations for R&D are not directly labeled as such (except in certain program areas, such as defense, energy, health, and environment). Thus, most funds for R&D are not line items in agency budget submissions but are included instead as part of general program funding.

To provide information on federal R&D funding, OMB requires all agencies with R&D funding levels greater than \$10 million annually to submit data on their R&D programs as part of their annual budget submissions. Such agencies are requested to provide data on their funding levels for basic research, applied research, experimental development, R&D facilities, and capital equipment for R&D, in accordance with OMB's Circular A-11, Section 84, "Character Classification (Schedule C)" at <https://www.whitehouse.gov/wp-content/uploads/2018/06/s84.pdf>.

The data in this report were collected from July through October 2021 and represent the agencies' official estimates of actual and proposed federal funding for R&D over FYs 2019–21. The data are based primarily on information provided to OMB by 26 agencies, which account for about 99% of all federally sponsored R&D activities. (OMB has routinely tracked the R&D budget authority for these 26 agencies; other agencies with negligible levels of R&D budget authority are excluded.) The data reflect R&D funding information that became available from individual agencies after the administration's FY 2022 budget proposal, *Budget of the United States Government, Fiscal Year 2022*, was prepared and transmitted to Congress on 28 May 2021. This information consists of budget justification documents that agencies submit to Congress and supplemental, program-specific information obtained from agency budget and program staff through October 2021. Accordingly, the budget numbers reported for individual activities, programs, or agencies may differ somewhat from those published in the president's budget or in agency budget documents.

**Table 25** reclassifies the budget function data in this report's earlier tables according to the 14 socioeconomic objective categories identified by the European Union (*Nomenclature for the Analysis and Comparison of Scientific Programmes and Budgets*, 2007 edition) and adopted by the OECD for the GBARD indicators (<https://rdmetadata.oecd.org/>) for subsequent publication in its *Main Science and Technology Indicators* statistical reports.

## Technical Tables

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Table	Title
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<a href="#">A-1</a>	Agency and budget function crosswalk, federal R&D funding, by budget function: FYs 2020–22
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TABLE A-1

## Agency and budget function crosswalk, federal R&amp;D funding, by budget function: FYs 2020–22

(Crosswalk)

Agency	Budget function															
	National defense (050)	International affairs (150)	General science and basic research (251)	Space flight, research, and supporting activities (252)	Energy (270)	Natural resources and environment (300)	Agriculture (350)	Commerce and housing credit (370)	Transportation (400)	Community and regional development (450)	Education, training, employment, and social services (500)	Health (550)	Medicare (570)	Income security (600)	Veterans benefits and services (700)	Administration of justice (750)
Agency for International Development		X														
Appalachian Regional Commission										X						
Army Corps of Engineers (civil)						X										
Consumer Product Safety Commission											X					
Department of Agriculture						X	X									
Department of Commerce						X		X								
Department of Defense (military)	X															
Department of Education											X					
Department of Energy	X		X		X											
Department of Health and Human Services											X	X	X			
Department of Homeland Security	X					X			X							X
Department of Housing and Urban Development										X						
Department of the Interior						X				X						
Department of Justice	X															X
Department of State		X														
Department of Transportation									X							
Department of Veterans Affairs															X	
Environmental Protection Agency						X										
National Aeronautics and Space Administration				X					X							
National Science Foundation			X													
Nuclear Regulatory Commission					X											
Postal Service								X								
Small Business Administration								X								
Smithsonian Institution										X						
Social Security Administration														X		
Tennessee Valley Authority					X											

X = R&amp;D function funded by specified agency.

**Source(s):**

Agencies' submissions to the Office of Management and Budget per MAX Schedule C, agencies' budget justification documents, and supplemental data obtained from agencies' budget offices.

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