

DATA BRIEF

Six States Account for Majority of R&D Spending, New NSF State Science and Engineering Profiles Available

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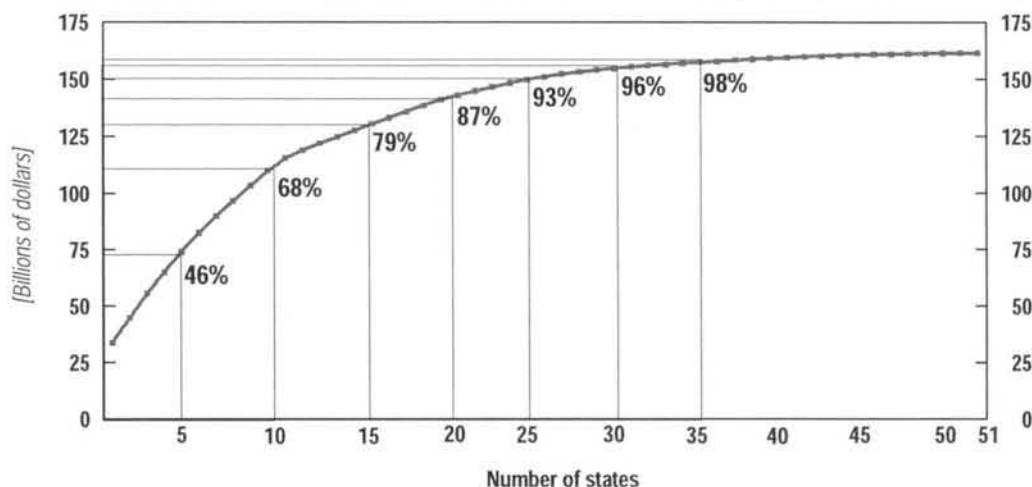
The 20 states with the largest shares of total U.S. R&D expenditures collectively account for 87 percent of the R&D conducted nationwide; the 20 states with the smallest shares, for just 4 percent of total.

Recently compiled statistics available from the National Science Foundation (NSF) detail the geographic distribution of the 1993 U.S. research and development (R&D) spending total (\$166 billion). The data include R&D performance by industry, academia, and the Federal Government and the federally funded R&D activities of nonprofit institutions. Substantial state-specific information also is available on the Federal agency sources of R&D support and on the R&D-performing sectors that receive Federal funding. These and many more statistics have been compiled in a set of 51 State Science & Engineering Profiles (including one for the District of Columbia) recently released by NSF.

State Distribution of R&D Performance

Roughly one-half of the \$166 billion of R&D spending in 1993 occurred in just six states (California, New York, Michigan, New Jersey, Massachusetts, and Pennsylvania) and 10 states (adding Texas, Illinois, Ohio, and Maryland) accounted for more than two-thirds of the national effort (chart 1). In each of these 10 states, more than \$6 billion was spent on R&D. Performance in California alone reached \$28 billion, one-fifth of all U.S. funds. R&D performance in each of the next 10 states totaled more than \$2 billion; when combined with the first 10 states, they collectively accounted for 87 percent of R&D conducted nationwide in 1993. In contrast, the 20 states with the smallest instate R&D

Chart 1. Cumulative distribution of R&D performance, by state: 1993



Electronic Dissemination

SRS data are available through the World Wide Web (<http://www.nsf.gov/sbe/srs/stats.htm>) and also through STIS, NSF's online Science and Technology Information System, described in NSF flyer 95-64, "Getting NSF Information and Publications." For a paper copy of the flyer, call 703-306-1130. For an electronic copy of the *STIS User's Guide*, send an e-mail with the phrase "get NSF9410.TXT" to stisserv@nsf.gov. For NSF's Telephonic Device for the Deaf, dial 703-306-0090.

NOTE: Includes R&D expenditures for DC but excludes R&D that cannot be distributed by state.
SOURCE: National Science Foundation/SRS, *National Patterns of R&D Resources*, annual series

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performance collectively accounted for just \$6 billion, 4 percent of nationally performed R&D.

Not coincidentally, states that are national leaders in total R&D performance usually are leading sites of industrial and academic R&D performance (table 1).

- All but Maryland ranked among the top 10 industrial performers—Washington State ranking 11th for total R&D) held the 10th spot for industrial R&D.
- All but New Jersey ranked among the top 10 academic performers—North Carolina (ranking 18th overall) ranked ninth among the academic listings.

The top 10 sites for R&D performed in Federal labs include 5 of the 10 states ranked highest in total R&D. Washington, DC, and Virginia are listed among the Federal top 10, a fact that—along with the number one ranking for Maryland—reflects the concentration of Federal

facilities and administrative offices within the Washington, DC, metropolitan area. Alabama, Florida, and New Mexico—with major space- and defense-related research activity—also were ranked among the Federal R&D top 10, but not among the 10 largest total R&D performers.

Ratio of R&D to Gross State Product

These state rankings change when R&D expenditures are normalized by the size of each state. Just as the ratio of R&D expenditures to GDP is used to gauge a country's commitment to R&D, the ratio of in-state R&D performance to gross state product (GSP) measures the R&D intensity of a state's economy and facilitates more meaningful interstate comparisons. For example, whereas the U.S. R&D/GDP ratio was 2.6 percent in 1993, the largest R&D/GSP ratio was achieved in New Mexico (8.1 percent) even though the state ranked 17th in terms of total R&D spending. The high research intensity of New Mexico's economy grew primarily from the considerable Federal

Table 1. R&D performance by state and sector and ratio of R&D to gross state product: 1993

Rank	Total R&D ¹	Largest 10 performers (ranked by size of R&D in sector)				R&D intensity	
		Total	Industry	Universities and colleges ²	Federal Government ²	Largest 10	R&D/GSP
	[Millions of dollars]						[Percent]
1	\$33,721	California	California	California	Maryland	New Mexico	8.1
2	10,975	New York	Michigan	New York	California	Maryland	6.2
3	10,778	Michigan	New York	Texas	DC	DC	6.1
4	9,468	Massachusetts	New Jersey	Maryland	Virginia	Massachusetts	5.7
5	9,182	New Jersey	Massachusetts	Massachusetts	Alabama	Michigan	5.1
6	8,278	Pennsylvania	Pennsylvania	Pennsylvania	Florida	Delaware	4.9
7	7,442	Maryland	Illinois	Illinois	Ohio	California	4.3
8	6,966	Texas	Ohio	Michigan	New Jersey	Washington	4.2
9	6,768	Illinois	Texas	North Carolina	New Mexico	New Jersey	4.0
10	6,395	Ohio	Washington	Ohio	Texas	Colorado	3.2

¹ Includes in-state R&D performance of industry, universities, federally funded research and development centers (FFRDCs), and Federal agencies and the federally funded R&D performance of nonprofit institutions.

² Excludes R&D activities of FFRDCs located within these states.

KEY: GSP = gross state product

SOURCE: NSF/SRS, *National Patterns of R&D Resources*, annual series

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support provided by the Department of Energy to the several federally funded R&D centers (FFRDCs) located in the state.

On the other hand, California—ranked first each in total, industrial, and academic R&D spending—ranked seventh in terms of R&D intensity, 4.3 percent. Most small performers, however, have low R&D intensities. There were 20 states with less than \$0.5 billion of R&D spending, and 14 of them had an R&D/GSP ratio of less than 1.0 percent.

Federal Support for R&D

The Department of Defense (DOD) and the Department of Health and Human Services (HHS) collectively provided 70 percent of the Federal Government's R&D support in 1993 to all performers, including firms, universities, nonprofit institutions, and Federal labs. California and Maryland were the two largest recipients of each of these agencies' funds (table 2) and thereby were also ranked first and second in total Federal R&D support. Performers—primarily industrial firms—in California received 27 percent of DOD's R&D support, and Maryland received 22 percent of HHS funding primarily in support of the intramural activities undertaken at its National Institutes of Health biomedical research facilities. California also received

more of the R&D funds than any other state from the National Aeronautics and Space Administration (the main recipients being firms and FFRDCs) and the National Science Foundation (support going to universities and colleges). Maryland led all other states in receiving 30 percent of R&D funds from the Department of Commerce (DOC). Again, intramural research activities accounted for most of Maryland's DOC funding, here undertaken at the agency's National Institute of Standards and Technology.

State Science & Engineering Profiles

In addition to the state statistics on R&D expenditures summarized above, NSF's Division of Science Resources Studies (SRS) collects a variety of state-specific data in its surveys of science and engineering (S&E) personnel and institutions. All this material is summarized in a set of 51 one-page state S&E Profiles available in hard copy or over the World Wide Web. Comparative statistics and rankings are provided for states' R&D and S&E resource bases, as well as for broader economic variables from non-SRS sources. The SRS-surveyed indicators include—

- doctoral scientists and engineers;
- S&E doctorates awarded, including by major S&E fields;

California and Maryland are the two largest recipients of both Federal defense and health R&D funding.

Table 2. Federal R&D obligations, by agency and state: FY 1993

Agency	Total R&D	Primary recipient	Percent	Secondary recipient	Percent
	[Millions of dollars]				
Total, all agencies.....	65,744	California	23	Maryland	11
Department of Agriculture.....	1,323	Dist. of Columbia	11	Maryland	8
Department of Commerce.....	656	Maryland	30	Colorado	11
Department of Defense.....	35,677	California	27	Maryland	10
Department of Energy.....	6,258	New Mexico	20	California	18
Dept. of Health & Human Services.....	10,297	Maryland	22	California	11
Department of the Interior.....	618	Colorado	8	Virginia	7
Department of Transportation.....	544	Massachusetts	15	New Jersey	13
Environmental Protection Agency.....	495	North Carolina	19	Virginia	12
National Aeronautics & Space Admin.....	7,995	California	32	Alabama	12
National Science Foundation.....	1,880	California	15	New York	10

SOURCE: NSF/SRS, *Federal Funds for Research and Development: Fiscal Years 1993, 1994, and 1995*, volume 43, NSF 95-334 (Arlington, VA, 1995).

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- S&E graduate students and post-doctorates;
- Federal R&D obligations, by agency and performer;
- total and industrial R&D expenditures; and
- academic R&D expenditures, including by major S&E fields.

The indicators from non-SRS sources include population, civilian labor force, per capita personal income, Federal expenditures, higher education expenditures, patents, small business innovation research awards, and gross state product originating in manufacturing, agriculture, trade, government, and services.

User Notes

U.S. and state R&D expenditures data were assembled from a number of ongoing NSF surveys. For information about, and copies of, State Science & Engineering Profiles, please contact—

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For free *printed* copies of SRS Data Briefs, write to the above address, call 703-306-1773, or send e-mail to databrief@nsf.gov.

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