

NEW NSF SURVEY FINDS SIX STATES ACCOUNT FOR NEARLY HALF OF STATE AGENCIES' R&D EXPENDITURES

by John E. Jankowski¹

Results of a new survey show that state agency expenditures for research and development and R&D facilities topped \$1 billion in state fiscal year 2006. Expenditures of six states, Pennsylvania, California, New York, Michigan, Ohio, and Florida, accounted for 49% of all state-agency research and development. This InfoBrief presents summary statistics from that survey.

Why Collect State R&D Data?

State governments play an important role in advancing knowledge—notably through their support of academic research—and in promoting science- and technology-based economic development. They also undertake their own research in support of government functions over which states have influence and responsibility, such as those related to transportation, health, and the environment. Although considerable anecdotal evidence exists of state involvement in such R&D activities, systematic state data, using consistent, uniform definitions and collection techniques, are not widely available. To help close this gap, a survey was fielded to measure R&D activity performed and funded by government agencies in each of the 50 states, the District of Columbia, and Puerto Rico (referred to collectively in this report as *state*).

State R&D Expenditures Nationwide

State agencies reported approximately \$1.1 billion in FY 2006 R&D and R&D facilities expenditures

(table 1).² Of the R&D expenditure total (\$1.0 billion), most (\$761 million) was to support R&D activities of external performers, primarily at academic institutions (\$504 million) and companies (\$136 million).³ State agencies also expended \$261 million on R&D that state agencies performed themselves.

Most state R&D expenditures (\$767 million) originated from state and other nonfederal sources; \$256 million in state-controlled funds expended for R&D originated

TABLE 1. State agency R&D and R&D facilities expenditures: FY 2006

(Millions of current dollars)

Characteristic	Expenditures
All R&D and R&D facilities expenditures	1,095.674
R&D facilities	73.198
R&D	1,022.476
Source of funds	
Federal government	255.504
State and other sources	766.971
Performer	
State agency	261.469
Academic institutions	503.973
Companies and individuals	136.375
Other	120.658
Character of work	
Basic research	213.571
Applied R&D	808.904

NOTE: Detail may not add to total because of rounding.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of FY 2006 State R&D Expenditures.



from the federal government. Overall, basic research expenditures accounted for 21% (\$214 million) of the states' R&D total.

States' R&D Focus

The names of state agencies do not always convey a precise statement of agencies' underlying mission and are at best imperfect indicators of the specific focus of agencies' activities. Nonetheless, they do provide insight on the likely purpose of their R&D funding. Among the 252 agencies nationwide that reported any R&D expenditures, the most prevalent names indicated state responsibility in areas of natural resources (64), transportation (50), agriculture (46), and health (30) (table 2). Of the nearly 170 agencies nationwide that performed R&D, the majority had names that indicated natural resources (53) and transportation (44) functions. A similar name distribution is reported for agencies that funded R&D to external performers, namely academic institutions and companies.

State-Level R&D Expenditures and Performers

The level of reported R&D state expenditures ranged from \$150,000 in Rhode Island to more than \$117

million in Pennsylvania (table 3, figure 1). Three states (Pennsylvania, California, and New York) led all others in terms of total R&D state agency expenditures. Each of these three states reported R&D expenditures of more than \$100 million in FY 2006 and collectively accounted for 32% of the \$1 billion state total. These three states and Michigan, Ohio, and Florida accounted for nearly one-half (49%) of the state-agency R&D total.

New York agencies reported the largest level of expenditures for R&D performed internally (\$42 million) in FY 2006 (table 3). Agencies in Pennsylvania (\$25 million), California (\$18 million), and Ohio (\$18 million) reported the largest amounts of R&D funding to companies. Agencies in Pennsylvania (\$69 million), New York (\$57 million), and California (\$57 million) reported the largest amounts of R&D funding to academic institutions (table 4).

These amounts are for R&D expenditures that flow through state agencies' budgets. The state totals do not include direct appropriations from state legislatures to universities, colleges, and private organizations. State agencies reported \$0.5 billion in expenditures used to

TABLE 2. State agencies that perform and/or fund R&D, by functional category: FY 2006

Functional category	All state agencies reporting R&D expenditures	R&D performing agencies	R&D funding agencies, by performer	
			Academic institutions	Companies and individuals
Agriculture (food, fiber, other agricultural products)	46	20	37	16
Community development, housing, public services	6	5	2	2
Crime prevention and control	5	5	1	1
Economic development	9	2	8	6
Education	3	2	2	1
Energy	6	2	4	4
Environment	22	15	19	11
Health	30	17	22	13
Income security	6	5	4	2
Natural resources	64	53	52	24
Science and technology base	13	4	9	7
Transportation	50	44	48	29
Other	5	5	1	6

NOTES: Functional categories are based on the name of the state agency. Detail exceeds total because agencies can be categorized in more than one functional category. Excludes agency counts for Maine.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of FY 2006 State R&D Expenditures.

TABLE 3. State agency expenditures for R&D, by state and performer: FY 2006

(Millions of current dollars)

State	All R&D expenditures	Internal performers	External performers	State	All R&D expenditures	Internal performers	External performers
United States	1,022.476	261.469	761.006	Montana	8.606	2.404	6.202
Alabama	7.269	4.339	2.930	Nebraska	5.602	0.436	5.166
Alaska	10.019	5.356	4.663	Nevada	1.397	0.323	1.074
Arizona	37.151	8.576	28.575	New Hampshire	2.041	0.425	1.616
Arkansas	4.870	1.073	3.796	New Jersey	25.900	5.484	20.417
California	107.793	16.494	91.299	New Mexico	3.105	3.000	0.105
Colorado	8.997	6.595	2.402	New York	103.597	42.048	61.549
Connecticut	19.209	14.520	4.689	North Carolina	14.344	3.789	10.555
Delaware	2.812	1.207	1.605	North Dakota	21.062	0.762	20.300
District of Columbia	1.173	0.302	0.871	Ohio	55.069	1.515	53.554
Florida	42.330	10.014	32.316	Oklahoma	8.922	0.083	8.839
Georgia	10.620	0.861	9.759	Oregon	7.383	3.318	4.065
Hawaii	12.068	2.329	9.739	Pennsylvania	117.320	3.311	114.009
Idaho	2.281	0.258	2.023	Rhode Island	0.150	0.000	0.150
Illinois	37.184	17.617	19.567	South Carolina	22.428	15.781	6.647
Indiana	6.221	2.364	3.857	South Dakota	5.792	2.319	3.473
Iowa	13.564	5.754	7.810	Tennessee	5.355	0.704	4.651
Kansas	14.348	2.138	12.211	Texas	28.020	5.870	22.149
Kentucky	17.559	3.703	13.856	Utah	3.214	0.964	2.250
Louisiana	11.217	7.531	3.686	Vermont	1.681	0.849	0.832
Maine	17.509	0.000	17.509	Virginia	11.580	5.046	6.534
Maryland	24.945	6.086	18.859	Washington	22.834	12.187	10.647
Massachusetts	10.729	3.624	7.106	West Virginia	6.025	1.768	4.257
Michigan	75.017	1.527	73.489	Wisconsin	10.949	5.534	5.415
Minnesota	6.219	2.132	4.087	Wyoming	6.327	4.216	2.110
Mississippi	2.745	1.485	1.260	Puerto Rico	1.459	1.274	0.184
Missouri	18.465	12.172	6.294				

NOTES: Detail may not add to total because of rounding. External performers include academic institutions, companies, individuals, and other.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of FY 2006 State R&D Expenditures.

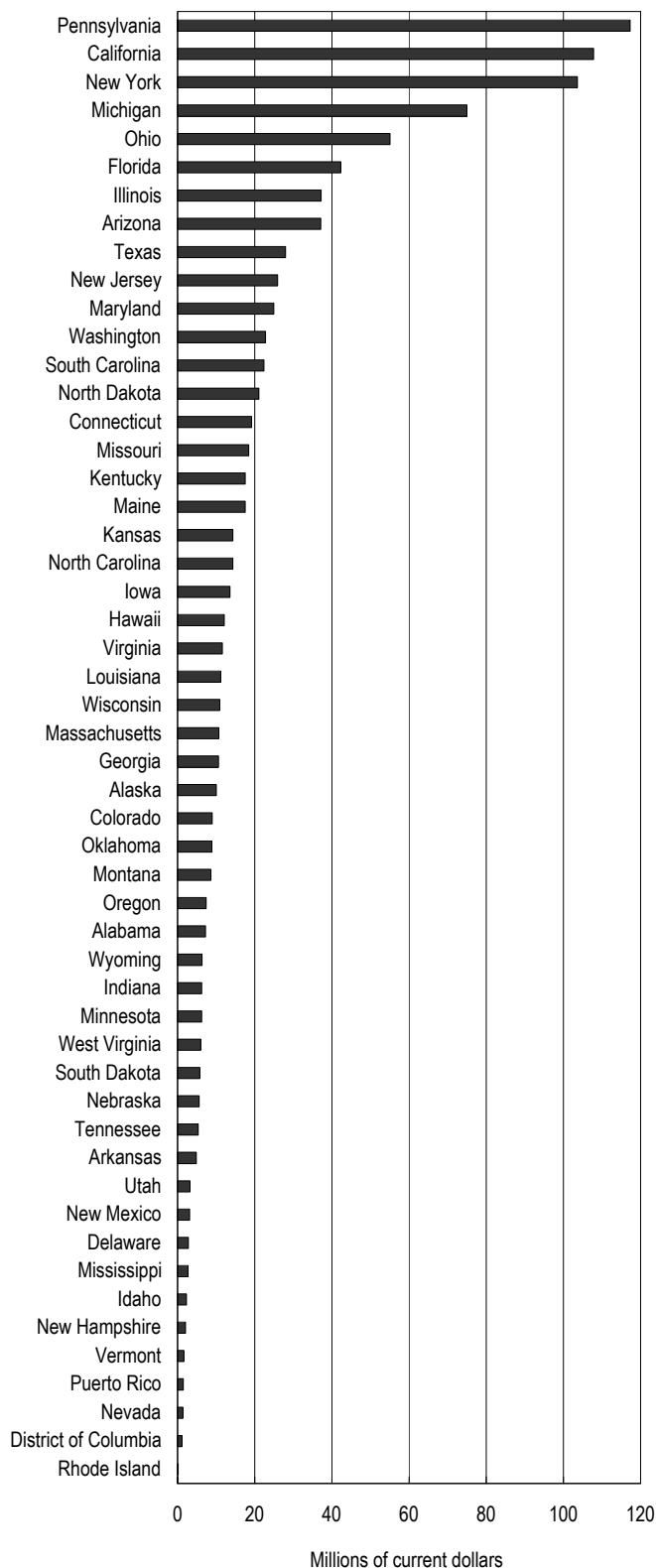
support R&D performance by academic institutions. By comparison, on a different National Science Foundation (NSF) survey, academic institutions reported expending \$3.0 billion in FY 2006 on separately budgeted R&D activities that were funded from all sources of state and local government support.⁴ A major factor in the difference between the totals reported to the academic and the state R&D surveys is that direct appropriations to state-run universities are included in the former but not the latter. Another likely factor is the exclusion of R&D at agricultural experiment stations from the state survey totals. Table 4 provides state-specific comparisons between state agency reports of R&D funding to

the academic sector and university and college reports of R&D funding from all state and local government sources.

Data Comments

All 50 states, the District of Columbia, and Puerto Rico participated in the survey. A total of 423 state agencies were contacted, of which 416 (98.3%) responded to the survey. 252 agency respondents reported performing or funding R&D. (Maine did not report R&D details for the 10 individual agencies that were contacted but provided aggregate R&D totals for all agencies combined; those

FIGURE 1. State agency R&D expenditures, by state: FY 2006



SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of FY 2006 State R&D Expenditures.

10 agencies are excluded from these agency counts.) The data collection agent was the U.S. Census Bureau.

Two previous NSF-supported surveys of state government R&D were undertaken more than a decade ago. Because of differences in the survey populations, definition of covered R&D activities, and collection methods, the results of those surveys are not comparable with the statistics collected on the FY 2006 Survey of State R&D Expenditures.^{5,6}

The data reported here focus exclusively on R&D expenditures of state departments, agencies, commissions, and dependent entities, with the exception of state-run colleges and universities. Universities, colleges, or other higher education entities surveyed under the NSF Survey of R&D Expenditures at Universities and Colleges were out of scope, as respondents, for this effort. Laboratories and experiment stations controlled by state universities also were considered out of scope. Any entities determined to be nonprofit or private, as defined by Census Bureau government classification, were also excluded from the respondent universe. Several industry-specific state commissions, which are generally chartered by state legislatures, but administered independently, were considered state agencies and included in the survey.

Data Availability

A full set of detailed tables from this survey will be available in the forthcoming report *State Agency Research and Development Expenditures: Fiscal Year 2006* at <http://www.nsf.gov/statistics/staterd/>. Individual detailed tables from the 2006 survey may be available in advance of publication of the full report. For further information, please contact the author.

Notes

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2. R&D facilities include construction projects, major renovations of buildings, and the acquisition of land and buildings used primarily for R&D.

TABLE 4. State-funded R&D expenditures at universities and colleges, reported by academic and state agency survey respondents: FY 2006 (Millions of current dollars)

State	State agency survey ^a	Academic survey ^b	State	State agency survey ^a	Academic survey ^b
United States	503.973	3,013.112	Montana	2.915	22.218
Alabama	1.830	9.989	Nebraska	2.344	10.881
Alaska	0.621	2.392	Nevada	1.054	7.695
Arizona	20.914	29.386	New Hampshire	1.087	9.425
Arkansas	2.296	50.625	New Jersey	18.121	57.502
California	57.223	266.911	New Mexico	0.065	27.164
Colorado	1.198	18.030	New York	57.387	201.728
Connecticut	3.969	9.334	North Carolina	9.750	138.796
Delaware	0.719	4.989	North Dakota	8.977	32.349
District of Columbia	0.781	4.477	Ohio	33.956	150.297
Florida	21.162	169.020	Oklahoma	4.561	39.099
Georgia	2.937	82.124	Oregon	2.872	44.585
Hawaii	2.504	8.933	Pennsylvania	68.743	121.023
Idaho	1.313	25.643	Rhode Island	0.150	8.032
Illinois	15.428	67.523	South Carolina	3.838	34.467
Indiana	3.702	62.201	South Dakota	2.090	15.848
Iowa	6.932	50.318	Tennessee	4.348	64.384
Kansas	9.483	49.150	Texas	22.106	409.255
Kentucky	12.249	54.237	Utah	2.000	20.632
Louisiana	3.605	105.588	Vermont	0.610	5.679
Maine	0.000	8.811	Virginia	5.567	104.458
Maryland	14.712	63.874	Washington	5.667	42.391
Massachusetts	5.907	53.406	West Virginia	4.113	5.220
Michigan	37.931	74.737	Wisconsin	3.309	36.584
Minnesota	3.732	53.684	Wyoming	1.969	2.616
Mississippi	0.454	35.180	Puerto Rico	0.000	6.793
Missouri	4.771	33.429			

^aExcludes direct legislative appropriations to academic institutions and R&D performed at agricultural experiment stations.

^bIncludes academic R&D support from local government sources.

SOURCES: National Science Foundation/Division of Science Resources Statistics (NSF/SRS), Survey of FY 2006 State R&D Expenditures; NSF/SRS Survey of Research and Development Expenditures at Universities and Colleges: FY 2006.

3. The amounts reported for companies include funding to individuals.

4. National Science Foundation, Division of Science Resources Statistics. 2007. *Academic Research and Development Expenditures: Fiscal Year 2006*. Detailed Statistical Tables NSF 08-300. Arlington, VA. Available at <http://www.nsf.gov/statistics/nsf08300/>.

5. National Science Foundation, Division of Science Resources Studies. 1990. *Research and Development Expenditures of State Government Agencies: Fiscal*

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6. National Science Foundation, Division of Science Resources Studies. 1999. *What is the State Government Role in the R&D Enterprise?* NSF 99-348. Arlington, VA. Available at <http://www.nsf.gov/statistics/nsf99348/>. (Report based on Survey of State Research and Development Expenditures: Fiscal Year 1995, conducted by Battelle Memorial Institute and State Science & Technology Institute.)

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