

# DATA BRIEF

## Nonprofit Sector's R&D Grows Over Past Quarter Century

by Mary  
V. Burke

*First survey of nonprofits in 23 years shows substantial growth in R&D expenditures.*

### Electronic Dissemination

SRS data are available through the World Wide Web (<http://www.nsf.gov/sbe/srs/>). For more information about obtaining reports, contact [paperpubs@nsf.gov](mailto:paperpubs@nsf.gov) or call 301-947-2722. For NSF's Telephonic Device for the Deaf, dial 703-292-5090.

NSF 01-318

As U.S. research and development (R&D) spending has grown over the past 24 years, the nonprofit sector's share has kept up with that of its larger colleagues. Nonprofit organizations' (NPOs) R&D performance held steady at 3 percent of total U.S. R&D from 1973-97. Thus, for 1997, intramural research and development (R&D) expenditures at U.S. nonprofit organizations are estimated at \$7.3 billion, a 4 percent or \$286 million current dollar increase from \$7.1 billion in 1996. The 1997 amount equated to an average annual current dollar increase of 10 percent (5 percent when adjusted for inflation) over the \$0.8 billion expended in 1973, the last time a survey of this sector's R&D work was conducted (table 1).<sup>1</sup> Performers spent an estimated \$1.5 billion for extramural<sup>2</sup> R&D in 1997 and \$1.3 billion in 1996. Extramural R&D is estimated to have increased almost 13 percent between 1996 and 1997.<sup>3</sup>

### Limitations of Data

The final response rate for the 1996-97 survey was 40 percent, adjusting for the nonrespondents that were assumed to be ineligible because they were out of business or could not be traced anywhere in the U.S. Although the response rate is not as high as in other NSF surveys, the overall data totals and major components are presented with sufficient reliability for use. The survey had low nonresponse from certainty stratum of large nonprofit organizations and substantial work was done in weighting for all nonrespondents. Hot-deck imputation was used for item nonresponse. Smaller data items are reported in tables so that readers may judge the large components in context, but the standard errors for items below \$1 billion are quite high, making comparisons of small cells in tables inadvisable.

**Table 1. Intramural R&D expenditures by nonprofit organizations, by character of work: fiscal years 1973, 1996, and 1997**

Character of work	Intramural R&D expenditures			Character of work as percentage of total R&D	
	1973	1996	1997	1973	1997
	(in millions of current dollars)			Percentage of R&D	
Total R&D.....	786	7,063	7,349	100.0	100.0
Federal.....	485	3,740	3,709		
Non-Federal.....	300	3,323	3,640		
Basic research.....	318	3,926	4,004	40.5	54.5
Federal.....	187	2,041	2,049		
Non-Federal.....	131	1,885	1,954		
Applied research.....	331	2,059	2,202	42.1	30.0
Federal.....	211	1,164	1,207		
Non-Federal.....	119	895	995		
Development.....	137	1,079	1,143	17.5	15.6
Federal.....	87	536	452		
Non-Federal.....	50	544	691		

**NOTES:** Intramural R&D includes all direct and indirect costs incurred for R&D performed by people engaged in R&D at the respondent nonprofit organizations. Data exclude R&D performed by nonprofit-administered Federally Funded Research and Development Centers in 1973, 1996, and 1997.

**SOURCES:** National Science Foundation/Division of Science Resources Studies, R&D Activities of Independent Nonprofit Institutions, 1973, and Survey of R&D Funding and Performance by Nonprofit Organizations, 1996 and 1997.

<sup>1</sup>Most dollar values and growth rates in this Data Brief are in current dollars. Constant (1996) dollar R&D was \$2.3 billion in 1973 and \$7.2 billion in 1997. Readers wishing to calculate real changes for other data items can deflate current dollar values to constant dollars. The GDP deflator, based on constant 1996 dollars, is 34.02 for 1973, 100.0 for 1996, and 101.66 for 1997.

<sup>2</sup>Extramural R&D funding includes all R&D contracts, subcontracts, all costs of R&D the NPOs contracted out or passed through to sub-recipients, and R&D conducted by others outside the NPOs with funds distributed through or by the NPOs. In contrast, intramural R&D includes all direct and indirect costs incurred for R&D performed by people engaged in R&D at the respondent nonprofit organizations.

<sup>3</sup>Extramural R&D expenditures were not collected in the 1973 survey.

### Top 10 Respondents<sup>4</sup> Account for 18 Percent of Nonprofit R&D

The 10 respondents with the largest R&D expenditures accounted for 18 percent of total nonprofit intramural expenditures in both 1996 and 1997 (table 2). Eight of the 10 also participated in the 1973

<sup>4</sup>This top 10 list is a list of respondents. There are several large nonprofit organizations that did not respond to the survey questionnaire. These large NPOs may have made the top 10 list. Totals are adjusted for unit nonresponse.

Nonprofit Sector's R&D Grows Over Past Quarter Century...—page 2

*Nonprofit organizations emphasize basic research, which comprises 54 percent of their R&D work.*

survey.<sup>5</sup> In 1973, the top 10 respondents performed 43 percent of all nonprofit intramural R&D. This indicates that R&D in the nonprofit sector may be less concentrated in 1997 than in 1973 despite the fact that Howard Hughes Medical Institute (HHMI) increased its R&D expenditures from \$1.8 million in 1973 to \$352.0 million in 1997.<sup>6</sup> HHMI's increase is a unique case and is due to a huge increase in its endowment.

**Sources of Funds for Intramural R&D**

NPOs reported that the Federal Government provided approximately half their R&D funding in 1996 and 1997 (table 3). In 1973, nonprofit organizations received almost 62 percent of their R&D funding from the Federal Government.

The importance of funding from "other sources" that include organizations' own funds, all foreign sources, and donations from individual persons<sup>7</sup> increased from 17 percent in 1973 to 30 percent in 1997. Anecdotal evidence indicates that most of "other sources" are from organizations' own

funds.<sup>8</sup> Respondents received an additional 6 percent of their 1997 intramural R&D funds from "other nonprofit organizations." Thus, approximately 36 percent of the 1997 R&D performed in the nonprofit sector was funded by the sector itself.

**R&D by Character of Work**

For 1997, nonprofit R&D performers reported that the greater part (\$4.0 billion or 54 percent) of their intramural R&D work was in basic research. This contrasts with the 40 percent share for basic research reported in 1973.

The proportion of nonprofit expenditures used for applied research declined over the quarter century. In 1973, 42 percent of nonprofit R&D expenditures supported work in applied research. This share declined to 30 percent (\$2.2 billion) in 1997. Part of this shift is a result of R&D changes at the Howard Hughes Medical Institute (HHMI), the largest respondent in the survey. In 1973, all of its research expenditures—\$1.8 million—were

**Table 2. Top 10 nonprofit organization respondents by amount of intramural R&D expenditures: fiscal years 1996 and 1997**

Name of nonprofit organization	Intramural R&D expenditures (in millions of current dollars)	
	1996	1997
Total nonprofit intramural R&D, U.S. weighted.....	7,063	7,349
Subtotal, top 10 respondents.....	1,255	1,343
Howard Hughes Medical Institute.....	304	352
Mayo Foundation/St. Mary's Hospital Rochester.....	140	157
SRI International.....	146	146
Memorial Sloan Kettering Cancer Center .....	112	115
Research Triangle Institute.....	113	113
Fred Hutchinson Cancer Research Center.....	90	100
SEMATECH, Inc.....	106	98
Dana-Farber Cancer Institute (Children's Cancer Research Foundation)	91	91
Brigham and Women's Hospital.....	79	88
Beth Israel Deaconess Medical Center, Inc.....	75	83

**NOTE:** Intramural R&D includes all direct and indirect costs incurred for R&D performed by people engaged in R&D at the respondent nonprofit organizations.

**SOURCE:** National Science Foundation/Division of Science Resources Studies, Survey of R&D Funding and Performance by Nonprofit Organizations, 1996 and 1997.

<sup>5</sup>The two respondents among the 1997 top 10 that did not participate in the 1973 survey are Fred Hutchinson Cancer Research Center, founded in 1971, and SEMATECH, Inc, founded in 1987.  
<sup>6</sup>The current 1996-97 survey concentration rate may have been affected by the nonresponse of several large NPOs. See footnote 4 above.

<sup>7</sup>"Other sources, including organization's own funds" includes funds other than those from Federal, State and local governments, universities and colleges, other nonprofit organizations, or industry. Other sources include gifts, grants, or contracts received from private individuals and all foreign sources. Organization's own funds include earnings from investments, disbursements from capital, membership dues and assessments, liquidation of assets, unrestricted funds from all sources except other nonprofit organizations, and earnings from miscellaneous sources such as publication sales, admissions, advertising, etc.

used for applied research. In 1976, HHMI began to alter its emphasis; by 1997, all \$352 million of its work was performed in basic research.

In contrast to the change from applied research to basic research over the 1973-97 period, development's share has remained relatively steady, accounting for 16 percent (\$1.1 billion) in 1997 and 18 percent (\$0.1 billion) in 1973.

<sup>8</sup>Members of the NSF Special Emphasis Panel which represented nonprofit organizations and groups said most of the "other sources" of nonprofit organizations would be their own funds. The Panel met on December 10, 1996, at NSF's Arlington office.

## Nonprofit Sector's R&amp;D Grows Over Past Quarter Century...—page 3

**Table 3. Intramural R&D expenditures by nonprofit organizations, by source of funds: fiscal years 1973, 1996, and 1997**

Source	(in millions of current dollars)		
	1973	1996	1997
Total.....	786	7,063	7,349
Federal Government.....	485	3,740	3,709
State and local governments.....	17	148	173
Universities and colleges <sup>1</sup> .....	n.a.	45	48
Other nonprofit organizations.....	50	376	411
Industry.....	99	740	823
Other sources <sup>2</sup> .....	134	2,014	2,185

<sup>1</sup> In 1973, universities and colleges were included with "Other sources" of funding.

<sup>2</sup> Includes organizations' own funds and gifts, grants, and contracts from private individuals and all foreign sources.

**KEY:** n.a. = Not available at this level of detail.

**NOTES:** Intramural R&D includes all direct and indirect costs incurred for R&D performed by people engaged in R&D at the respondent nonprofit organizations. Data exclude R&D performed by nonprofit-administered Federally Funded Research and Development Centers in 1973, 1996, and 1997.

**SOURCES:** National Science Foundation/Division of Science Resources Studies, R&D Activities of Independent Nonprofit Institutions, 1973, and Survey of R&D Funding and Performance by Nonprofit Organizations, 1996 and 1997.

**Table 4. Intramural R&D expenditures by nonprofit organizations, by science and engineering field: fiscal years 1973, 1996, and 1997**

S&E field	(in millions of current dollars)		
	1973	1996	1997
Total.....	785	7,063	7,349
Life sciences.....	357	5,084	5,289
Biological sciences.....	n.a.	805	854
Agricultural sciences.....	n.a.	22	22
Medical & health sciences.....	n.a.	4,257	4,413
Psychology.....	30	61	70
Environmental/earth sciences.....	20	242	232
Physical sciences.....	71	229	255
Mathematics & computer sciences.....	37	240	269
Engineering.....	135	491	490
Social sciences.....	129	294	325
Other sciences <sup>1</sup> .....	6	423	419

<sup>1</sup> Much of the "other sciences" in 1997 was reported by Sematech (\$98 million) and the Summer Institute for Linguistics (\$40 million).

**KEY:** n.a. = Not available at this level of detail.

**NOTES:** Intramural R&D includes all direct and indirect costs incurred for R&D performed by people engaged in R&D at the respondent nonprofit organizations. Data exclude R&D performed by nonprofit-administered Federally Funded Research and Development Centers in 1973, 1996, and 1997.

**SOURCES:** National Science Foundation/Division of Science Resources Studies, R&D Activities of Independent Nonprofit Institutions, 1973, and Survey of R&D Funding and Performance by Nonprofit Organizations, 1996 and 1997.

### Fields of Science and Engineering

The life sciences were the focus of most nonprofit R&D in 1997 (table 4). At \$5.3 billion, the life sciences accounted for 72 percent of 1997 intramural expenditures, up considerably from a 45-percent share in 1973.<sup>9</sup>

<sup>9</sup>The methodology of the 1996-97 survey may have exaggerated the concentration of R&D in the life sciences. Specifically, the Association of Independent Research Institutes (AIRI) encouraged its members to respond. AIRI specializes in biomedical research, and 49 (21 percent) of the 233 survey respondents were AIRI members. No other group received as much follow-up attention.

### Survey Technical Notes

From June 1998 through December 1999, the National Science Foundation collected data from nonprofit organizations (NPOs) for their fiscal years 1996 and 1997 funding and performance of science and engineering R&D. NSF used an Internal Revenue Service public-use file of 600,000 NPOs that was reduced to a database of almost 185,000 possible nonprofit R&D performers.<sup>10</sup> NSF sent screener questionnaires to approximately 9,000

<sup>10</sup>The Internal Revenue Service file was trimmed by removing private foundations, NPOs that had gross receipts of less than \$25,000, and religious organizations.

## Nonprofit Sector's R&amp;D Grows Over Past Quarter Century...—page 4

nonprofit organizations that were selected by probability proportional to size of their gross annual 1996 expenditures. Seven hundred and ninety-five of the NPOs that returned the screener questionnaires were eligible and were sent the R&D performer survey form. Two hundred and thirty-three NPOs with at least \$250,000 in annual R&D completed the form.

Coverage in the 1996-97 survey differed from that of the 1973 survey. The 1973 survey form was sent to 664 known R&D performers; the 1996-97 survey was sent to a sample of all nonprofit organizations. The 1973 survey assumed it had captured all major nonprofit R&D performers; the survey results from 444 NPOs (437 when the seven Federally Funded Research and Development Centers are removed) and estimates for 220 nonrespondents were reported as national nonprofit totals. The 1996-97 survey sampled all nonprofit organizations; national estimates were then calculated from data that were weighted for nonrespondents. Education R&D was included in 1973, but excluded from the current survey.<sup>11</sup> Data for 1973 were not adjusted for the presence of education R&D. Respondents in both surveys were asked to report R&D according to their organizational fiscal years.

<sup>11</sup>In the 1973 survey, education R&D was part of the larger category "other social sciences, not elsewhere classified" that was \$53 million.

The 1996-97 survey provided a new expenditures benchmark for R&D performance by NPOs which is higher than previous NSF estimates for this sector. As evidence of this, NSF staff estimated nonprofit R&D performance at \$5.6 billion for 1997 before the current survey data became available. These lower estimates were based on nonprofit data in other SRS R&D expenditures surveys. Higher NSF estimates based on the results of the current survey are available in *National Patterns of R&D Resources: 2000 Data Update* at <http://www.nsf.gov/sbe/srs/nsf01309/start.htm>.

See the complete Methodology Report and information on other SRS R&D expenditures surveys at <http://www.nsf.gov/sbe/srs/survey.htm>.

For more information about this Data Brief contact:

**John E. Jankowski**  
**Division of Science Resources Studies**  
**National Science Foundation**  
**4201 Wilson Boulevard, Suite 965**  
**Arlington, VA 22230**

**703-292-7781**  
**[jjankows@nsf.gov](mailto:jjankows@nsf.gov)**

NSF 01-318

RETURN THIS COVER SHEET TO ROOM P35 IF YOU DO  
 NOT WISH TO RECEIVE THIS MATERIAL  OR IF  
 CHANGE OF ADDRESS IS NEEDED  INDICATE  
 CHANGE INCLUDING ZIP CODE ON THE LABEL (DO  
 NOT REMOVE LABEL).

OFFICIAL BUSINESS  
 PENALTY FOR PRIVATE USE \$300

NATIONAL SCIENCE FOUNDATION  
 ARLINGTON, VA 22230

PRESORTED STANDARD  
 POSTAGE & FEES PAID  
 National Science Foundation  
 Permit No. G-69