



NSF Higher Education R&D Survey

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National Science Foundation
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www.nsf.gov/statistics/



Presentation Outline

- Overview of National Center for Science and Engineering Statistics (NCSES)
- Overview of Higher Education R&D Survey
- Overall trends
- Summary of recent field of R&D revisions
- Discussion of potential future survey revisions and additions
- Open Forum
- Next steps




Overview of NCSES

- A federal statistical agency that reports to the National Science Foundation's Directorate for Social, Behavioral, and Economic Sciences.
- NCSES provides data users with objective, high-quality statistical information on U.S. and international science, engineering, technology, and R&D, and fosters research that improves the measurement and understanding of science and engineering enterprise.



NCSES Home Page: nsf.gov/statistics



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National Center for Science and Engineering Statistics

The National Center for Science and Engineering Statistics (NCSES) is the nation's leading provider of statistical data on the U.S. science and engineering enterprise.

Explore our website for data on research and development, the science and engineering workforce, the condition and progress of STEM education, and U.S. competitiveness in science, engineering, technology, and R&D.

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What's New?

U.S. R&D Increased by \$20 Billion in 2015, to \$495 Billion; Estimates for 2016 Indicate a Rise to \$510 Billion
INFOBRIEFS | NSF 18-308 | DECEMBER 14, 2017


State Government R&D Expenditures Increase 3.1% in FY 2016
INFOBRIEFS | NSF 18-305 | DECEMBER 13, 2017

Survey of State Government Research and Development: FY 2016
DATA TABLES | DECEMBER 13, 2017

Science and Engineering State Profiles: Fall 2017 update
OTHER WEB PRODUCT | DECEMBER 7, 2017

Doctorate Recipients from U.S. Universities: 2016
DATA TABLES | NSF 18-304 | DECEMBER 6, 2017

Universities Report Increased Federal R&D Funding after 4-year Decline; R&D Fields Revised for FY 2016




Key Publications

[Science and Engineering Indicators](#)

[Women, Minorities, and Persons with Disabilities in Science and Engineering](#)

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Statistics - it's not what you think.
Learn more about the importance of statistics

Higher Education R&D Survey

Overview

- Conducted annually since FY 1972, significantly redesigned in FY 2010
- Census of all U.S. universities and colleges with minimum of \$150,000 of R&D spending (N = 926 in FY 2016)
- Survey response rate has consistently been over 95%
- Requests expenditures for all separately accounted for R&D performed at institutions during previous academic FY
- Institution level tables available on NCSES website

Higher Education R&D Survey

Overview

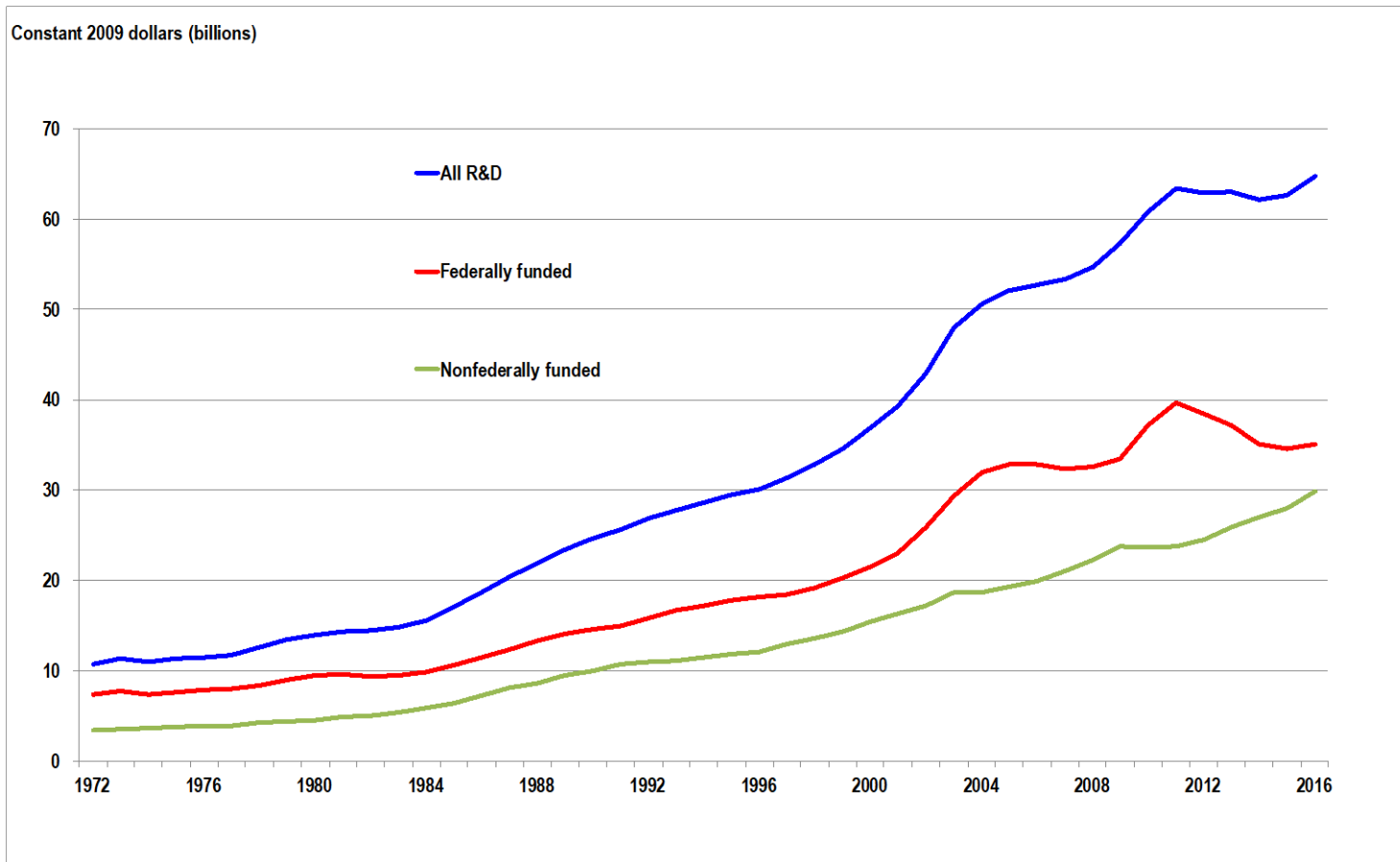
- Types of data collected:
 - ✓ Federal agency sources of funding by field
 - ✓ Nonfederal sources of funding by field
 - ✓ Type of R&D (basic research, applied research, and experimental development)
 - ✓ Spending on R&D equipment by field
 - ✓ R&D spending passed through to subrecipients or received as a subrecipient

Higher Education R&D Survey

Overview

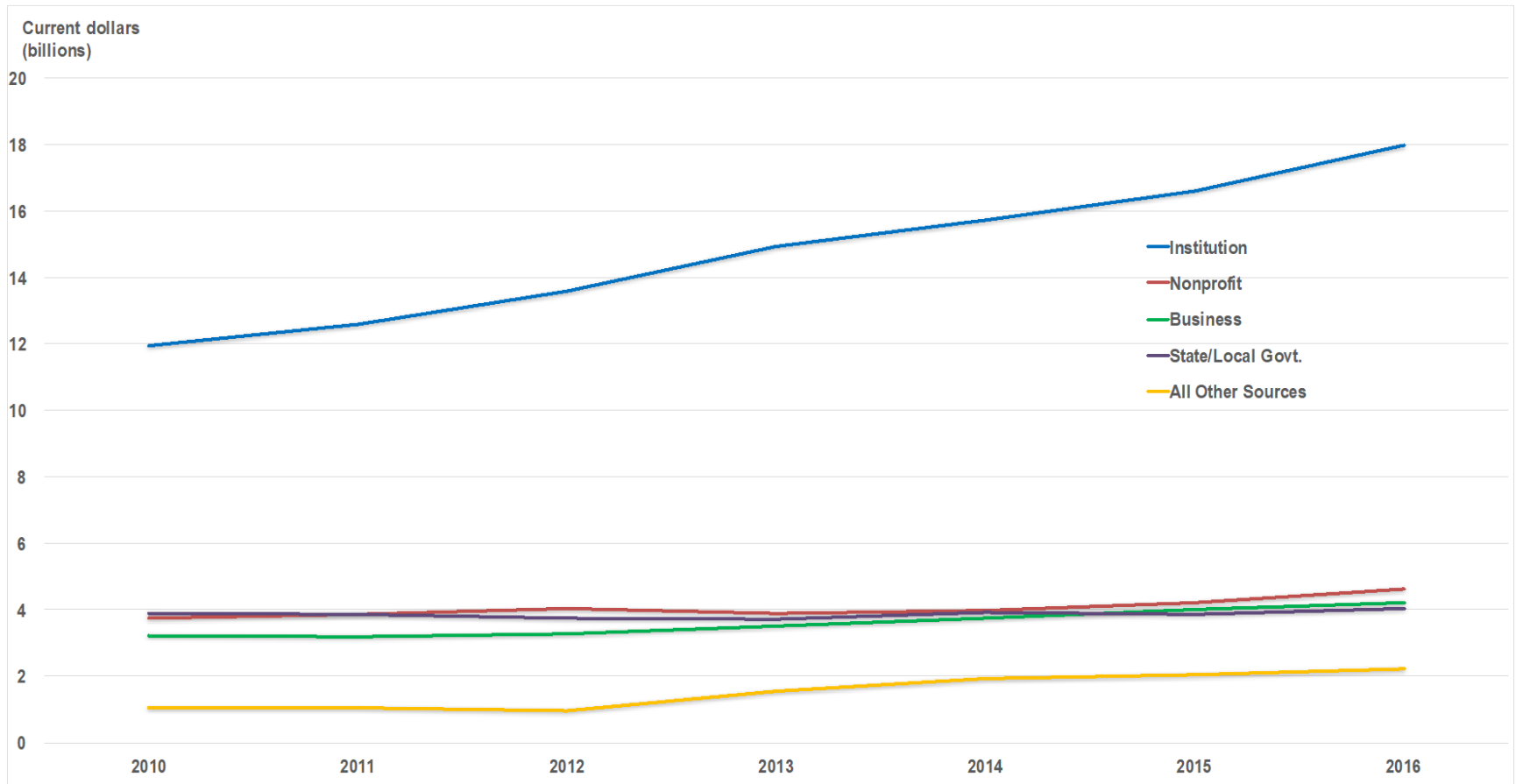
- Types of data collected (continued):
 - ✓ Foreign sources of funding
 - ✓ Medical school R&D
 - ✓ Clinical trial R&D
 - ✓ Type of funding agreement: contracts vs. grants
 - ✓ Specific cost elements of R&D expenditures (salaries, software, equipment, etc.)
 - ✓ Headcounts of personnel paid from R&D accounts

Trends in Higher Education R&D Spending by Source of Funds: FYs 1972-2016



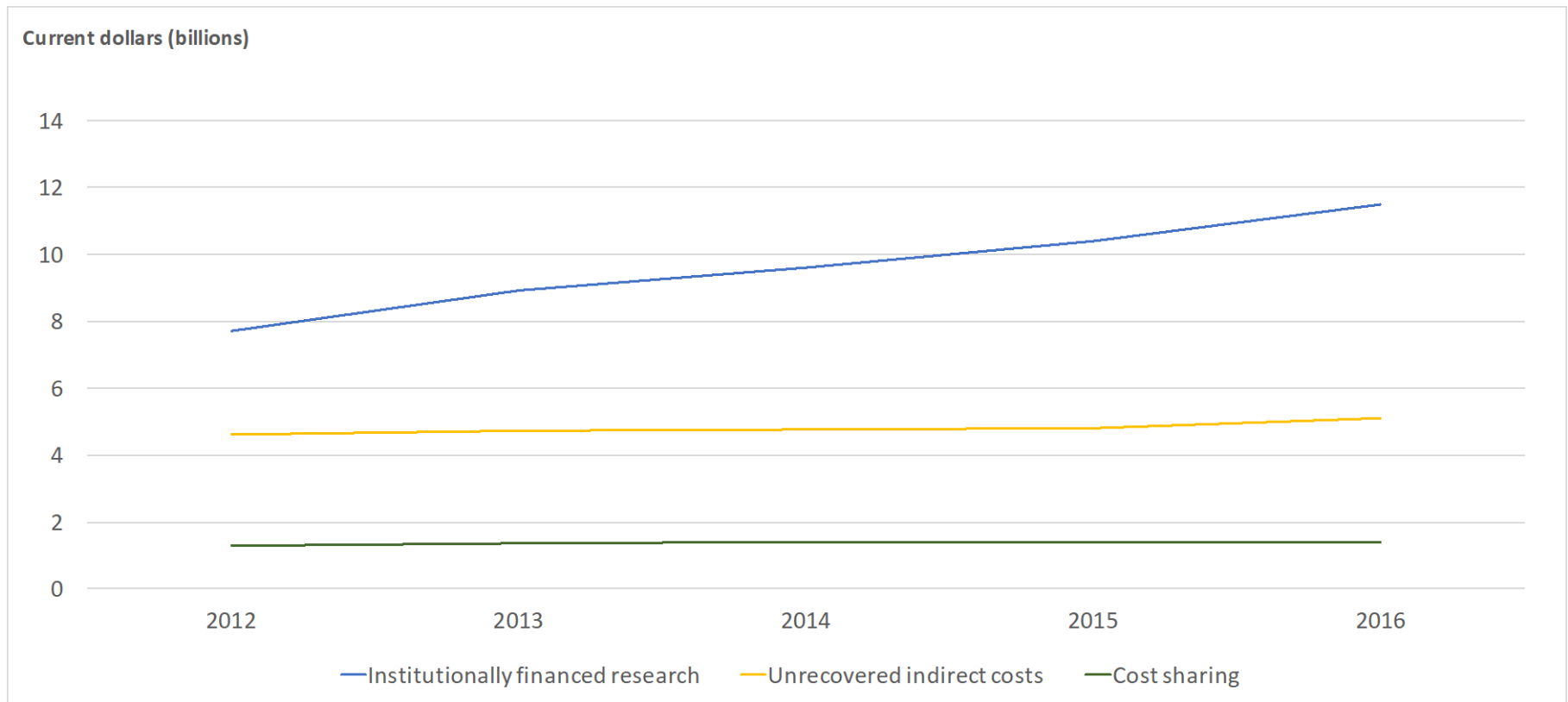
SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Higher Education Research and Development Survey.

Higher Education R&D Spending by Nonfederal Sources of Funds: FYs 2010-16



SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Higher Education Research and Development Survey.

Institutionally-financed Higher Education R&D Spending by Type of Cost: FYs 2010-16



SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Higher Education Research and Development Survey.

Summary of FY 2016 Field of R&D Revisions (1)

- Fields of R&D updated to make the survey fields more consistent with taxonomy used across NCSES and by the Department of Education's Classification of Instructional Programs (CIP)
- Changes included:
 - Fields now listed in alphabetical order
 - Some field names were revised to better reflect the disciplines included in those fields
 - New disciplines were added as examples under many fields
 - Some disciplines were reclassified under different fields

Summary of FY 2016 Field of R&D Revisions (2)

- Four new fields added:
 - 1) Industrial and Manufacturing Engineering under Engineering
 - 2) Natural Resources and Conservation under Life Sciences
 - 3) Materials Science under Physical Sciences
 - 4) Anthropology under Social Sciences

- Overall, 37% of institutions reported expenditures in at least one of the new R&D fields in FY 2016

Summary of FY 2016 Field of R&D Revisions (3)

- The new field with the largest amount of expenditures was Natural Resources and Conservation; 23% of institutions reported expenditures in this field (total of \$690 million)
- FY 2016 data tables include a technical notes appendix detailing the field changes
- Broad field trends are largely unaffected

Discussion of potential future survey revisions and additions

- Last comprehensive survey redesign began 10 years ago
- Several new areas of content and revisions needed to fill data needs and improve international comparability
- Site visits conducted with 4 institutions last summer to begin feasibility discussions

Potential new content areas: Capital expenditures for R&D (1)

- Currently, HERD only asks about capital expenditures for R&D equipment, other countries measuring HERD include all capital expenditures for R&D
- NCSES considering adding a question to the survey to collect capital R&D expenditures for land, buildings, equipment, software and intellectual property

Potential new content areas: Capital expenditures for R&D (2)

Question X. Of your capital expenditures for R&D in FY 20XX, how much was spent for each of the following categories?

	R&D expenditures (Dollars in thousands)
a. Land Land acquired for R&D use, including land purchased for building construction.	<input type="text"/>
b. Buildings Buildings constructed or purchased for R&D use. If the building is constructed or purchased for mixed use, please report the estimated proportion of the cost that is for R&D.	<input type="text"/>
c. Machinery and equipment Major (capitalized) machinery and equipment acquired for use in the performance of R&D.	<input type="text"/>
d. Capitalized software Computer software that is used in the performance of R&D for more than one year. Include long-term licenses and the acquisition of computer software, as well as production costs for internally produced software.	<input type="text"/>
e. Other intellectual property products Purchased patents, long-term licenses, or other intangible assets used in R&D and which are in use for more than one year.	<input type="text"/>
f. Total¹	\$ <u>TOTAL</u>

¹ The column total is automatically generated on the Web survey.

Potential new content areas:

Full-time equivalents working on R&D (1)

- HERD has collected head counts of R&D principal investigators and other personnel since FY 2010
- International comparisons of R&D personnel are made using full-time equivalents (FTE)
- NSF considering adding a question to collect FTE for R&D in addition to head counts

Potential new content areas:

Full-time equivalents working on R&D (2)

Question X. Approximately how many (paid) full-time equivalents (FTEs) worked on research activities in FY 2016?

FTE research personnel are calculated as the total working (paid) hours spent working on research during a specific reference period (usually a calendar year) divided by the number of hours representing a full-time schedule within the same period.

For example, if you have 3 people working 20, 30, and 40 hours in a week on research activities and a full-time schedule is 40 hours a week at your institution, your research FTE calculation is $(20 + 30 + 40)/40 = 2.25$ FTE.



a. Researchers

Professionals engaged in the conception or creation of new knowledge.

FTEs

b. Technicians and other support personnel

Staff who work under the supervision of researchers to conduct research activities or who provide direct support services for the research project.

FTEs

c. TOTAL

FTEs

Other Issues Under Consideration

- Criteria for campus level reporting
- Improving consistency of institution funding and personnel counts across institutions
- Separate category to report other sponsored activities
- Separate reporting for R&D expenditures at foreign satellite campuses

Open Forum

- Reactions to planned or potential changes?
- What additional areas on HERD would you like to see changed or refined?
- Other questions or concerns?

Next Steps

- A workshop will be held later this year to continue discussion of the new content areas and other issues
- Additional site visits and phone interviews with institutions to test potential new questions
- Annual webinar this summer to update all HERD respondents on status of planned changes
- Your feedback is welcome anytime!



Thank You!

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