

Research Expenditures Summary September 1, 2016-August 31, 2017

Texas Universities and Health-Related Institutions

April 2018

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Agency Mission

The mission of the Texas Higher Education Coordinating Board (THECB) is to provide leadership and coordination for the Texas higher education system and to promote access, affordability, quality, success, and cost efficiency through *60x30TX*, resulting in a globally competitive workforce that positions Texas as an international leader.

Agency Vision

The THECB will be recognized as an international leader in developing and implementing innovative higher education policy to accomplish our mission.

Agency Philosophy

The THECB will promote access to and success in quality higher education across the state with the conviction that access and success without quality is mediocrity and that quality without access and success is unacceptable.

The Coordinating Board's core values are:

Accountability: We hold ourselves responsible for our actions and welcome every opportunity to educate stakeholders about our policies, decisions, and aspirations.

Efficiency: We accomplish our work using resources in the most effective manner.

Collaboration: We develop partnerships that result in student success and a highly qualified, globally competent workforce.

Excellence: We strive for excellence in all our endeavors.

The Texas Higher Education Coordinating Board does not discriminate on the basis of race, color, national origin, gender, religion, age or disability in employment or the provision of services.

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Executive Summary

The Texas Higher Education Coordinating Board's annual research expenditures report summarizes data submitted to the board, as required by Section 61.0662 of the Texas Education Code.

Data presented in this report were submitted by Texas public and independent universities and health-related institutions for Fiscal Year (FY) 2017 (September 1, 2016 through August 31, 2017).

Highlights include:

- **All institutions.** Institutions reported research expenditures that totaled \$5,185,087,345 in FY 2017, an increase of 4.7 percent over the previous year and an increase of 56.3 percent since FY 2007.
- **Public institutions.** Research expenditures at public universities and health-related institutions totaled \$4,370,989,635 in FY 2017, an increase of 4.5 percent over the previous year. The expenditures increased by \$113,257,118 at public universities (5.2%) and by \$76,527,895 at public health-related institutions (3.8%).
- **Independent institutions.** Research expenditures at independent universities and health-related institutions totaled \$814,097,710 in FY 2017, an increase of 5.9 percent over the previous year. The expenditures increased by \$14,690,713 at independent universities (6.5%) and by \$30,353,184 at independent health-related institutions (5.6%).
- **Research fields.** Research expenditures were greatest in these fields for FY 2017:
 - Medical Sciences: \$1,653,654,584
 - Biological and Other Life Sciences: \$1,217,409,954
 - Engineering: \$802,782,511
 - Physical Sciences: \$261,547,624
 - Environmental Sciences: \$258,412,462
- **Funding source.** The federal government, through the National Institutes of Health, the National Science Foundation, and other federal agencies, provided \$2,206,293,196 (42.6%) of the research funds expended. Expenditures from federal sources increased by \$114 million (5.5%) compared to FY 2016.

According to data provided by the **National Science Foundation** for FY 2015:

- Texas ranked third among all states in total research expenditures in all fields.
- Life sciences accounted for 60.5 percent of the research expenditures in Texas, followed by engineering (16.2%), geosciences (5.0%), and math and computer sciences (3.8%).
- The National Institutes of Health provided 55.6 percent, the National Science Foundation provided 18.7 percent, and the Department of Defense provided 10.5 percent of the federal research support to Texas higher education institutions that are counted under the federal measure for science and engineering obligations.
- Texas institutions of higher education ranked sixth in federal obligations for research and development in science and engineering, after California, New York, Maryland, Pennsylvania, and Massachusetts.

The data presented in this report are available in the Online Report System at <http://www.thecb.state.tx.us/researchexpenditures>.

Overview

The annual research expenditures report summarizes data submitted to the Texas Higher Education Coordinating Board (THECB), as required by Section 61.0662 of the Texas Education Code:

The board shall maintain an inventory of all institutional and programmatic research activities being conducted by the various institutions of higher education, whether state-financed or not. Once a year, on dates prescribed by the board, each institution of higher education shall report to the board all research conducted at that institution during the preceding year. Each institution's report must include the amounts spent by the institution on human embryonic stem cell research and adult stem cell research during the year covered by the report and the source of the funding for that research. All reports required by this section shall be made subject to the limitations imposed by security regulations governing defense contracts for research.

This report presents expenditure information, rather than award information, since expenditures more accurately reflect the current level of research activities. Research awards tend to fluctuate from year to year, which make them a less stable indicator for year-to-year comparisons. Institutions submit certified data reported in their Annual Financial Reports.

Definitions are provided in the research expenditures survey sent to the institutions. This approach ensures consistent reporting by institutions. However, even with these safeguards, institutions have some latitude in how they break out discipline-level expenditures.

Collection of research expenditure data is a challenging task for institutions. Administrators face many difficulties as they detail research expenditures at their institutions. For that reason, information reported by the institutions and the THECB's research expenditures report should be considered indicative rather than definitive.

A copy of the instructions and definitions for the survey completed by each institution is provided in the Appendix.

The data presented in this report are available in the Online Report System at <http://www.thecb.state.tx.us/researchexpenditures>.

Major Findings

Total research expenditures at Texas public and independent universities and health-related institutions increased 4.7 percent from \$4,950,258,435 in Fiscal Year (FY) 2016 to \$5,185,087,345 in FY 2017. Expenditures at public and independent universities and health-related institutions increased \$127,947,831 (5.2%) and \$106,881,079 (4.2%), respectively, compared to FY 2016. Research expenditures at public universities and health-related institutions increased from \$4,181,204,622 in FY 2016 to \$4,370,989,635 in FY 2017 (4.5%). The expenditures increased by \$113,257,118 at public universities (5.2%) and by \$76,527,895 at public health-related institutions (3.8%). Research expenditures at independent universities increased from \$769,053,813 in FY 2016 to \$814,097,710 in FY 2017 (5.9%). The expenditures increased by \$14,690,713 at independent universities (6.5%) and by \$30,353,184 at independent health-related institutions (5.6%).

The 10 top-ranked institutions are listed in Table 1, based on the total amount of research and development from all sources of funding. Figures 1 and 2 provide separate summaries of total research expenditures for public and private universities and health-related institutions. A complete list of funding by institution is provided in Table 8.

The top 10 institutions in research spending accounted for 79.5 percent of the total research expenditures. Collectively, the top five institutions in research spending accounted for 62.3 percent of total research expenditures. Six of the state’s health-related institutions ranked among the top 10 Texas public institutions in research expenditures.

The first six institutions in Table 1 also appear in the top 100 rankings of the National Science Foundation’s list of institutions reporting the largest FY 2016 research and development expenditures in all fields.¹

Table 1. Research and development expenditures rankings, FY 2013-FY 2017.

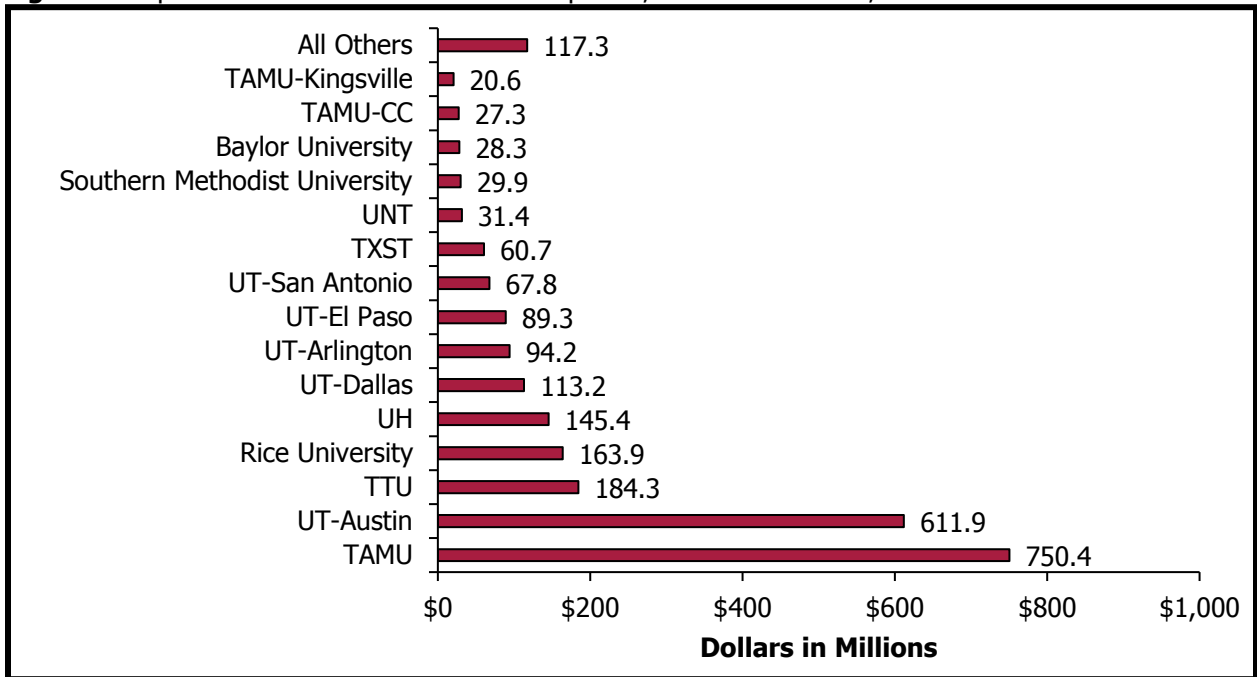
Research and development expenditures at institutions are ranked on the total amount of research from all sources of funding to include federal, state appropriations, state and local contracts and grants, institution sources, and private funds.

Institution	2013	2014	2015	2016	2017
The University of Texas M.D. Anderson Cancer Center	1	1	1	1	1
Texas A&M University (including Texas A&M Services)	2	2	2	2	2
The University of Texas at Austin	3	3	3	3	3
Baylor College of Medicine	4	4	4	4	4
The University of Texas Southwestern Medical Center	5	5	5	5	5
The University of Texas Health Science Center at Houston	6	6	6	6	6
Texas Tech University	9	7	7	8	7
The University of Texas Health Science Center at San Antonio	7	8	9	7	8
Rice University	10	10	8	9	9
The University of Texas Medical Branch at Galveston	8	9	10	10	10

Source: Texas Higher Education Coordinating Board

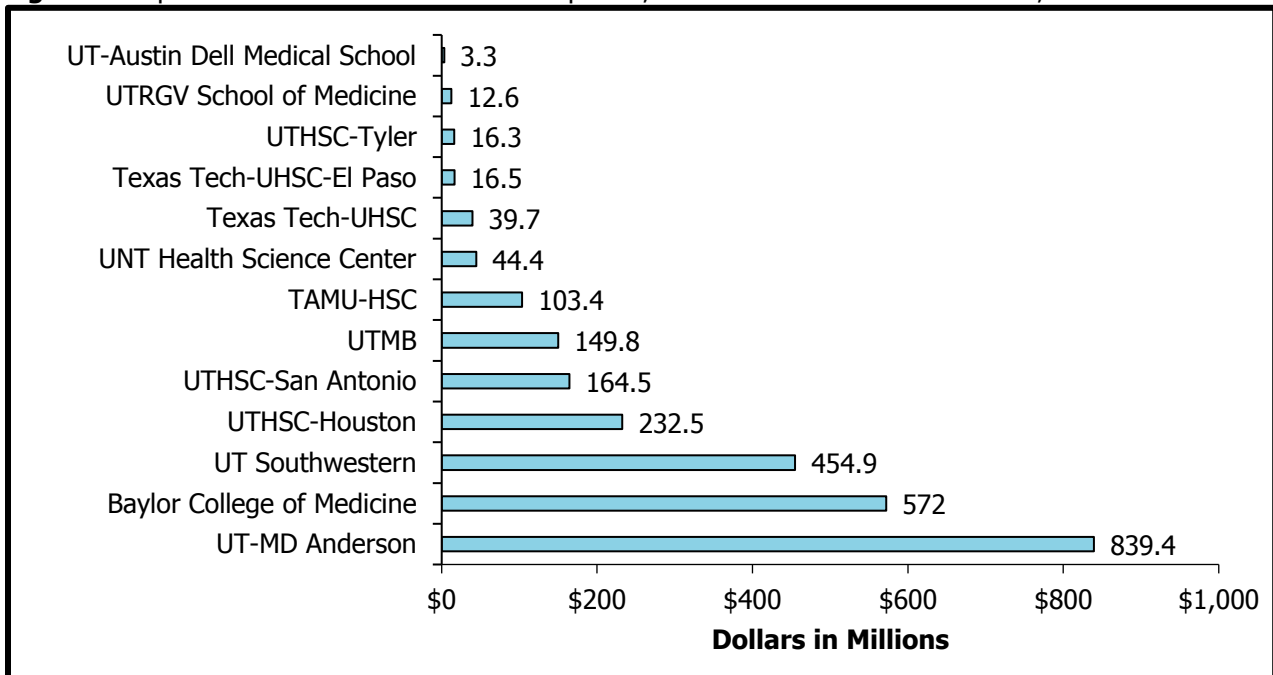
¹ National Science Foundation, National Center for Science and Engineering Statistics, Higher Education Research and Development Survey, FY 2016, Table 20. Higher Education Research and Development (R&D) expenditures, ranked by FY 2016 R&D expenditures: FYs 2007-2016, Retrieved from <https://ncesdata.nsf.gov/herd/2016/>

Figure 1. Expenditures for research and development, Texas universities, FY 2017.



Source: Texas Higher Education Coordinating Board

Figure 2. Expenditures for research and development, Texas health-related institutions, FY 2017.



Source: Texas Higher Education Coordinating Board

Table 2. Federal/state research and development expenditures ratio rankings, FY 2017.

The ratio of federal funds to state-appropriated funds for each of the top 10 Texas institutions reporting the greatest research expenditures.

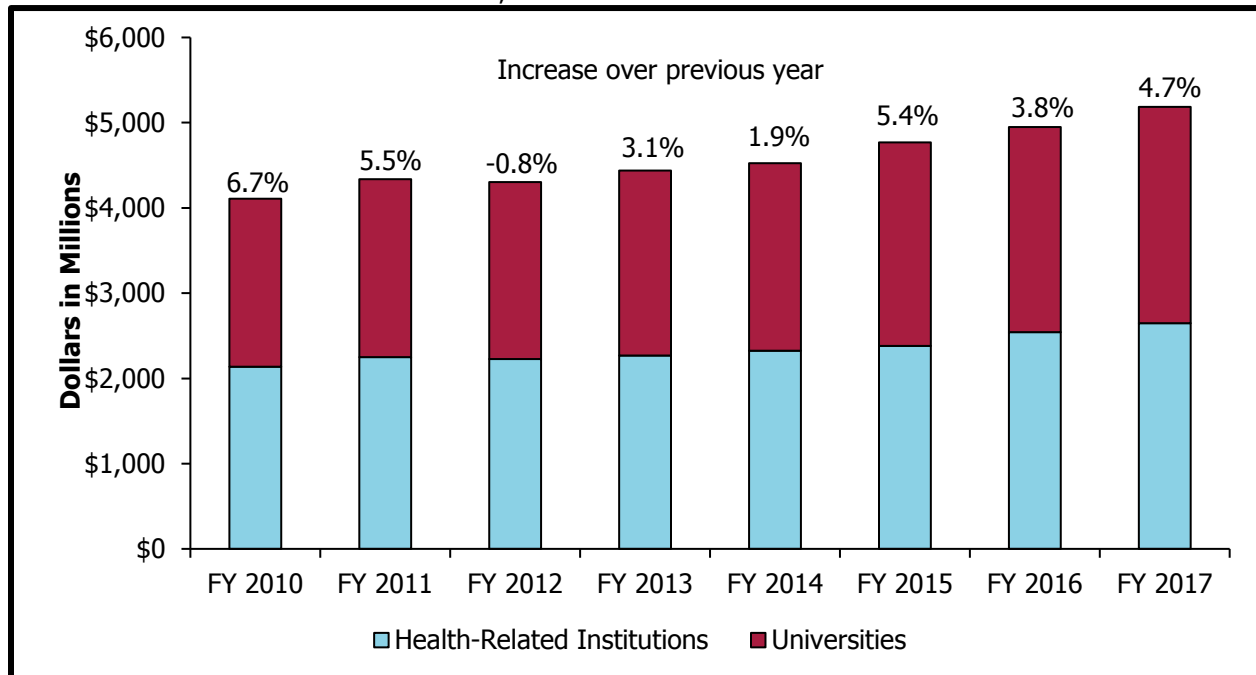
Institution	R&D Rank	Fed/State Ratio	Ratio Rank
The University of Texas Medical Branch at Galveston	10	21.22	1
Rice University	9	14.02	2
Baylor College of Medicine-Medical School	4	9.19	3
The University of Texas at Austin	3	7.81	4
The University of Texas Health Science Center at San Antonio	8	5.08	5
The University of Texas Health Science Center at Houston	6	3.52	6
The University of Texas Southwestern Medical Center	5	2.65	7
Texas A&M University (including Texas A&M Services)	2	2.55	8
The University of Texas M.D. Anderson Cancer Center	1	0.65	9
Texas Tech University	7	0.34	10

Source: Texas Higher Education Coordinating Board

Figure 3 shows growth rates in research and development expenditures for public and independent universities and health-related institutions. Expenditures were \$234.8 million more in FY 2017 than in FY 2016, with increases of \$127.9 million at universities and \$106.9 million at health-related institutions.

Single digit growth occurred in recent fiscal years. Negative growth in FY 2012 occurred for the first time since 1971.

Figure 3. Growth rates in research and development expenditures, Texas public and independent universities and health-related institutions, FY 2010-FY 2017.



Source: Texas Higher Education Coordinating Board

Statewide Summary Data

Table 3 presents total expenditures and sources of funds for research and development at Texas public and independent universities and health-related institutions. Expenditures from federal sources increased overall by \$114.2 million (5.5%) compared to FY 2016. Federal funds increased by \$59.7 million (5.6%) for Texas public and independent universities and \$54.5 million (5.3%) for health-related institutions compared to FY 2016. Expenditures from state and local contracts and grants increased overall by \$25.3 million (8.6%) compared to FY 2016; state and local contracts and grants increased by \$16.2 million (12.3%) for Texas public and independent universities and \$8.9 million (5.6%) for health-related institutions.

Table 3. Sources of funds for research and development, FY 2017.

	Federal	State and Local		Institution	Private		Total
		Appropriated	Contracts & Grants		Profit	Nonprofit	
Public							
Health-Related Institutions	\$788,497,868	\$329,276,101	\$142,021,011	\$227,931,516	\$199,286,635	\$390,074,947	\$2,077,088,078
Universities	\$1,011,920,472	\$347,033,245	\$139,880,155	\$434,295,084	\$156,119,283	\$204,662,848	\$2,293,901,557
Total for Public	\$1,800,418,340	\$676,309,346	\$281,901,166	\$662,226,600	\$355,405,918	\$594,737,795	\$ 4,370,989,635
Independent							
Health-Related Institutions	\$292,805,805	\$3,948,610	\$27,900,639	\$177,270,828	\$25,774,183	\$44,347,363	\$572,047,428
Universities	\$113,069,051	\$6,627	\$9,277,504	\$78,786,086	\$16,407,836	\$24,503,178	\$242,050,282
Total for Independent	\$405,874,856	\$3,955,237	\$37,178,143	\$256,056,914	\$42,182,019	\$68,850,541	\$814,097,710
All Institutions							
Health-Related Institutions	\$1,081,303,673	\$333,224,711	\$169,921,650	\$405,202,344	\$225,060,818	\$434,422,310	\$2,649,135,506
Universities	\$1,124,989,523	\$347,039,872	\$149,157,659	\$513,071,640	\$172,527,119	\$229,166,026	\$2,535,951,839
Total for All Institutions	\$2,206,293,196	\$680,264,583	\$319,079,309	\$918,273,984	\$397,587,937	\$663,588,336	\$5,185,087,345

Federal 42.6%	State and Local 19.3%	Institution 17.7%	Private 20.5%
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Source: Texas Higher Education Coordinating Board

Table 4 presents expenditures in the 16 different fields, as defined in the Instructions and Definitions for Survey (see Appendix). The THECB's instructions directed institutions to assign project expenditures to only one field to avoid duplication.

Medical sciences led all other disciplines and accounted for 31.9 percent of the total research and development expenditures. The top five disciplines – medical sciences, biological and other life sciences, engineering, physical sciences, and environmental sciences – collectively accounted for 80.9 percent of all reported research expenditures.

For the most part, research fields in Table 4 reflect expenditures in particular academic disciplines. Some deviation may result as institutions categorize all research as belonging to only one field. For example, a college of agriculture could perform basic research in biological sciences and report expenses in that field rather than in agricultural sciences.

Table 4. Expenditures for conduct of research and development by field, Texas public and independent universities and health-related institutions, FY 2017.

Field	Total	% Total
Medical Sciences	\$1,653,654,584	31.9%
Biological and Other Life Sciences	\$1,217,409,954	23.5%
Engineering	\$802,782,511	15.5%
Physical Sciences	\$261,547,624	5.0%
Environmental Sciences	\$258,412,462	5.0%
Agricultural Sciences	\$238,972,809	4.6%
Computer Science	\$155,948,843	3.0%
Social Sciences	\$102,328,307	2.0%
Other Sciences not classified above	\$98,416,989	1.9%
Education	\$89,829,335	1.7%
Other Non-Science Activities	\$72,411,429	1.4%
Psychology	\$68,203,152	1.3%
Mathematical Sciences	\$62,487,667	1.2%
Business Administration	\$45,833,864	0.9%
Arts and Humanities	\$29,298,351	0.6%
Law	\$26,549,464	0.5%
Total for All Institutions	\$5,185,087,345	100%

Source: Texas Higher Education Coordinating Board

Tables 5 and 6 show research expenditures in the 10 areas of special interest at universities and in the seven areas at health-related institutions. Human Stem Cells – Embryonic and Human Stem Cells – Adult were added to the Areas of Special Interest section in Fiscal Year 2013.

Table 5. Expenditures for conduct of research and development in areas of special interest, Texas public and independent universities, FY 2017.

Field	Total
Microelectronics and Computer Technology	\$133,243,549
Energy	\$108,858,411
Materials Science	\$89,937,673
Biotechnology	\$86,105,630
Cancer Research	\$50,952,827
Aerospace Technology	\$37,701,875
Manufacturing Technology	\$25,674,638
Water Resources	\$24,135,385
Human Stem Cells - Adult	\$451,062
Human Stem Cells - Embryonic	\$0
Total for All Universities	\$557,061,050

Source: Texas Higher Education Coordinating Board

Table 6. Expenditures for conduct of research and development in areas of special interest, Texas public and independent health-related institutions, FY 2017.

Field	Total
Cancer Research	\$1,185,359,884
Child Health and Human Development	\$152,321,361
Mental Health	\$102,223,677
Cardiovascular Research	\$101,116,832
Aging	\$72,858,926
Human Stem Cells - Adult	\$12,637,426
Human Stem Cells - Embryonic	\$1,268,685
Total for All Health-Related Institutions	\$1,627,786,791

Source: Texas Higher Education Coordinating Board

Table 7 shows the research expenditures in the area of Stem Cell Research by source of funds, as required by Texas Education Code, Section 61.662(d).

Expenditures in Human Stem Cells - Embryonic decreased at public and independent universities by \$20,070 and decreased at public and independent health-related institutions by \$2,515,784. Expenditures in Human Stem Cells - Adult increased at public and private universities by \$451,062 and increased at public and independent health-related institutions by \$4,516,468 from FY 2016 to FY 2017.

Table 7. Expenditures for stem cell research by source of funds, Texas public and independent universities and health-related institutions, FY 2017.

	Federal	State and Local		Institution	Private		Total
		Appropriated	Contracts & Grants		Profit	Non-Profit	
Human Stem Cells - Adult							
Independent - Universities							
Total for Independent - Universities	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Public - Universities							
The University of Texas at Austin	\$384,874	\$0	\$0	\$0	\$0	\$62,946	\$447,820
Texas A&M University - Texas Engineering Experiment Station	\$3,242	\$0	\$0	\$0	\$0	\$0	\$3,242
Total for Public - Universities	\$388,116	\$0	\$0	\$0	\$0	\$62,946	\$451,062
Independent – Health-Related							
Total for Independent – Health-Related	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Public - Health-Related							
The University of Texas Health Science Center at Houston	\$4,249,293	\$0	\$0	\$1,699,721	\$796,247	\$1,621,743	\$8,367,004
The University of Texas Health Science Center at San Antonio	\$2,521,912	\$0	\$235,933	\$40,121	\$146,605	\$345,604	\$3,290,175
The University of Texas M.D. Anderson Cancer Center	\$439,114	\$0	\$0	\$0	\$341,353	\$199,780	\$980,247
Total for Public - Health-Related	\$7,210,319	\$0	\$235,933	\$1,739,842	\$1,284,205	\$2,167,127	\$12,637,426
Total for All Human Stem Cells – Adult	\$7,598,435	\$0	\$235,933	\$1,739,842	\$1,284,205	\$2,230,073	\$13,088,488
Human Stem Cells - Embryonic							
Independent - Universities							
Total for Independent - Universities	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Public - Universities							
Total for Public - Universities	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Independent - Health-Related							
Baylor College of Medicine	\$0	\$0	\$0	\$0	\$0	\$2,702	\$2,702
Total for Independent - Health-Related	\$0	\$0	\$0	\$0	\$0	\$2,702	\$2,702
Public - Health-Related							
Texas Tech University Health Sciences Center	\$211,577	\$0	\$0	\$0	\$0	\$0	\$211,577
The University of Texas Health Science Center at Houston	\$105,802	\$0	\$430,787	\$0	\$0	\$365,651	\$902,240
The University of Texas Health Science Center at San Antonio	\$59,930	\$0	\$0	\$0	\$0	\$11,052	\$70,982
The University of Texas M.D. Anderson Cancer Center	\$0	\$0	\$0	\$0	\$0	\$81,184	\$81,184
Total for Public - Health-Related	\$377,309	\$0	\$430,787	\$0	\$0	\$457,887	\$1,265,983
Total for All Human Stem Cells – Embryonic	\$377,309	\$0	\$430,787	\$0	\$0	\$460,589	\$1,268,685
Grand Total for Human Stem Cells – Adult & Embryonic	\$7,975,744	\$0	\$666,720	\$1,739,842	\$1,284,205	\$2,690,662	\$14,357,173

Source: Texas Higher Education Coordinating Board

Institutional Data

This section of the report presents detailed information on research expenditures reported by institution. Definitions for sources of funds and research fields are found in the Appendix.

Table 8. Total expenditures for research by source of funds, Texas public and independent universities and health-related institutions, FY 2017.

	Federal	State and Local		Institution	Private		Total
		Appropriated	Contracts & Grants		Profit	Non-Profit	
Independent - Universities							
Abilene Christian University	\$477,249	\$0	\$0	\$148,588	\$0	\$43,398	\$669,235
Austin College	49,243	0	0	168,102	0	148,041	365,386
Baylor University	5,265,333	0	1,171,666	17,487,121	1,872,115	2,522,724	28,318,959
Huston-Tillotson University	668,080	0	0	0	0	23,030	691,110
LeTourneau University	257,792	0	0	38,714	162,099	99,988	558,593
McMurry University	0	0	15,413	0	0	35,932	51,345
Parker University	0	0	0	485,507	0	0	485,507
Rice University	84,939,074	0	6,058,152	44,347,458	11,165,423	17,388,621	163,898,728
Southern Methodist University	14,464,233	0	1,018,703	9,865,532	3,106,679	1,424,281	29,879,428
St. Edward's University	1,425,644	6,627	0	400,000	95,000	276,675	2,203,946
Texas Christian University	3,046,056	0	1,012,150	4,360,894	0	1,529,102	9,948,202
Trinity University	855,667	0	1,420	1,358,567	6,520	943,751	3,165,925
University of the Incarnate Word	1,620,680	0	0	108,293	0	42,139	1,771,112
Wayland Baptist University	0	0	0	17,310	0	25,496	42,806
Total for Independent - Universities	\$113,069,051	\$6,627	\$9,277,504	\$78,786,086	\$16,407,836	\$24,503,178	\$242,050,282
Public - Universities							
Angelo State University	\$75,545	\$532,717	\$50,344	\$7,146	\$65,360	\$50,385	\$781,497
Lamar University	1,443,258	148,665	182,853	87,982	321,205	148,388	2,332,351
Midwestern State University	16,676	0	0	0	0	438,828	455,504
Prairie View A&M University	8,721,845	2,818,832	57,302	2,119,176	66,020	100,291	13,883,466
Sam Houston State University	1,870,090	0	277,894	2,892,977	17,130	202,689	5,260,780
Stephen F. Austin State University	1,025,312	1,145,531	103,870	445,304	104,063	558,094	3,382,174
Sul Ross State University	433,825	415,203	6,633	501,450	35,100	849,375	2,241,586
Tarleton State University	3,991,156	1,945,434	2,566,853	2,025,243	33,208	175,217	10,737,111
Texas A&M International University	1,752,855	1,196,470	0	488,666	50,348	1,256,750	4,745,089
Texas A&M University (including Texas A&M Services)	281,646,555	120,564,591	58,168,394	170,885,578	44,066,831	75,045,691	750,377,640
Texas A&M University at Galveston	1,959,018	991,533	969,434	1,369,753	229,369	2,645,608	8,164,715
Texas A&M University-Central Texas	80,966	0	127,528	1,080,968	0	58,799	1,348,261
Texas A&M University-Commerce	822,737	407,029	1,084,944	1,473,611	114,094	168,481	4,070,896
Texas A&M University-Corpus Christi	10,663,318	2,343,156	2,838,149	4,007,013	1,572,502	5,919,551	27,343,689
Texas A&M University-Kingsville	7,786,462	3,927,177	1,189,281	2,168,930	384,437	5,097,768	20,554,055
Texas A&M University-San Antonio	137,248	0	0	0	39,185	8,525	184,958
Texas A&M University-Texarkana	8,076	31,733	0	6,973	0	29,529	76,311
Texas Southern University	3,674,303	107,270	144,657	421,625	79,052	294,503	4,721,410
Texas State University	25,131,511	10,471,762	6,670,836	12,379,784	909,689	5,177,305	60,740,887
Texas Tech University	31,347,490	82,314,868	10,738,521	30,818,547	15,573,773	13,546,907	184,340,106

(Table 8. continued)

	Federal	State and Local		Institution	Private		Total
		Appropriated	Contracts & Grants		Profit	Non-Profit	
Texas Woman's University	\$944,627	\$696,502	\$0	\$1,312,705	\$447,622	\$536,517	\$3,937,973
The University of Texas at Arlington	31,653,641	14,635,459	4,780,825	32,390,427	4,456,623	6,267,897	94,184,872
The University of Texas at Austin	395,058,642	23,199,627	27,354,513	62,404,139	68,049,812	35,857,186	611,923,919
The University of Texas at Dallas	36,096,595	10,433,257	5,737,579	34,524,575	5,553,587	20,858,510	113,204,103
The University of Texas at El Paso	45,158,205	15,836,359	3,301,862	11,037,994	1,191,029	12,760,401	89,285,850
The University of Texas at San Antonio	29,356,816	16,986,230	2,271,264	11,779,139	3,902,459	3,485,310	67,781,218
The University of Texas at Tyler	729,582	211,635	75,006	746,034	156,020	397,150	2,315,427
The University of Texas of the Permian Basin	327,977	133,556	230,183	50,571	56,524	351,715	1,150,526
The University of Texas-Rio Grande Valley	9,883,355	3,390,962	258,055	1,548,324	268,712	652,940	16,002,348
University of Houston (including UH System)	59,354,144	26,268,540	9,420,528	35,731,084	6,318,019	9,427,378	146,519,693
University of Houston-Clear Lake	752,156	555,852	140,987	185,664	47,343	97,063	1,779,065
University of Houston-Downtown	2,603,174	236,444	61,518	260,127	96,227	0	3,257,490
University of Houston-Victoria	398,880	0	0	0	0	0	398,880
University of North Texas	15,668,272	3,166,356	1,011,162	8,059,559	1,447,359	2,089,073	31,441,781
University of North Texas at Dallas	8,484	0	0	7,288	0	16,925	32,697
West Texas A&M University	1,337,676	1,920,495	59,180	1,067,198	466,581	92,099	4,943,229
Total for Public - Universities	\$1,011,920,472	\$347,033,245	\$139,880,155	\$434,285,554	\$156,119,283	\$204,662,848	\$2,293,901,557
Total for All Universities	\$1,124,989,523	\$347,039,872	\$149,157,659	\$513,071,640	\$172,527,119	\$229,166,026	\$2,535,951,839
Independent - Health-Related							
Baylor College of Medicine	\$292,805,805	\$3,948,610	\$27,900,639	\$177,270,828	\$25,774,183	\$44,347,363	\$572,047,428
Public - Health-Related							
Texas A&M University System Health Science Center	\$43,835,809	\$25,106,767	\$11,572,685	\$12,666,270	\$4,857,396	\$5,322,855	\$103,361,782
Texas Tech University Health Sciences Center	9,143,203	13,232,933	3,734,694	9,155,407	607,190	3,830,191	39,703,618
Texas Tech University Health Sciences Center-El Paso	2,410,256	10,825,740	156,813	1,672,235	611,750	786,563	16,463,357
The University of Texas Health Science Center at Houston	124,461,137	19,505,279	15,897,601	20,841,785	12,820,877	38,941,479	232,468,158
The University of Texas Health Science Center at San Antonio	94,683,991	9,218,756	9,428,117	19,896,402	17,834,454	13,411,485	164,473,205
The University of Texas Health Science Center at Tyler	5,791,880	1,548,012	594,167	5,428,281	698,354	2,231,661	16,292,355
The University of Texas M.D. Anderson Cancer Center	166,551,539	202,669,269	53,291,032	98,048,243	127,758,909	191,113,776	839,432,768
The University of Texas Medical Branch at Galveston	104,458,146	563,730	4,359,642	18,946,354	3,409,535	18,048,906	149,786,313
The University of Texas Southwestern Medical Center	204,482,065	36,467,205	40,803,950	30,810,603	27,701,096	114,590,727	454,855,646
The University of Texas at Austin Dell Medical School	1,388,277	0	257,581	1,490,245	93,878	41,638	3,271,619
The University of Texas-Rio Grande Valley - Medical School	4,923,943	2,740,535	9,038	4,574,980	44,594	265,415	12,558,505
University of North Texas Health Science Center	26,367,622	7,397,875	1,915,691	4,400,711	2,848,602	1,490,251	44,420,752
Total for Public - Health-Related	\$788,497,868	\$329,276,101	\$142,021,011	\$227,931,516	\$199,286,635	\$390,074,947	\$2,077,088,078
Total for All Health-Related Institutions	\$1,081,303,673	\$333,224,711	\$169,921,650	\$405,202,344	\$225,060,818	\$434,422,310	\$2,649,135,506
Grand Total for All Institutions	\$2,206,293,196	\$680,264,583	\$319,079,309	\$918,273,984	\$397,587,937	\$663,588,336	\$5,185,087,345

Source: Texas Higher Education Coordinating Board

Table 9. Federal research and development expenditures/FTE faculty ratio, Texas public universities, FY 2017.

	Federal R&D Expenditures	FTE Faculty*	Federal R&D Expenditures/FTE
Angelo State University	\$75,545	179.2	\$422
Lamar University	\$1,443,258	300.8	\$4,799
Midwestern State University	\$16,676	175.2	\$95
Prairie View A&M University	\$8,721,845	182.2	\$47,859
Sam Houston State University	\$1,870,090	404.1	\$4,627
Stephen F. Austin State University	\$1,025,312	377.8	\$2,714
Sul Ross State University	\$433,825	82.5	\$5,258
Tarleton State University	\$3,991,156	263.3	\$15,161
Texas A&M International University	\$1,752,855	137.3	\$12,763
Texas A&M University (including Texas A&M Services)**	\$281,646,555	2,102.9	\$133,931
Texas A&M University at Galveston	\$1,959,018	50.7	\$38,678
Texas A&M University-Central Texas	\$80,966	67.0	\$1,208
Texas A&M University-Commerce	\$822,737	239.8	\$3,432
Texas A&M University-Corpus Christi	\$10,663,318	179.8	\$59,300
Texas A&M University-Kingsville	\$7,786,462	253.2	\$30,753
Texas A&M University-San Antonio	\$137,248	90.8	\$1,512
Texas A&M University-Texarkana	\$8,076	61.1	\$132
Texas Southern University	\$3,674,303	235.7	\$15,589
Texas State University	\$25,131,511	490.8	\$51,209
Texas Tech University	\$31,347,490	984.6	\$31,838
Texas Woman's University	\$944,627	316.7	\$2,983
The University of Texas at Arlington	\$31,653,641	505.6	\$62,611
The University of Texas at Austin	\$395,058,642	1,646.1	\$239,995
The University of Texas at Dallas	\$36,096,595	489.7	\$73,715
The University of Texas at El Paso	\$45,158,205	472.3	\$95,615
The University of Texas at San Antonio	\$29,356,816	574.3	\$51,121
The University of Texas at Tyler	\$729,582	204.1	\$3,575
The University of Texas of the Permian Basin	\$327,977	91.3	\$3,594
The University of Texas-Rio Grande Valley	\$9,883,355	410.8	\$24,061
University of Houston	\$59,354,144	906.9	\$65,451
University of Houston-Clear Lake	\$752,156	250.8	\$2,999
University of Houston-Downtown	\$2,603,174	221.6	\$11,745
University of Houston-Victoria	\$398,880	94.9	\$4,205
University of North Texas	\$15,668,272	546.3	\$28,681
University of North Texas at Dallas	\$8,484	31.9	\$266
West Texas A&M University	\$1,337,676	156.0	\$8,575
Totals	\$1,011,920,472	13,777.6	\$73,447

Source: Texas Higher Education Coordinating Board

* FTE Faculty indicates number of full-time equivalents (FTE) for tenured and tenure-track faculty with teaching responsibilities based on fall 2016 (FY 2017) THECB Accountability System reports.

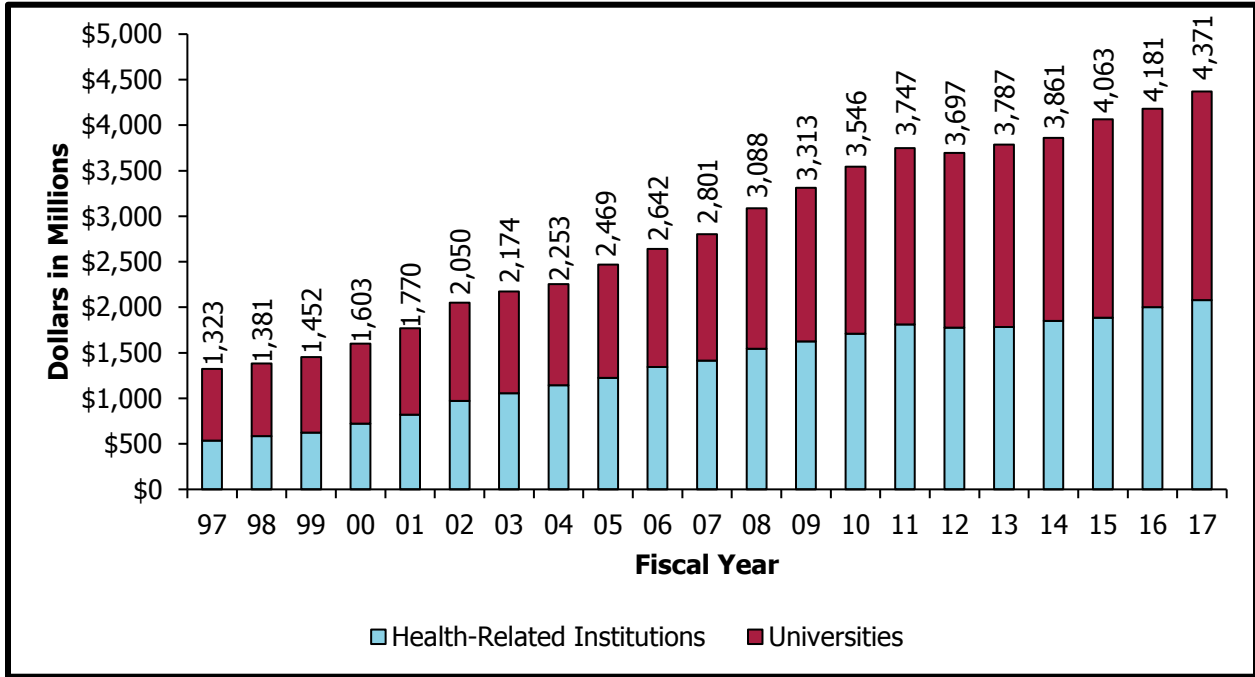
** FTE faculty for Texas A&M University is based on its FTE faculty plus faculty from Texas AgriLife Research and the Texas Engineering Experiment Station. Service agency counts come from [Legislative Appropriations Requests](#) for FY 2018 and 2019 include 189.6 FTEs from Texas AgriLife Research and 330 from Texas Engineering Experiment Station.

Historical Data for Public Institutions

Figure 4 presents total research development expenditures since 1997. The accelerated growth in research expenditures for the public health-related institutions from 1999 to 2003 was likely due to the doubling of the National Institutes of Health budget, a major source of research funding. Research expenditures declined in FY 2012, but increased every year since.

From FY 2016 to FY 2017, research expenditures increased \$189.7 million (4.5%). By source of funds, the large percentage increase was due to a \$85.0 million increase in federal funds (5.0%), a \$34.5 million increase in state and local funds (3.7%), and a \$41.0 million increase in private funds (4.5%). Health-related institutions increased by \$76.5 million and universities increased by \$112.1 million. The majority of growth in research expenditures (64.4%) for the public institutions from FY 2016 to FY 2017 was due to increases of \$52.1 million at The University of Texas M.D. Anderson Cancer Center, \$28.4 million at The University of Texas at Austin, \$23.2 million at The University of Texas Southwestern Medical Center, and \$17.8 million at Texas Tech University.

Figure 4. Expenditures for research and development, Texas public universities and health-related institutions, FY 1997-FY 2017.



Source: Texas Higher Education Coordinating Board

National Indicators

National indicators are based on data provided by the National Science Foundation (NSF). Figures are not entirely consistent with data provided in earlier sections of this report because these statistics are based on a previous year and reporting requirements are somewhat different. One difference in the reporting requirements is the way the NSF survey allows institutions to calculate unreimbursed indirect costs. The THECB's survey allows only tracked indirect costs as reported in the institution's annual financial report. Thus, the NSF calculation will have a considerably higher total in the *Institution* source of funding (see <http://www.nsf.gov/statistics/profiles> to compare individual institutions) in comparison to the THECB's reports. NSF may impute data for institutions that do not respond to or fully complete the survey, which is another difference in the reporting requirements.

In data collected by the NSF's Higher Education Research and Development Survey for FY 2015, Texas (\$5.0 billion) ranked third among the states in total research expenditures in all fields, behind California (\$8.7 billion) and New York (\$5.7 billion). The NSF publishes several reports on research obligations and research expenditures. Two common approaches look at somewhat different information:

- *Federally Financed Research and Development Expenditures in All Fields* summarizes federal funds expenditures by higher education institutions that support research and development in any given year. This report is based on data reported by institutions and summarized by the NSF.

The top six states for *Federally Financed Research and Development Expenditures in All Fields* in FY 2015 were:

- California: \$4.7 billion
 - New York: \$3.0 billion
 - Maryland: \$2.9 billion
 - Pennsylvania: \$2.2 billion
 - Massachusetts: \$2.1 billion
 - Texas: \$2.0 billion
- Federal Obligations for Research and Development in Science and Engineering includes only federal funds obligated during a year to support, directly or indirectly, basic and applied research and development in science and engineering disciplines at higher education institutions. Funds obligated in any given year may be expended over several years, so obligations differ from expenditures. The amount of support is reported by federal agencies.
 - The top six states for Federal Obligations for Research and Development in Science and Engineering in FY 2015 were:
 - California: \$3.8 billion
 - New York: \$2.2 billion
 - Maryland: \$1.7 billion
 - Pennsylvania: \$1.6 billion
 - Massachusetts: \$1.5 billion
 - Texas: \$1.4 billion

Table 10 shows the ranking of the top 10 states in federal research and development expenditures in selected science and engineering fields for 2015. Texas ranked fifth in life sciences, seventh in engineering, fifth in physical sciences, and fourth in environmental sciences.

Table 10. Top 10 states in federal research and development expenditures in selected science and engineering fields, FY 2015.

Rank	Life Sciences	\$	Engineering	\$	Physical Sciences	\$	Environmental Sciences	\$
1	California	2.77	Maryland	1.05	California	0.59	California	0.25
2	New York	2.05	California	0.56	Maryland	0.23	Colorado	0.23
3	Pennsylvania	1.29	Massachusetts	0.46	Massachusetts	0.23	Massachusetts	0.18
4	Maryland	1.20	Georgia	0.42	New York	0.22	Texas	0.13
5	Texas	1.17	Pennsylvania	0.39	Texas	0.14	New York	0.12
6	North Carolina	1.09	New York	0.35	Michigan	0.14	Washington	0.10
7	Massachusetts	0.93	Texas	0.32	Illinois	0.13	Maryland	0.10
8	Ohio	0.84	Michigan	0.23	Pennsylvania	0.11	Florida	0.08
9	Illinois	0.82	Ohio	0.23	Arizona	0.09	Hawaii	0.06
10	Washington	0.65	Illinois	0.17	Colorado	0.09	Oregon	0.05

Source: National Science Foundation, WebCASPARD Database System, 1/2/2018

Note: Dollars in Millions

Table 11 shows the ranking of the top 10 states in federal obligations for research and development in science and engineering, and federally financed research and development expenditures for all fields for 2015. Texas ranks sixth in federal obligations for research and development in science and engineering, and ranks sixth in research and development expenditures in all fields from federal sources as well.

Table 11. State rank in federal obligations and federally financed research and development, FY 2015.

Rank	Federal Obligations for R&D in Science and Engineering to Colleges and Universities	\$	Federally Financed R&D Expenditures in All Fields at Colleges and Universities	\$
1	California	\$3,842	California	\$4,714
2	New York	2,198	New York	3,026
3	Maryland	1,735	Maryland	2,943
4	Pennsylvania	1,635	Pennsylvania	2,179
5	Massachusetts	1,511	Massachusetts	2,142
6	Texas	1,395	Texas	2,016
7	North Carolina	1,185	North Carolina	1,600
8	Illinois	1,050	Illinois	1,378
9	Michigan	884	Ohio	1,269
10	Georgia	840	Georgia	1,211

Source: National Science Foundation, WebCASPARD Database System, 1/2/2018

Note: Dollars in Millions

Appendix – Instructions and Definitions for Survey

Texas Higher Education Coordinating Board Survey of Research Expenditures, FY 2017
Universities and Health-Related Institutions
Instructions and Definitions for Survey

About This Survey

The Texas Higher Education Coordinating Board collects data from Texas higher education institutions annually through the Survey of Research Expenditures. Beginning in Fiscal Year 2010, the survey was issued as part of the *Academic Sources and Uses Template*. The collection of these data is mandated by the Texas Legislature. The data collected are published and accessible in an online report system (<http://www.thecb.state.tx.us/ResearchExpenditures>).

The figures from this survey are used by institutions of higher education and other state agencies. In addition, the data provides the basis for public policy and management decisions. Therefore, it is critical that the data reported are accurate and complete.

The information provided in the report should be consistent with the Annual Financial Report (AFR) of the institution. For additional information, please refer to College and University Business Administration, NACUBO.

The data collection form and definitions are modeled after similar forms used by the National Science Foundation. This approach is an effort to provide comparability of data with national data and reduce the data collection efforts of the institutions.

General Concepts and Definitions

A. Research and Development (R&D) activities are defined as follows:

1. Research is systematic study directed toward fuller scientific knowledge or understanding of the subject studied (reference OMB Circular A-110, subpart A, definition A.2dd).
2. Development is systematic use of knowledge or understanding gained from research, directed toward the production of useful materials, devices, systems, or methods including design and development of prototypes and processes (reference OMB Circular A-110, subpart A, definition A.2dd).

Research and Development (R&D) also includes activities involving the training of individuals in research techniques where such activities utilize the same facilities as other research and development activities and where such activities are not included in the instruction function (reference OMB Circular A-21, B.1.b).

Exclusions from research and development:

- Training of scientific manpower
- Mapping and surveys
- Routine product testing
- Quality Control
- Experimental production
- Collection of general purpose statistics (statistics not collected as part of a specific R&D project)

NOTE: Certain activities may or may not be classified as research and development depending upon circumstances. Examples of such activities are given below in section B, Reporting Guidelines for R&D versus Non-R&D Activities.

B. Selected financial terms

Fiscal Year - The 12-month accounting period ending August 31 of each year.

Expenditures - All amounts of money paid out by your institution to support R&D activities. Include funds "passed through" to other institutions of higher education. Include earned indirect costs and fringe benefits. Do not include non-monetary awards.

Federal Funds - All Federal monies used in support of the R&D activities of your institution. These include reimbursements, contracts, grants, and any identifiable amounts spent from Federal programs including Federal monies passed through state agencies.

State Sources - Include all expenditures of funds appropriated by the State of Texas not included in institutionally controlled funds listed in paragraph 5 below. Included in this category are state appropriated "Special Items" and state contracts and grants such as NHARP and ATP funds, interagency contracts, contracts with Texas local governments, etc.

Institution Resources - Include expenditures of funds that are locally controlled. This would include PUF and AUF funds, other local funds, etc.

Private - Include expenditures of funds from both for-profit and non-profit corporations and individuals. Also, include in this category funds from agencies from other states.

Definitions for Specific Items

Total R&D Expenditures - Defined for Survey - All expenditures except those for R&D plant.

Capital outlay for research equipment

According to the Government Accounting Standards Board, annual financial reports use expenses rather than expenditures. The major difference is that capital outlays for research equipment will be depreciated over the life of the equipment and will not be separately identified as research items in the annual financial reports. This line allows inclusion of expenditures for equipment that are not included in research expenses. The research definition used for this report does not allow inclusion of expenses for R&D plant or construction.

R&D Expenses not meeting the narrow definition of R&D used in the Research Expenditure Survey. Externally-funded activities that cannot be classified as R&D using the definitions appearing in A, above, are included. Do not include projects funded with "development" funds unless they are related to research activities.

Notes: Reporting Guidelines for R&D versus Non-R&D Activities:

Economic studies - To be classified as research, the activities under this heading should be systematic and intensive. They should not include program planning, implementation, and evaluation unless these activities are designed as a fairly rigorous research effort. For example, a study to determine the impact of proposed tax changes on State revenues, or on Statewide employment, consumption, or industrial output could be reported as economic research. But the collection of economic data on tax revenues, personal income, or industrial output would be reported as economic research only if collected as part of the research project.

Evaluation - Evaluation qualifies as research when it is part of a specific research undertaking. Evaluation conducted separately from a research project is considered research when it involves scientific method and hypothesis testing procedures with fairly rigorous standards. Evaluation activities that do not involve systematic design and testing should not be included.

Demonstration - Demonstration activities that are part of research or development (i.e., that are intended to prove or to test whether a technology or method does, in fact, work) should be included. Demonstration intended to make available information about new technologies or methods should not be included. For example, an educational demonstration on new teaching methods should be reported as an R&D activity if the demonstration is established as an experiment to produce new information, is accomplished within a definite time period, and is accompanied by a thorough evaluation. An educational demonstration to apply or exhibit new teaching methods, or a demonstration without a scheduled termination or a thorough evaluation, should not be reported as an R&D activity.

Collection of statistical data - The collection of statistics is an R&D activity only if conducted as part of a specific research or development program. For example, the regular collection and publication of statistics on the incidence of various diseases within a State by a State health

department is general purpose data collection and not research or development. The data gathering is not part of a research program and is designed for use by a range of persons, such as practicing physicians, public health officials, and school officials. If the data on incidence of diseases are gathered as part of a project on the origin and nature of particular diseases, however, or to establish generalizations on why certain individuals or groups contract certain diseases, this would be research.

Satellite information - Photographs and tapes purchased from Federal agencies (or others) sponsoring satellite operations are not considered research and development unless they are used primarily in support of a research or development program. Tapes and photographs that are stored in documentation centers or used primarily for the formulation of regulations are excluded from this survey.

Technology transfer - Technology transfer involves the adoption, and perhaps adaptation, of new techniques or products that have already been brought to a usable condition. The adoption and use of a technology is not research and development, but the adaptation of a technology to meet unique regional or local needs could involve R&D activities. For example, a new method of treating water to make it potable is developed in one State. If another State adopts the same treatment process, the adoption costs for facilities, equipment, personnel, etc., are not R&D expenditures. However, if further systematic, intensive study is required by the second State to modify the treatment process to adapt it to unique local conditions, the costs of modification and adaptation could be R&D expenditures.

Agricultural sciences deal with the production of food and fiber. They include work in plant sciences, animal sciences, aquaculture, agricultural economics, and other topics related to the agricultural enterprise.

Biological sciences are those life sciences (apart from medical sciences and agricultural sciences described above) that deal with the origin, development, structure, function, and interaction of living things. Examples of biological sciences are as follows: anatomy; animal sciences; bacteriology; biochemistry; biogeography; biophysics; ecology; embryology; entomology; evolutionary biology; genetics; immunology; microbiology; molecular biology; nutrition and metabolism; parasitology; pathology; pharmacology; physical anthropology; physiology; plant sciences; radiobiology; systematics.

Computer science is concerned with the application of mathematical methods to automated information systems, the development of computer technology, and advanced applications of computers.

Engineering is concerned with studies directed toward developing engineering principles or toward making specific principles usable in engineering practice. Engineering fields include aeronautical, astronautical, chemical, civil, electrical, mechanical, metallurgy and materials, and engineering not elsewhere classified, such as agricultural, bioengineering, biomedical, industrial, nuclear, ocean and systems.

Environmental sciences (terrestrial and extraterrestrial) are concerned with the gross, non-biological properties (with one exception) of the areas of the solar system that directly or indirectly affect man's survival and welfare. They comprise the fields of atmospheric sciences,

geological sciences, and oceanography. The one exception is that expenditures for studies pertaining to life in the sea or other bodies of water are to be reported as support of oceanography and not biology.

Mathematical sciences employ logical reasoning with the aid of symbols and are concerned with the development of methods of operation employing such symbols.

Medical sciences are concerned with the causes, effects, prevention, or control of abnormal conditions in man or his environment as they relate to health. Included are the clinical medical sciences, which are concerned with the study of the origins, diagnosis, or treatment of a particular disease in living human subjects under controlled conditions, and other medical sciences. Examples of the medical sciences are as follows: internal medicine; neurology; ophthalmology; preventive medicine and public health; psychiatry; radiology; surgery; veterinary medicine; dentistry; physical medicine and rehabilitation; podiatry.

Physical sciences are concerned with the understanding of the material universe and its phenomena. They comprise the fields of astronomy, chemistry; physics, and physical sciences not elsewhere classified.

Psychology deals with behavior, mental processes, and individual and group characteristics and abilities. Examples of disciplines within psychology are as follows: experimental psychology; animal behavior; clinical psychology; comparative psychology; ethnology; social psychology; educational personnel, vocational psychology and testing; industrial and engineering psychology; development and personality.

Social sciences are directed toward an understanding of the behavior of social institutions and groups and of individuals as members of a group. These include anthropology, economics, history, linguistics, political sciences, and sociology.

Other sciences not elsewhere classified is a category to be used for multidisciplinary and interdisciplinary projects and cannot be classified within one of the broad fields of science listed above.

Arts and humanities include topics such as art, music, history, languages, religion, and other aspects of man's culture and heritage.

Business administration deals with the management and operation of business enterprises. It includes work in management, marketing, accounting, and related topics.

Education includes research related to any aspect of education. This includes elementary, secondary, and higher education; educational policy; education administration; etc.

Law and public administration includes research related to legal systems and to public policy at the federal, state, or local levels.

Other non-science activities should include all non-science disciplines not appropriately categorized above.

Areas of Special Interest - This section is intended to provide information on expenditures in areas of special interest to the public. The list is not all-inclusive. The totals of the Areas of Special Interest will not normally be equal to the "Total Expenditures for Conduct of R&D". Further, expenditures may overlap two or more categories (e.g., a given project may be reported both as materials science and microelectronics or as aging and mental health). Institutions may need to use ad hoc estimators to come up with these numbers.

Human embryonic stem cell research and adult stem cell research were added to the areas of special interest section beginning in FY 2013.

Pass Throughs - Determines the amounts of expenditures your institution received as a subrecipient and passed through to subrecipients.

This document and previous editions of Research Expenditures are available on the Texas Higher Education Coordinating Board website: <http://www.thecb.state.tx.us>

National level reports and statistics are available from the National Science Foundation at: <http://www.nsf.gov/statistics/> and <https://ncesdata.nsf.gov/webcaspar/>



This document is available on the [Texas Higher Education Coordinating Board website](#).

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