RESEARCH ARTICLES

The Impact of Student-Faculty Ratio on Pharmacy Faculty Scholarship

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Objective. To determine the relationship and impact of student-faculty ratio on scholarship of pharmacy faculty members.

Methods. The number and rank of faculty members, pharmacy program characteristics, and faculty productivity data were collected to determine the impact of student-faculty ratio on faculty scholarship.

Results. Faculty scholarship was not predicted by student-faculty ratio. Factors impacting positively on faculty productivity included National Institutes of Health funding; presence of clinical associate professors, instructors, and lecturers; and programs located in public universities.

Conclusions. Faculty productivity is not related to the student-faculty ratio, wherein more faculty members and fewer students equates to increased scholarship. However, public universities may have different infrastructures which are associated with greater academic productivity compared to private institutions. Additionally, utilizing instructors and clinical or nontenure-track faculty members can significantly increase scholarship among faculty members.

Keywords: pharmacy faculty, scholarship, student-faculty ratio, productivity

INTRODUCTION

Since the 2003-2004 academic year, over 20 new colleges and schools of pharmacy were established in the United States. Additionally, many existing programs transitioned from a bachelor of science degree to a doctor of pharmacy (PharmD) entry-level program as the first professional degree and concomitantly increased class size. As a result, the number of pharmacy students enrolled in a pharmacy college or school has increased by approximately 47% in this timeframe. However, the number of pharmacy faculty members has increased only 37% during the same time period, thereby potentially increasing the student-faculty ratio in some pharmacy programs.¹

The Accreditation Council for Pharmacy Education (ACPE) Accreditation Standards and Guidelines for the Professional Program in Pharmacy does not mandate explicitly a specific student-faculty ratio, but requires the college/school to “have a sufficient number of qualified full-time faculty and staff to effectively deliver and evaluate the professional degree program, while providing adequate time for faculty development, research, and other scholarly activities, service, and pharmacy practice.”² However, the standard further states the student-faculty

ratio should be “commensurate with the averages of institutions of similar mission and size.” Additionally, the ACPE standard on faculty scholarship advocates that pharmacy faculty members “should generate and disseminate knowledge through scholarship,” which may include original research in scientific and educational literature, review articles, book publications, and procurement of extramural funding.² Currently, ACPE standards do not provide a quantitative minimum for these activities per institution nor per individual faculty member.

A large increase in the student body, without a similar increase in the number of faculty members, results in a higher student-faculty ratio. To what extent this may contribute to faculty members becoming laden with additional teaching (eg, classroom, laboratory, experiential) and administrative responsibilities is not known. If these additional demands become excessive, the time commitment to scholarship may be decreased or eliminated.^{3,4} The objective of this study was to determine the relationship and impact of student-faculty ratio on scholarship of pharmacy faculty members.

METHODS

Data were retrieved from various sources. The number and rank of faculty members (including full-time, part-time, and adjunct teaching) was obtained from the American Association of Colleges of Pharmacy (AACP) Faculty Roster for 2006-2007.⁵ Faculty members were

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classified based on their academic rank. Persons with administrative titles only (eg, director of student affairs), assistant lecturers, and assistant instructors were not included in the total faculty. The type of institution (public or private), and ACPE accreditation status (accredited, non-accredited, probation) were obtained from the ACPE, American College of Clinical Pharmacy (ACCP), and/or individual pharmacy program Web sites. The number of students enrolled was obtained from the AACP Institutional Research Report Series, Profile of Pharmacy Students.⁶ Only the total student enrollment for the first-professional PharmD program was included. Publication rate was determined by searching PubMed for articles cited from January 1, 2007, through December 31, 2007, using the official name of the pharmacy institution. Publications were also divided into research and review publications by the PubMed search engine. The search results were examined individually and aberrant results were removed. Data regarding extramural funding to pharmacy institutions from the National Institutes of Health and from non-National Institutes of Health (NIH) Federal Agencies, foundations, and association awards for 2007 were obtained from AACP data.⁷ Only pharmacy programs that had graduated at least 1 first-professional PharmD degree class were included in the study.

The data were entered into an Excel spreadsheet and double-checked for accuracy. Any inaccuracy was rechecked by a third author. Data were subsequently imported into the program NCSS (V 7.1.14, NCSS, Kaysville, UT) for statistical analysis. Upon initial inspection of the data, we found that some variables were not distributed normally; therefore, a natural log transformation was applied to normalize student-faculty ratio and NIH funding. Scholarship, the dependent variable, was defined as the annual publication rate per faculty member as defined by the American Association of University Professors (AAUP) (Appendix 1). Many colleges/schools of pharmacy employ faculty classifications not included in the AAUP definition (eg, instructor). We defined a second category (AAUP PLUS) to include faculty members with clinical titles, instructor, lecturer, and emeritus level not included in the AAUP definition (Appendix 2). Scholarship was defined alternately as the annual publication rate per AAUP PLUS faculty member. We also examined the research publication rate with scholarship defined as the annual research publication rate per AAUP or AAUP PLUS faculty member. To examine the use of student-faculty ratio in predicting scholarship (AAUP and AAUP PLUS), we subjected these data to a receiver operating characteristic (ROC) analysis, using the empirical method and the following cut-point criterion for scholarship: AAUP publication rate of 0.87 publications

per year (50th percentile); AAUP publication rate of 1.8 publications per year (75th percentile); AAUP research publication rate of 0.49 publications per year (50th percentile); AAUP research publication rate of 1.0 publications per year (75th percentile); AAUP PLUS publication rate of 0.6 publications per year (50th percentile); AAUP PLUS publication rate of 1.2 publications per year (75th percentile); AAUP PLUS research publication rate 0.34 publications per year (50th percentile); and AAUP PLUS research publication rate of 0.67 publications per year (75th percentile).

Last, logistic regression analysis was used to assess the relationship of other variables to scholarship. Publication rate was transformed into a binary variable using the 50th percentile of the publication rate as the cut point. No variable selection routines were employed to examine the odds ratios of all variables, even if not significant. All variables with a *p* value < 0.2 were reported.

RESULTS

Data from 103 colleges/schools of pharmacy were retrieved. Fourteen had not graduated a class at the time of writing and were therefore excluded from further analysis. Additionally, the University of South Carolina and the Medical University of South Carolina were excluded because the faculty members from the 2 universities made up 1 college of pharmacy during the study period. Therefore, 87 colleges/schools were available for analysis. Basic demographics of the colleges/schools included in the analysis are shown in Appendix 3. The median, mean, and standard deviations for student-faculty ratio are reported in Table 1.

Receiver operating characteristics analysis of the AAUP cohort of faculty members demonstrates that there is no association between student-faculty ratio and scholarship. The ROC analysis of the AAUP PLUS cohort for all publications does show moderate predictive ability for scholarship at the 75th percentile with an AUC of 0.63, (*p* = 0.02).

Table 1. Student-faculty Ratios for all Programs and for Public and Private Institutions

Programs	Mean (SD)	Median
AAUP SFR All	15.9 (9.5)	12.9
AAUP PLUS All	11.7 (6.4)	9.7
AAUP SFR Public	13.7 (8.3)	11.2
AAUP SFR Private	19.4 (10.2)	15.9
AAUP PLUS Public	8.8 (4.2)	7.7
AAUP PLUS Private	16.2 (6.6)	14.7

Abbreviations: AAUP = American Association of University Professors; SFR = Student-faculty ratios

Tables 2 through 5 exhibit the results of the logistic regression analysis on the dependent variable “publications” or “research publications” per “all faculty members as defined by AAUP” or “AAUP PLUS” (publication rate). The continuous dependent variable was converted into a binary variable where 1 represents “scholarship” (or scholarly colleges/schools) and 0 represents “lack of scholarship” (or non-scholarly colleges/schools), using the 50th percentile cut point of the publication rate data as stated above. The reference group in all logistic analyses is 0 for colleges/schools displaying a “lack of scholarship.”

AAUP Faculty

Using the cut point of 0.87 publications per year (1 publication per faculty member per 1.14 years), NIH funding was found to be the strongest predictive factor on publication rates and scholarship. Our model predicts \$50,000 of NIH funding increases the level of scholarship 1.2-fold more in a scholarly college/school than in a non-scholarly member of the academy. Public versus private status of the institution also predicted scholarship, whereas public colleges/schools published 1.6-fold more than private colleges/schools ($p = 0.12$). The student-faculty ratio had a moderate effect in decreasing scholarship. A student-faculty ratio increase of 1 resulted in a decreased scholarship of 7%.

The logistic model for AAUP faculty and research scholarship is reported in Table 3. Public colleges/schools are more scholarly according to our model, publishing twice the rate of research publications as private colleges/schools ($p = 0.01$). NIH funding was the only other positive predictor of research publication rates, with the effect identical to that reported for the all publications model above. Negative effects on research scholarship were significant for full-time professors ($p = 0.055$).

AAUP PLUS Faculty

Table 4 demonstrates the differences between scholarly colleges/schools and non-scholarly colleges/schools

Table 2. Logistic Regression Analysis of Publication Rate per AAUP Faculty Member

Independent Variable	Odds Ratio (95% CI)	P
NIH funding	1.2 (1.1 - 1.3)	< 0.001
Student-faculty ratio	0.5 (0.3 - 0.8)	0.002
Public versus private	1.6 (0.9 - 3.0)	0.120

Binary cut-off set at the 50th percentile publication rate of 0.87 per year per AAUP faculty member, reference group 0 (< 0.87 publications per year).

Abbreviations: AAUP = American Association of University Professors; NIH = National Institutes of Health; CI = confidence interval

Table 3. Logistic Regression Analysis of Research Publication Rate per AAUP Faculty Member

Independent Variable	Odds Ratio (95% CI)	P
NIH funding	1.2 (1.1 - 1.4)	0.001
Public versus private	2.0 (1.0 - 3.9)	0.010
Professor	0.9 (0.8 - 1.0)	0.055

Binary cut-off set at the 50th percentile research publication rate of 0.49 per year per AAUP faculty member, reference group 0 (< 0.49 publications per year).

Abbreviations: AAUP = American Association of University Professors; NIH = National Institutes of Health; SFR = student-faculty ratio; CI = confidence interval

using the publication rate of AAUP PLUS faculty members. Clinical associate professors, lecturers, and instructors appear in the model as having positive effects on scholarship. The presence of 1 full-time equivalent (FTE) clinical associate professor increases scholarship by 90%. National Institutes of Health funding and public versus private colleges/schools appear in the model with a similar effect seen in the AAUP-only models. Professors and student-faculty ratio had negative effects on scholarship, with effects similar to those seen in the AAUP-only model.

Table 5 demonstrates the differences between scholarly colleges/schools and non-scholarly colleges/schools using the research publication rate of AAUP PLUS faculty. Instructors and lecturers had positive effects on research scholarship, along with public versus private and NIH funding. Professors, assistant professors, and the student-faculty ratio had negative effects on scholarship.

DISCUSSION

The search for meaningful productivity metrics in academia has been ongoing. We decided to employ ROC

Table 4. Logistic Regression Analysis of Publication Rate per AAUP PLUS Faculty Member

Independent Variable	Odds Ratio (95% CI)	P
Clinical associate professor	1.9 (1.2 - 2.9)	0.006
NIH funding	1.2 (1.1 - 1.4)	0.009
Student-faculty ratio	0.4 (0.2 - 0.8)	0.010
Instructor	1.9 (1.1 - 3.0)	0.010
Part-time lecturer	14.8 (1.6 - 138)	0.020
Public versus private	2.8 (1.2 - 6.6)	0.020
Professor	0.9 (0.8 - 1.0)	0.030
Lecturer	3.4 (0.7 - 16.5)	0.130

Binary cut-off set at the 50th percentile publication rate of 0.6 per year per AAUP PLUS, reference group 0 (< 0.6 per year).

Abbreviations: AAUP = American Association of University Professors; NIH = National Institutes of Health; CI = confidence interval

Table 5. Logistic Regression Analysis of Research Publication Rate per AAUP PLUS Faculty Member

Independent Variable	Odds Ratio (95% CI)	P
Assistant Professor	0.9 (0.8 - 1.0)	0.01
Part-time lecturer	14.8 (1.6 - 138)	0.02
Public versus private	2.1 (1.1 - 4.2)	0.04
Instructor	1.6 (1.0 - 2.4)	0.04
NIH funding	1.1 (1.0 - 1.3)	0.04
Professor	0.9 (0.8 - 1.0)	0.12
Lecturer	3.4 (0.7 - 16.5)	0.13
Student-faculty ratio	0.7 (0.4 - 1.1)	0.15

Binary cut-off set at the 50th percentile publication rate of 0.34 per year per AAUP PLUS faculty member, reference group 0 (< 0.34 per year).

Abbreviations: AAUP = American Association of University Professors; NIH = National Institutes of Health; CI = confidence interval

and logistic regression analysis to examine the capability of student-faculty ratio to predict scholarship. According to the ROC analysis, student-faculty ratio was not useful as a predictor of faculty scholarship at the 50th or 75th percentile of publications or research publications when faculty is defined by the AAUP definition. The area under the empirical ROC in this cohort was 0.54, which is considered a “D” in a traditional grading system and moreover was not significantly different from 0.5.⁸ Consequently, it is not better than a flip of a coin for predicting scholarship. The AAUP PLUS cohort of faculty members improves the predictive ability of student-faculty ratio for scholarship; however the improvement is not great with the area under the empirical ROC of 0.64. Nonetheless, the extra faculty classifications included in the AAUP PLUS appeared to have a greater impact on scholarship than traditional faculty members’ roles.

When evaluated in the logistic regression model, clinical associate professor, instructor, and lecturer faculty members consistently appeared as an important factor in scholarly institutions. In the all publications regression model, clinical associate faculty members had a significant impact on increasing publications, however they did not appear in the research publications model. This is most likely attributed to nontenure-track faculty members producing more scholarship of integration rather than scholarship of discovery. As indicated in our analysis, the addition of 1 clinical associate professor increased scholarship by 90%. The nontenure-track clinical faculty members themselves may not have been responsible directly for the increase in publications. However, because clinical faculty members typically have a larger teaching role, tenure-track faculty members may be more able to devote time to research.

Instructors and lecturers, if implemented appropriately, can unload significantly the teaching and administrative responsibilities of faculty members (eg, grading, examination proctoring). Typically, instructors have no scholarship requirements and can be assigned labor-intensive teaching tasks, such as small group workshops, laboratory practice courses, and facilitation. The method by which instructors are incorporated into the program’s teaching needs determines their level of effectiveness and ultimately the collective productivity of a college/school.

One of the predictors of scholarship that appears in most versions of the models is the difference between private and public institutions. Student-faculty ratios are significantly lower in public colleges/schools versus private colleges/schools ($p < 0.001$). Within public schools, the student-faculty ratio for the AAUP is also different than the student-faculty ratio for the AAUP PLUS. Public schools appear to be hiring enough instructors to impact significantly the student-faculty ratio. For private colleges/schools, the student-faculty ratio for AAUP and the AAUP PLUS is not different, indicating they do not employ enough instructors to impact the student-faculty ratio. A previous study found similar differences in student-faculty ratio in public versus private programs.⁹ Another explanation for the presence of private versus public institution impact on scholarship may be a result of funding strategies of public institutions. Public universities are funded through tuition and state appropriations and rely heavily on research support. Although the funding for specific research does not go directly to the university, the finance and administration fees (F&A costs or “indirect costs”), which can be as high as 50% of the funded grant, often pay a substantial portion of building maintenance and other administrative costs.

Although the presence of a doctor of philosophy (PhD) was not analyzed in our models, such programs also may contribute to the overall productivity of a college/school. Ninety-one percent of public programs studied had at least 1 PhD program, whereas only 30% of private programs did.⁹ Colleges/schools of pharmacy with a PhD program most likely have additional personnel for support of scholarly activities, such as graduate assistants, teaching assistants, postdoctoral trainees, or laboratory technicians. Some, but not all, may have been excluded from the AACP Roster and thus were not included in this analysis. However, using these personnel lessens the teaching responsibilities and maximizes research opportunities for pharmacy faculty members.

The combination of NIH funding and PhD programs may define some universities as a “Research I” institution. The Carnegie Foundation for the Advancement of Teaching classifies universities as “Research I” when

they meet the following criteria: (1) offer a full range of baccalaureate programs; (2) are committed to graduate education through the doctorate; (3) give high priority to research; (4) award 50 or more doctoral degrees each year; and (5) receive \$40 million or more annually in federal support.¹⁰ Many of the public universities in our study are classified as Research I universities, whereas none of the private institutions meet these criteria. These basic differences in the mission of the university explain the difference in scholarship between public and private institutions. Tenure and promotion requirements may differ between research and teaching universities. Research universities may require a specific amount of extramural funding for promotion and tenure, whereas teaching institutions may require evidence of excellence in teaching. Research I universities may offer competitive start-up incentives and intramural funding to assist in the faculty development of a research program, which may not be available at a teaching-intensive university. Such incentives may attract faculty members with more training in research methodologies and publishing. Additionally, once a faculty member receives extramural funding, his/her time may be protected to focus on research. Our results are consistent with a previous study which found a higher number of publications (scholarship) in public versus private institutions.¹¹

Sources of data used in the study had limitations. Using the ACCP Faculty Roster may be inaccurate or not inclusive of all faculty members, and the roster may not be consistent among colleges/schools. For example, some colleges/schools list adjunct faculty members, instructors, residents, and fellows, whereas other colleges/schools do not. It is important to take into account the time adjunct faculty members, instructors, residents, and fellows teach in establishing a more systematic student-faculty ratio. Calculating student-faculty ratios is controversial because of the lack of consistent definitions in how to count appropriately full-time equivalent (FTE) faculty members involved with teaching, and how to determine an FTE student. The FTE faculty question has been addressed by the US Department of Education in the common data set initiative (Appendix 1). In one study, the student-faculty ratio was determined by using the total number of PharmD students and the total number of full-time faculty members only.⁹ The median student-faculty ratio reported was 23 for the 2007-2008 academic year. In our analysis, the median student-faculty ratio, using AAUP and AAUP PLUS definitions, were 12.9 and 9.7, respectively. Although the data for each of the studies were not from the same year, the incorporation of part-time faculty members and lecturers (omitted from the Knapp study) resulted in a much lower student-faculty ratio. Additionally, although the

ACPE guidelines state that the student-faculty ratio is important, ACPE and ACCP do not have an official stance on the most appropriate student-faculty ratio for a particular college/school of pharmacy.¹² One study predicting pharmacy faculty workforce in the next 10 years used a student-faculty ratio of 10 as the "realistic target."¹² Therefore, consistent calculation of student-faculty ratio, in addition to guidance from the accrediting bodies regarding an appropriate student-faculty ratio, would aid administrators in hiring strategies.

The student-faculty ratio alone does not take into account the teaching workload for any particular faculty member. However, an increase in the number of students may result in increased instructional and clinical teaching; certain departments (such as pharmacy practice) may assume these responsibilities disproportionately. Often, problem-based teaching requiring small groups exists in pharmacy practice courses, such as therapeutics. However, these small groups are an ideal placement for instructors and lecturers. The increased number of students in pharmacy programs requires an increased number of introductory and advanced pharmacy practice experiences (IPPE and APPE), which may also require pharmacy practice faculty members to precept more clinical students. Although student-faculty ratio is not an ideal surrogate for teaching responsibilities, no other objective measures are available to determine the relationship between class size and teaching requirements. Other factors, such as course difficulties, multiple sessions of courses, class preparation, curriculum revisions, and student advising also must be incorporated.

Publications in PubMed and extramural funding were our 2 primary outcomes for scholarly productivity. However, some programs may be placing a priority on teaching and have a less stringent requirement for scholarly activity. As a result, their faculty members may be disseminating results in non-indexed print, online journals, and by other methods (eg, pharmacy and therapeutics reports, educational brochures). Advancement in the scientific community is defined by the research conducted by a profession or practice.¹⁰ Therefore, if our profession is not publishing results of such research, there are no archival records of the data and advancements achieved.¹¹ Although the selection of Medline as a marker for scholarship is not all inclusive, indexed journals should be the most appropriate place for pharmacy faculty members to publish.

CONCLUSION

Scholarship is a multifactorial process, and assigning a single metric as a surrogate is fraught with problems.

The academy should employ validated methods to evaluate scholarship of its member institutions. Validated methods are created by “good science” which has been defined as being evidence-based, logical, convincing, explanatory, honest, testable, and systematic. As defined currently, the student-faculty ratio as a surrogate for scholarship, possesses none of these qualities. The results indicate that faculty productivity is not related simply to the student-faculty ratio, wherein more faculty members and fewer students equate to increased scholarship. However, public universities may have a different infrastructure which allows for greater scholarly productivity compared to that of private institutions. Additionally, employing instructors, and clinical, or nontenure-track, faculty members can significantly increase scholarship.

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Appendix 1. Common data set initiative by the US Department of Education definition of total faculty and student-faculty ratio for the AAUP cohort.

FT Prof + PT Prof/3 + FT Assoc Prof + PT Assoc Prof/3 + FT Asst Prof + PT Asst Prof/3 + FT Researcher + PT Researcher/3 + Resident or Fellow/3

Student-faculty Ratio: The ratio of full-time equivalent students (full-time plus 1/3 part-time) to full-time equivalent instructional faculty (full-time plus 1/3 part-time).

Appendix 2. AAUP PLUS cohort

AAUP cohort + FT Clin Prof + PT Clin Prof/3 + FT Clin Assoc Prof + PT Clin Assoc Prof/3 + FT Clin Asst Prof + PT Clin Asst Prof/3 + FT Emeritus + PT Emeritus/3 + FT Lecturer + PT Lecturer/3 + FT Instructor + PT Instructor/3

Appendix 3. Demographics of Colleges of Pharmacy Included in the Analysis of Student-Faculty Ratio

	Public/ Private	Total Pubs	Research Pubs	Pub Rate	NIH Funding	Total Faculty	Class Size	AAUP SFR	AAUP PLUS SFR
Auburn University	S	24	15	0.39	277,400	59	492	23.1	8.8
Samford University	P	5	4	0.14	N/R	37	482	13.3	13.3
University of Arkansas	S	7	6	0.10	N/R	64	394	7.6	6.6
University of Arizona	S	49	44	1.07	8,467,250	52	321	9.0	6.6
Midwestern University, Glendale	P	7	5	0.27	N/R	23	397	20.2	20.2
University of California, San Francisco	S	24	19	0.21	25,254,306	110	488	10.2	4.8
University of Southern California	P	31	21	0.44	7,263,692	70	740	12.5	12.1
University of California, San Diego	S	26	19	1.30	3,761,286	16	174	20.9	13.1
University of the Pacific	P	14	12	0.27	373,047	53	638	15.8	12.9
Loma Linda University	P	3	0	0.12	N/R	24	211	9.6	9.0
Western University	P	10	8	0.32	59,225	31	454	14.7	14.7
University of Colorado	S	48	41	0.96	7,890,046	63	513	10.8	8.6
University of Connecticut	S	41	31	0.73	1,491,114	55	399	14.1	7.4
Howard University	P	2	2	0.08	625,000	28	342	13.5	13.5
University of Florida	S	48	36	0.80	4,959,305	66	1241	31.8	19.7
Florida A&M University	S	14	14	0.31	3,186,932	60	948	16.1	16.1
Nova Southeastern University	P	15	11	0.34	N/R	57	792	16.0	14.2
Palm Beach Atlantic University	P	2	0	0.10	N/R	19	308	16.2	16.2
University of Georgia	S	36	34	0.52	1,257,600	65	510	14.7	8.3
Mercer University	P	15	9	0.41	219,315	34	566	27.8	17.0
South University	P	2	1	0.11	N/R	15	216	15.4	15.4
University of Iowa	S	43	39	0.60	2,864,961	69	430	11.9	6.6
Drake University	P	2	1	0.06	N/R	33	497	18.4	17.1
Idaho State University	S	3	0	0.06	221,409	48	232	8.2	5.1
University of Illinois at Chicago	S	63	50	0.44	13,470,722	171	657	12.2	4.4
Midwestern University, Chicago	P	7	4	0.16	195,378	49	763	19.1	16.7
Southern Illinois University	S	6	3	0.26	N/R	20	161	9.9	8.6
Purdue University	S	26	24	0.32	7,042,858	85	637	10.9	7.7
Butler University	P	6	4	0.15	N/R	37	537	16.6	15.2
University of Kansas	S	9	8	0.18	11,041,971	50	414	10.6	8.5
University of Kentucky	S	61	51	0.79	5,684,703	75	457	7.7	6.3
University of Louisiana	S	37	33	0.79	N/R	48	432	10.9	9.7
Xavier University of Louisiana	P	9	9	0.27	201,721	34	637	39.8	19.1
Northeastern University	P	26	18	0.62	4,666,304	40	696	18.8	18.0
Boston, Massachusetts College of Pharmacy	P	17	16	0.32	N/R	54	1674	37.2	31.0
Worcester/Manchester, Massachusetts College of Pharmacy	P	12	6	0.32	N/R	38	539	16.0	14.7
University of Maryland	S	73	64	1.06	5,598,218	70	481	7.4	6.9
University of Michigan	S	34	25	0.47	3,762,787	70	278	8.4	4.4
Wayne State University	S	33	25	0.85	1,880,991	39	301	12.4	8.0
Ferris State University	S	2	0	0.05	N/R	46	510	31.2	11.8
University of Minnesota	S	59	47	0.62	4,585,773	103	640	7.2	6.5
University of Missouri - Kansas City	S	23	18	0.48	1,060,897	47	495	23.6	10.5
St. Louis College of Pharmacy	P	0	0	0.00	N/R	96	1123	16.9	13.9
University of Mississippi	S	58	53	1.02	5,998,192	69	417	9.5	6.8
University of Montana	S	3	2	0.05	7,261,133	62	255	7.9	6.1

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University of North Carolina	S	97	81	0.99	9,109,525	89	542	13.7	9.0
Campbell University	P	8	7	0.15	154,645	52	438	8.8	8.4
Wingate University	P	7	1	0.24	N/R	29	243	10.9	10.0
North Dakota State University	S	11	9	0.30	401,283	37	340	14.6	9.9
University of Nebraska	S	22	20	0.67	3,300,445	34	261	10.7	9.4
Creighton University	P	11	10	0.17	N/R	60	651	12.1	11.5
Rutgers University	S	43	33	0.51	5,846,770	77	1382	43.2	21.8
University of New Mexico	S	36	29	0.62	2,810,061	53	341	9.2	7.3
University of Southern Nevada	P	0	0	0.00	N/R	31	458	14.8	14.8
University of Buffalo	S	47	40	1.18	3,990,815	44	470	27.1	12.3
Albany College of Pharmacy	P	43	36	0.54	394,232	72	1190	20.9	16.7
St John's University	P	30	20	0.40	192,258	65	1574	41.4	24.2
Long Island University	P	17	6	0.30	N/R	56	1391	26.8	25.1
The Ohio State University	S	86	79	1.18	5,558,315	71	457	12.6	6.5
University of Cincinnati	S	32	26	0.48	1,252,640	67	335	8.7	6.3
Ohio Northern University	P	3	3	0.10	247,500	53	1042	41.1	28.7
University of Toledo	S	9	6	0.17	646,410	52	416	11.5	8.9
University of Oklahoma	S	21	19	0.28	1,251,481	76	519	12.9	7.0
Southwestern Oklahoma State University	S	4	1	0.07	N/R	62	321	8.5	8.0
Oregon State University	S	20	16	0.54	1,347,952	35	334	15.7	11.4
University of Pittsburgh	S	50	34	0.58	7,383,285	87	406	6.1	5.2
University of the Sciences in Philadelphia	P	20	15	0.37	N/R	56	1535	35.7	29.3
Duquesne University	P	6	6	0.15	1,399,303	38	1068	36.4	28.6
Temple University	S	27	25	1.08	742,941	27	581	41.5	21.5
Lake Erie College of Osteopathic Medicine	P	1	1	0.03	N/R	36	367	14.7	13.4
Wilkes University	P	2	2	0.09	N/R	25	269	12.2	11.7
University of Puerto Rico	S	1	1	0.02	91,800	39	186	5.2	5.0
University of Rhode Island	S	16	14	0.33	3,604,201	47	552	18.4	12.7
South Dakota State University	S	7	6	0.21	N/R	34	249	7.7	7.5
University of Tennessee	S	17	13	0.08	1,651,967	181	613	6.0	5.4
University of Texas, Austin	S	57	50	0.56	3,683,449	105	518	12.2	6.5
Texas Tech University	S	31	28	0.42	1,779,523	64	349	6.0	5.6
University of Houston	S	41	36	0.80	1,841,815	50	486	16.8	10.6
Texas Southern University	S	9	8	0.32	1,361,001	28	510	21.0	20.1
University of Utah	S	17	13	0.22	23,583,771	86	183	4.1	3.3
Virginia Commonwealth	S	31	24	0.43	1,441,806	67	470	9.8	7.8
Shenandoah University	P	7	7	0.24	N/R	25	300	12.9	12.7
University of Washington	S	20	17	0.38	9,291,752	55	348	9.7	7.1
Washington State	S	25	16	0.52	1,457,151	48	378	16.4	9.1
University of Wisconsin	S	58	51	0.87	6,911,663	66	529	12.9	8.1
West Virginia University	S	9	8	0.24	575,379	39	323	12.3	8.6
University of Wyoming	S	6	4	0.21	208,155	28	202	14.4	7.2

Abbreviations: S = state funded; P = private; NIH = National Institutes of Health; N/R = not reported; SFR= student-faculty ratio; AAUP = American Association of University Professors