RESEARCH ARTICLES

The Status of PhD Education in Economic, Social, and Administrative Sciences Between 2005 and 2008

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Objectives. To describe the funding, education, enrollment, and graduation patterns from economic, social, and administrative sciences PhD programs in colleges and schools of pharmacy in the United States.

Methods. Economic, social, and administrative sciences PhD programs were identified from the American Association of Colleges of Pharmacy (AACP) Web site. A 41-item online survey instrument was sent to the director of graduate studies of each identified program. Only programs offering a PhD degree were included in the study.

Results. Of the 26 programs surveyed, 20 (77%) provided useable responses to the survey instrument. Approximately 91% of PhD programs guarantee funding to incoming students with an average commitment of 2.9 years. On average, students were paid a stipend of $18,000 per year for commitments to research and teaching assistantships, each averaging approximately 2 years in length. Programs admitted an average of 3.5 students per year and graduated approximately 85% of entering students. The majority of students are non-US citizens and accept positions in either academic or industrial positions after graduation.

Conclusions. Most economic, social, and administrative sciences PhD programs guarantee funding to incoming PhD candidates. Programs offering funding packages significantly below the average may be at a competitive disadvantage. It is unclear whether the number of students graduating from PhD programs is adequate to fulfill academic and industrial needs.

Keywords: graduate education, academia, social and administrative sciences, doctor of philosophy

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INTRODUCTION

The number of colleges and schools of pharmacy in the United States has increased significantly since the mid 1990s.[1] In addition, the number of faculty members with expertise in economic, social, and administrative sciences-related topics has increased as the number of pharmacy schools and colleges offering education to PharmD students in pharmacoepidemiology[2] and pharmacoeconomics has increased.[3] Similarly, pharmaceutical companies, managed care companies, governmental agencies, and others have experienced an increase in the need for employees with expertise in pharmaceutical economic, social, and administrative sciences research, indicating a greater need for qualified applicants to PhD programs in these areas.[4,5]

An annual survey conducted by AACP to assess vacancies in US colleges and schools of pharmacy suggests significant concerns over retention and recruitment into pharmacy faculty positions.[4] Among the 93 colleges and schools of pharmacy responding to this survey, 80 colleges and schools reported a total of 425 vacant faculty positions in the United States in 2007-2008. Positions in pharmaceutical sciences accounted for approximately 32% of vacant positions. These findings imply that the existing shortage of pharmacists in the US health care system will worsen. Negative implications also exist for training graduate students in pharmaceutical sciences such as economic, social, and administrative sciences.

One incentive to impact the recruitment of high-quality graduate students into PhD programs is the availability of competitive funding packages. To our knowledge, no studies have documented the funding of PhD training in US colleges and schools of pharmacy. Therefore, little information is available to compare the competitiveness of funding across PhD programs, or the ways funding for graduate education in pharmaceutical sciences is obtained. In addition, little is known about levels of enrollment and graduation from economic, social, and administrative sciences PhD programs, which can affect faculty vacancy rates at US colleges and schools of pharmacy. The objective of

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this study was to describe funding for PhD education and enrollment, and graduation patterns from economic, social, and administrative sciences PhD programs housed in US schools of pharmacy. The results from this study should be useful to guide funding and enrollment decisions in economic, social, and administrative sciences PhD programs.

METHODS

A 6-part survey instrument with 41 items was developed using SurveyMonkey (SurveyMonkey, Palo Alto, CA). Survey questions were designed to capture information about the characteristics of PhD programs in economic, social, and administrative sciences, the demographics of graduate students enrolled in PhD programs, the funding mechanisms used for graduate education, and the effect of the 2008-2009 recession on funding decisions. The survey instrument was pilot tested with 3 faculty members from the division of pharmaceutical outcomes and policy at the UNC Eshelman School of Pharmacy. Questions were scaled either as continuous or categorical responses. To reduce respondent burden and improve the validity of responses, response options for several questions were categorized into either quartiles ranging from 0% - 25%, 25% - 50%, 51% - 75%, and 76% - 100%, or Likert categories. This precluded examination of average responses for certain questions. The 0% - 25% and 25% - 50% responses are not mutually exclusive due to an oversight during development of the survey instrument.

Economic, social, and administrative sciences graduate programs were identified from the American Association of Colleges of Pharmacy Web site.[5] Only programs offering a PhD degree were included in this study. The online survey instrument was sent to the person listed as director of graduate studies on the program's Web page. A reminder was sent to those programs that did not respond to the survey instrument within 2 weeks of the initial request, and a third follow-up was sent 2 weeks later to those programs that did not respond to the second request. All results were tabulated using either the mean or percent response and are presented with corresponding standard errors.

Table 1. Programs Surveyed to Describe Funding, Education, Enrollment, and Graduation Patterns from Economic, Social, and Administrative Sciences PhD Programs

Auburn University
Purdue University
University of Arizona
University of Cincinnati
University of Florida
University of Georgia
University of Houston
University of Illinois – Chicago
University of Iowa
University of Louisiana Monroe
University of Maryland
University of Michigan
University of Minnesota
University of Mississippi
University of New Mexico
University of North Carolina
University of Oklahoma
University of Rhode Island
University of Southern California
University of South Carolina
University of Tennessee - Memphis
University of Texas
University of Washington
University of Wisconsin
Virginia Commonwealth
West Virginia University

Program information obtained from American Association of Colleges of Pharmacy (AACP) Listing of Economic, Social, and Administrative Sciences PhD programs.

RESULTS

Of the 26 programs surveyed (Table 1), 21 (85%) responded to the survey instrument. Of these responses,

Table 2. Characteristics of Graduate Programs Responding to Survey Instrument (N = 20)

Program Characteristic	Mean (SD)	Min	Max
Number of faculty members			
Full-time	10 (6)	3	22
Part-time[a]	4 (7)	0	30
Tenured	8 (3)	5	14
Participate in the graduate program	9 (4)	5	20
Degrees offered, %			
PhD	100		
MS	80		
Other	5		
Number of years PhD degree offered[b]	24.2 (17.2)	0	54
Areas emphasized, %			
Pharmaceutical marketing	25		
Pharmacoeconomics	70		
Pharmacoepidemiology	60		
Social and behavioral pharmacy	75		
Pharmaceutical policy	60		
Pharmacy practice/health services research	80		
Other	15		

[a] Useable response rate for this item was 19.
[b] Useable response rate for this item was 17.

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useable data were obtained from 20 programs. In addition to overall response rates, individual item response rates differed across the type of question. Funding questions had a generally lower response rate than other questions in the survey instrument. Survey respondents were trained primarily as PhDs (95%) with a majority reporting that their current position was director of graduate studies (57.1%). The mean number of years at the respondent's current institution and in their current position was 14.4 ± 8.6 years and 6.8 ± 5.0 years, respectively.

Table 2 describes the characteristics of the graduate programs responding to the survey instrument and their current graduate students. The mean number of full- and part-time faculty members per institution was 10 and 4, respectively. In addition to offering PhD degrees, 80% of programs also offered masters degrees. The mean number of years the PhD degree had been offered per institution was 24.2 ± 17.2 years. PhD programs concentrated most commonly in pharmacy practice/health services research (80%), social and behavioral pharmacy (75%), pharmacoeconomics (70%), pharmacoepidemiology (60%), pharmaceutical policy (60%), and marketing (25%).

The number of students admitted to PhD programs per year ranged from 0 to 12, with a mean of 3.5 ± 2.7 students. The total number of students enrolled per program ranged from 5 to 40 with a mean of 13.9 ± 9.2 students (Table 3). Of interest, the median response category suggests that the majority of PhD students accepted into economic, social, and administrative sciences PhD programs were foreign applicants (51% - 75%). On average, 85.5% ± 12.1% of students appeared to have completed their PhD training with an average time to completion of 4.7 ± 0.7 years. Upon graduation, only 12.4% ± 22.8% of students take postdoctoral training positions. The median response for employment positions following graduation suggests that most students entered either academic or pharmaceutical company positions. Median responses for academic and pharmaceutical company positions was 25% - 50%, while median responses for consulting, governmental agency, and nonprofit organizations was 0% - 25%.

Table 4 describes funding mechanisms and Table 5 describes resources for PhD training in economic, social, and administrative sciences programs. The majority of PhD programs (91.4% ± 14.5%) guaranteed funding to students entering their program, with a mean of 2.9 ± 1.6 (ranged from 0 to 5) years of guaranteed funding. Within the funding packages, 94.4% of programs covered in-state tuition, 93.3% covered out-of-state tuition, 62.5% covered fees, and 100% of programs covered stipends for incoming students. Most students earned funding support through research assistantships and teaching assistantships which had higher median responses (25% - 50%) than other potential funding sources (Table 5). On average, students served 4.3 ± 1.8 (range = 2 to 8 semesters) as a teaching assistant and 4.4 ± 2.1 semesters (range = 0 to 8 semesters) as a research assistant.

Table 3. Characteristics of Graduate Students from Programs Responding to Survey Instrument (N = 20)

Funding Mechanisms	Mean(SD)	Min	Max
Average number of students entered per year, 2005 - 2008	3.5 (2.7)	0	12
Number of students currently enrolled in the PhD program	13.9 (9.2)	5	40
Percentage of current graduate students:[a] *			
That are full time students	76% - 100%		
With a previous graduate degree (eg, MS, MA, JD, MD, etc)	51% - 75%		
With a previous pharmacy degree (BS or PharmD)	51% - 75%		
Entering as foreign applicants	51% - 75%		
Percentage of students complete the PhD program	85.5(12.1)	50	100
Average number of years to complete the PhD program	4.7(0.7)	4	6.5
Percent of students taking post-doctoral positions upon completion	12.4(22.8)	0	50
What percentage students went into the following areas of employment after graduation between 2005 and 2008[a,b] *			
Academia	25% - 50%		
Pharmaceutical company	25% - 50%		
Consulting firm	0% - 25%		
Government agency	0% - 25%		
Nonprofit Organization	0% - 25%		
Other	0% - 25%		

[a] Represent the median response category.
[b] Useable response rate for this item was 19.

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Table 4. Funding Mechanisms for PhD Training in Economic, Social, and Administrative Sciences (N = 19)

Funding Mechanisms	Mean(SD)	Min	Max
Percent of students entering program with guaranteed funding[a]	91.4 (14.5)	50	100
Number of years of guaranteed funding[a]	2.9 (1.6)	0	5
Funding package includes:[a]			
In-state tuition	94.4%		
Out-of-state tuition	93.3%		
Fees	62.5%		
Stipend	100.0%		
Average (SD) amount for stipend[a]	$18,100 (6,324)	$12,894	$30,000
For those programs offering guaranteed funding, who guarantees this funding?[b]			
School of Pharmacy	68.8%		
Individual units within the school	25.0%		
Individual research investigators	6.3%		
Other	37.5%		
Percent of programs offering out-of-state tuition waivers[a]	66.7%		
What additional resources are committed to students upon entry:			
Space Within the School	100%		
Research Computer	100%		
Funding to Support their Research	35%		
Travel stipend to conferences regardless of whether a presentation is made	33%		
Travel stipend to conferences contingent on making a presentation	89%		
Percentage of students currently funded through the following sources[c]			
Self-funded	0% - 25%		
Research Assistant positions written into faculty grants and contracts	25% - 50%		
Teaching Assistant positions provided by the school using central resources	25% - 50%		
Program specific scholarships/fellowships available only to students in your unit	0% - 25%		
Fellowships/scholarships available to students from all units of the school	0% - 25%		
External fellowships/scholarships for which students apply	0% - 25%		
Faculty start-up funds	0% - 25%		
Revenue generated by indirect costs written into faculty grants and contracts	0% - 25%		
Number of semesters students are funded as a Teaching Assistant	4.3 (1.8)	2	8
Number of semesters students are funded as a Research Assistant	4.4 (2.1)	0	8

[a] Useable response rate for this item was 18.
[b] Useable response rate for this item was 16.
[c] Represent the median response category.

Eleven of the PhD programs in economic, social, and administrative sciences offered fellowships/scholarships for which only students in their unit were eligible to apply. Funding from these fellowships/scholarships originated from multiple sources, including private gifts and endowments (54.5%), industry sponsorship (45.5%), salary recovery dollars from grants and contracts (18.2%), and indirect costs written into contracts and grants (9.1%). When asked to rate on a Likert scale ranging from (1) very dissatisfied to (5) very satisfied, their satisfaction with their unit's ability to provide a competitive funding package for graduate students, the mean response of 3.2 ± 1.0 suggested that respondents were neither satisfied nor dissatisfied.

Respondents also were asked a series of Likert-type questions concerning the impact that the 2008 to 2009 recession had on funding for their graduate students. Response options ranged from (1) = strongly disagree to (5) = strongly agree (Table 6). On average, respondents agreed with the statement that the recession adversely affected resources available to fund graduate students (3.5 ± 1.1). However, they neither agreed nor disagreed with statements that the recession affected the number of students offered admission (2.7 ± 1.2), the amount of financial commitments made to students (2.7 ± 1.7), or decisions to admit students who were self-funded (2.6 ± 1.0). Moreover, they disagreed with the statement that the

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Table 5. Funding Resources for PhD Training in Economic, Social, and Administrative Sciences and Satisfaction with Ability to Provide Funding

Survey Item	Percentage
Funding sources for scholarships/fellowships for which only students in your unit are eligible to compete:[a]	
Private gifts/endowments	54.5
Industry-sponsored programs	45.5
Salary recovery dollars generated by faculty contracts and grants	18.2
Indirect costs written into faculty contracts and grants	9.1
Other	18.2
	Mean (SD)
Satisfaction with your unit's ability to provide a competitive funding package for graduate students.[b,c]	3.2 (1.0)

[a] Useable response rate for this item was 11.
[b] Useable response rate for this item was 18.
[c] 1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree

Table 6. Impact of the 2008-2009 Recession on Funding, Education, Enrollment, and Graduation Patterns from Economic, Social, and Administrative Sciences PhD Programs (N = 18)

Survey Item	Response, Mean (SD)
The recession adversely affected the financial resources available to our program to fund graduate students this year [a]	3.5 (1.1)
Fewer students were admitted to our program this year because of the recession [a]	2.7 (1.2)
Our program gave fewer financial commitments to incoming students this year because of the recession [a]	2.7 (1.7)
Our program reduced the duration of financial commitments to incoming students this year because of the recession [a,b]	2.2 (1.3)
Our program was more likely to admit students who were self funded this year because of the recession [a]	2.6 (1.0)
Effect of the recession had on the quality of students admitted to your program this year [c]	2.9 (0.2)

[a] 1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree
[b] Useable response rate for this item was 17.
[c] 1 = quality went down a lot; 2 = quality went down a little; 3 = no effect on quality; 4 = quality improved a little; 5 = quality improved a lot

recession had affected the duration of funding commitments made (2.2 ± 1.3). Finally, on average, respondents indicated that the recession had no effect on the quality of incoming students (2.9 ± 0.2).

DISCUSSION

The findings from this study provide valuable information concerning the status of graduate education in economic, social, and administrative sciences. Most programs provide funding packages for graduate students that include a stipend and tuition coverage. Many different approaches are used by programs to fund graduate students. The 2 most common approaches involve research and teaching assistantships. The average annual stipend provided to graduate students is approximately $18,000 annually, which is considerably less than the income pharmacists can earn. Consequently, the opportunity cost (or lost earnings) resulting from pursuing graduate education could serve as a significant deterrent for individuals with a PharmD degree.

Regarding manpower issues, we found that programs enroll an average of 3.5 PhD students per year or approximately 91 students across all 26 programs surveyed. Given that an average of 85.5% of enrolled students successfully complete their programs and that 25% to 50% of program graduates pursue careers in academia, we estimate that 20 to 40 PhD-trained economic, social, and administrative scientists enter academia each year. However, because 50% to 75% of the students enrolled in PhD economic, social, and administrative sciences programs are foreign applicants, many of these individuals may pursue academic careers outside the United States. Thus, it is unclear whether these numbers will fulfill the teaching and research needs of US colleges and schools of pharmacy. Nonetheless, to our knowledge, this is the first attempt to estimate the capacity of programs to enroll and graduate pharmacy educators and researchers specializing in economic, social, and administrative sciences.

These survey results must be interpreted in light of the study's limitations. Although the response rate obtained was good, given the limited number of economic, social, and administrative sciences PhD programs in the United States, there were insufficient numbers to examine correlations among funding and other parameters such as satisfaction with funding, enrollment decisions, or graduation rates. In addition, we assumed that the person who completed the survey instrument was the most qualified respondent to answer the questions.

CONCLUSIONS

Nearly all economic, social, and administrative sciences PhD programs guarantee funding to incoming PhD candidates. On average, funding is guaranteed for 3 years,

and students are paid a mean stipend of $18,000 per year for commitments to research and teaching assistantships which average approximately 2 years in length, respectively. Programs offering funding packages significantly below these average estimates may find themselves at a competitive disadvantage to other programs in recruiting qualified PhD applicants.

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