RESEARCH

Career Placement of Doctor of Pharmacy Graduates at Eight U.S. Midwestern Schools

Burgunda V. Sweet, PharmD, Katherine A. Kelley, PhD, Kristin K. Janke, PhD, Sarah E. Kuba, PhD, Kimberly S. Plake, PhD, RPh, Luke D Stanke, BS, Gary C. Yee, PharmD

University of Michigan Health System and College of Pharmacy, Ann Arbor, Michigan

Submitted August 23, 2014; accepted March 21, 2015; published August 25, 2015.

Objective. To characterize postgraduation placement plans of 2013 doctor of pharmacy (PharmD) graduates.

Methods. A cross-sectional survey of PharmD graduates from 8 midwestern colleges of pharmacy was designed to capture a comprehensive picture of graduating students' experiences and outcomes of their job search.

Results. At graduation, 81% of 2013 respondents had postgraduate plans, with approximately 40% accepting jobs and 40% accepting residencies or fellowships. Eighty-four percent of graduates reported being pleased with offers received, and 86% received placement in their preferred practice setting. Students perceived that securing residencies was more difficult than securing jobs. Students who participated in key activities had a nearly sevenfold increase in successful residency placement.

Conclusion. While the demand for pharmacists decreased in recent years, responses indicated successful placement by the majority of 2013 graduates at the time of graduation.

Keywords: Aggregate demand index, employment, pharmacy graduates, postgraduate plans, residency

INTRODUCTION

During the past 15 years, the demand for pharmacists has changed considerably, from shortage to near balance with supply. The shortage, which was attributed to several factors including an increase in prescription drug use, occurred despite steady growth in the pharmacy work force.¹ The national aggregate demand index (ADI) for pharmacists was about 4.3 in January 2000 (based on a 5-point rating scale, where 1 represents high surplus, and 5 represents high demand).² In response to the shortage, established pharmacy schools increased enrollment, and new pharmacy schools opened. The number of PharmD graduates nearly doubled, from about 7000 in 2000 to more than 13 000 in 2014.³ In June 2014, the national ADI was about 3.5, indicating demand in balance with supply, with the demand for pharmacists in the midwestern United States being slightly higher (3.76) than the national average in June 2014.

The changing job market has implications for the pharmacy academy. Students are seeking to stand out early by developing their leadership skills in student organizations, getting involved in research and scholarship

opportunities, and seeking postgraduate education and training (eg, residencies, master's degrees). In addition, students at the authors' home institutions have been asking for more career services, formal courses, and activities to better prepare them for job searches and interviews. At the same time, there is growing concern about rising student debt and the return on investment of a pharmacy education.⁴

In response to these concerns, 8 pharmacy colleges and schools that comprise the Committee on Institutional Cooperation (CIC: University of Iowa, Purdue University, The Ohio State University, University of Illinois at Chicago, University of Michigan, University of Minnesota, University of Nebraska Medical Center, and University of Wisconsin) collaborated to characterize the employment and postgraduation plans for graduates of PharmD programs in the midwestern United States. The CIC is a consortium of the "Big Ten" member universities, plus the University of Chicago. The group is made up of research-intensive institutions and is funded by the provosts of member universities. The mission of the CIC is to leverage resources, share expertise, and collaborate on programs.⁵ The purpose of this paper is to describe the postgraduation placement of PharmD students from CIC schools and inform faculty members, staff, and students about the nature of the search and application outcomes.

Corresponding Author: Katherine A. Kelley, PhD, Ohio State University, College of Pharmacy, 500 West 12th Ave., Columbus OH 43210. Tel: 614-292-5998. E-mail: kelley.168@osu.edu

METHODS

Starting in 2012, the CIC schools collaborated to create an instrument to measure postgraduation placement of PharmD graduates. While all of the schools already were collecting some form of these data, the group decided to create a standard format and data set. A draft instrument that combined elements from the existing tools was developed, pilot tested by The Ohio State University for the class of 2012 (125 students), and modified based on results of the pilot testing. Modifications included clarification of questions and addition of items to broaden the scope of some sections of the survey. The final instrument consisted of 50 questions in Likert-scale, free-response or drop-down format that collected demographics, information related to postgraduation plans, and characteristics of the students' employment searches. The goal was to capture a comprehensive analysis across the schools of graduates' experiences and outcomes of job searches.

A cross-sectional study was conducted of all graduating PharmD students at the CIC schools in the class of 2013 (996 graduates). Institutional review board approval was obtained from each participating school. Recruitment e-mails were sent by each school to their graduating class 4 weeks prior to graduation. One exception to this protocol was the University of Illinois Chicago, where data were gathered in July, after graduation. Follow-up requests to nonrespondents were sent weekly after the initial request, with an average of 3 reminders sent by each school. No incentives were provided to increase response rates. The survey was distributed electronically via Qualtrics (Qualtrics Labs, Inc, Provo, UT). Students could save their responses and return to complete the survey later.

Descriptive statistics were used to summarize the percentages of students choosing career options, perception of preparedness, level of satisfaction with postgraduation plans, and factors important to students as they searched and made decisions. A *t* test was used to compare the level of difficulty in the search process for those accepting residencies vs jobs. Logistic regression models were fit to determine if specific activities were associated with feeling prepared for the residency process and obtaining a residency. Cohen's *d*, the standardized mean difference from a logistic regression, was used to measure effect size, with values between 0.2 and 0.5 considered small, values between 0.5 and 0.8 considered moderate, and values greater than 0.8 considered large.⁶

RESULTS

Survey responses were received from 783 of the 996 graduates (79% response rate—individual school response

rates ranged from 63%-99%). While responses for University of Illinois Chicago were received later than for the other schools their response rate and job/residency placement rates were similar to those seen in the other schools. The average age of respondents was 26.6 (standard deviation, SD=3.6) years, with 64% being female. Most respondents were white (64%), followed by Asian (16%) and Hispanic (10%). Of the 778 respondents who provided information about their career goal, almost half (47%) aspired to be clinical practitioners, 25% want to be staff pharmacists and 17% managers.

Responses showed that most graduates used a multi-pronged approach, applying simultaneously for jobs and postgraduate training. Table 1 shows the results of the nature of their searches and postgraduation placements accepted. Eighty-one percent (81%) of graduates had accepted a postgraduation offer at the time the survey was administered, with accepted placements being roughly split between jobs (40%) and postgraduation training (40%; residency/fellowship). About 16% (123) of respondents reported no placement.

Five hundred twenty-nine respondents conducted a job search, with many applicants conducting simultaneous searches for postgraduation training. Job positions were accepted by 59% (314) of those who applied. Twenty-six percent of those accepting positions did so in November or earlier, with 88% of the early acceptances being for graduates who worked for the employer while they were students. An average of 2.7 months was spent job searching. Applicants received an average of 2.7 interviews (range, 2-20) and 1.2 offers (range, 0-7).

Table 2 shows the desired job setting and actual job placements for those accepting jobs. Nearly all who wanted to work in a community setting took jobs in that setting. Securing employment in a hospital pharmacy setting was more difficult. Many of the 314 graduates who

Table 1. Distribution of Postgraduate Search and Placements for PharmD Graduates at 8 Midwestern Pharmacy Schools (n=783)

	Postgraduate Placements Searched ^a n (%)	Postgraduate Placement Accepted n (%)
Job	529 (68)	314 (40)
Residency	379 (48)	297 (38)
Fellowship	30 (4)	15 (2)
Postgraduate education	24 (3)	10 (1)
No placement accepted	—	123 (16)
Hadn't started looking yet	—	24 (3)

^aTotal exceeds 100% as students often applied for more than one position type

Table 2. Distribution of Desired vs Actual Practice Placements of Pharmacy Graduates Accepting Jobs ^a

	Desired Setting n (%)	Actual Setting ^b n (%)
Ambulatory care	4 (1)	4 (1)
Community pharmacy	259 (83)	265 (84)
Hospital pharmacy	42 (13)	29 (9)
Managed care	1 (0.3)	1 (0.3)
Industry	2 (1)	1 (0.3)
Other/not disclosed	6 (2)	6 (5)

^aResults are for the 314 graduates who accepted a job offer

^bNot all graduates reported the actual job setting

accepted a job worked for the employer while in school (62%) and some (12%) were contracted for an average 3-year commitment to work as repayment for tuition assistance. Sign-on bonuses (average of \$6000) were given to 20 graduates (6%). Almost all respondents (99%) reported accepting a position that was at least 30 hours a week; 78% reported positions working at least 35 hours a week.

Table 3 shows the breakdown of the residency application search process. Approximately half of respondents (379/783, 48%; range 30%-67%) applied for residency positions. Ninety-six percent of the 379 who applied received an interview, and 81% of those who received an interview matched to a residency through the match process. Fourteen students matched through the residency scramble.

Fewer graduates pursued fellowship training and postgraduate education (Table 3). Thirty graduates (4%) pursued fellowships, submitting an average of 3.4 applications (range, 1-10). Successful fellowship placement was seen for 15 applicants (50%), with 10 of them (67%) being industry fellowships. The remaining placements were in academic or public health fellowships. Twenty-four graduates (3%) chose to pursue additional education. Only 9 of these graduates noted academic studies as their primary postgraduation plans, pursuing degrees in law, medicine, and various master's programs (eg, business administration, health system administration, public health).

About 80% of students reported feeling adequately prepared for their job and residency interviews. Several respondents provided qualitative feedback for specific areas that would have helped them through the postgraduation process including additional opportunities for career exploration and more information on fellowships. Respondents also requested additional practice with interviewing, support on curriculum vitae preparation, and coaching on the residency application process. Graduates

Table 3. Distribution of Postgraduate Education and Training of PharmD Graduates

Residency Search Outcome (n=379 applicants)	n (%)
Matched to a residency (includes students who scrambled)	295 (78)
Match choice (n=295)	
First choice	143 (49)
Second choice	99 (34)
Third choice	26 (9)
Other choice	27 (9)
Residency practice area ^a	
Pharmacy practice	209 (74)
Ambulatory care	20 (10)
Managed care	7 (3)
Community	24 (9)
Combined residency/masters	4 (2)
Other	10 (4)
Residency application process	
Average number of applications (range)	8.1 (1-42)
Average number of interviews (range)	4.8 (0-21)
Fellowship search outcome (n=30 applicants)	
Matched to a fellowship	15 (50)
Type of fellowship accepted	
Industry	10 (67)
Academic	3 (20)
Other	2 (13)
Postgraduate education (n=24 applicants)	
Academic degree in conjunction with residency/fellowship	8 (33)
Academic degree in conjunction with pharmacy employment	7 (29)
Academic degree as primary post-graduation plans	9 (38)

^aOnly 274 respondents provided information on this area

were asked to identify their perceived level of difficulty in securing postgraduation placement using a 4-point Likert scale (not at all difficult, somewhat difficult, difficult, extremely difficult). Perceived difficulty (difficult/extremely difficult) was highest for fellowships (53%), followed by residency (34%), jobs (16%), and postgraduate education (5%). The perceived level of difficulty between those seeking jobs and those seeking residencies was significantly different ($p<0.01$).

Respondents prepared for their postgraduation plans by attending job fairs, using school-based career websites, and seeking faculty advice (Table 4). The effect of 5 activities [faculty/adviser advice, current resident advice, practicing pharmacist advice, attending the American Society of Health-System Pharmacists (ASHP) Midyear Meeting, and participating in school career fairs] on students feeling prepared for the residency application process was explored with logistic regression. Of the

Table 4. Frequency of Participation in Student Career Search Activities

Activities Students Used to Prepare for Post-graduation Plans	n (%) ^a
Attended career fair	568 (75)
Used online resources	494 (63)
Used school-based career resource website	328 (42)
Sought faculty advice	321 (41)
Met with an adviser	158 (20)
None yet	45 (6)

^aTotals to more than 100%. Respondents could select more than one response

5 activities, only participation in the ASHP Midyear Meeting was significantly associated with feeling more prepared for the residency application process, with students who participated feeling 4.2 times more ready for the application process than students who did not attend the Midyear meeting, (effect size $d=0.79$).

The relationship between these 5 variables and successful placement in a residency position was also explored. Seeking advice from faculty members or an adviser (odds ratio (OR)=1.65; effect size $d=0.28$) or from a current resident (OR=2.43; $d=0.49$), and participating in school activities focused on residency application process (OR=1.72; $d=0.30$) were all significantly associated with obtaining a residency. These effects are additive for all participation permutations. Under the optimal scenario, students who participated in all 3 activities were 6.9 times more likely to obtain a residency than those who did none of the activities ($d=1.06$). The odds ratios and effect sizes quantify the incremental power of various strategies to prepare students for completing a residency.

While the individual effect sizes were relatively small for seeking advice from a faculty member or from a current resident, and participating in school activities focused on the residency application process, the cumulative effect resulted in a large effect size. Participating in ASHP Midyear programming made graduates feel more prepared for the residency application process, but had no effect on obtaining a residency. Conversely, seeking advice from a faculty member or from a current resident, and participating in school activities focused on the residency application process had no effect on feeling prepared for the application process, but had a significant relationship with obtaining a residency.

Student satisfaction with postgraduation plans was high (86% noting agree/strongly agree that they were satisfied). In addition, 84% were pleased with the offers received, and 86% received placement in their preferred

setting. Table 5 shows factors that graduates considered important when making postgraduate plans. Average self-reported debt was \$123 350 and average salaries were \$112 270, \$42 574, and \$47 701 for those placing in jobs, residencies, and fellowships, respectively. Graduates reported multiple means of financial assistance including loans (85.6%), scholarships (50.9%), and family support (44.4%). Forty-nine percent of graduates had a job during school.

DISCUSSION

In addition to student pharmacists, those involved in pharmacy education, postgraduate training, and employment may be interested in several data points. For example, 81% of respondents had a placement at the time of graduation and 86% agreed/strongly agreed that they were satisfied with their postgraduation plans. Of those accepting jobs, respondents reported receiving an average of 2.7 interviews and 1.2 offers; 93% accepted positions in their desired practice setting. Nearly all respondents indicating a desire for a job in community pharmacy took a job in that setting (97% placement).

Full-time employment was defined in this study as a position of at least 30 hours per week. This definition is

Table 5. Rank Order of Factors Graduates Considered in Making Post-graduate Plans

Factors Considered	Mean (SD) ^a
Opportunity for additional professional growth	3.5 (0.7)
Practice setting (eg, community or institutional)	3.5 (0.7)
Geographic preferences	3.4 (0.8)
Opportunity for advancement	3.2 (0.8)
Positive internship experience	3.2 (0.9)
Family/personal circumstances	3.2 (0.9)
Positive APPE rotation experience	3.2 (0.9)
Company or institution philosophy	3.0 (0.8)
Precepting opportunities	3.0 (1.0)
Advice from preceptors	2.8 (0.9)
Scheduling considerations (eg, hours, part-time options)	2.8 (1.0)
Staffing (technician pharmacist ratio, pharmacist overlap)	2.8 (0.9)
Benefits	2.7 (0.9)
Salary	2.7 (0.9)
Advice from faculty/advisor	2.7 (1.1)
Characteristics of patient population served	2.6 (0.9)
Prescription volume	2.5 (1.1)
Tuition reimbursement commitments	2.4 (1.1)

^a4-point scale (not important/somewhat important/important/very important)

APPE=advanced pharmacy practice experience

consistent with the breakpoint used in published workforce data and with the number of hours at which benefits must be provided as defined in the Affordable Care Act.^{7,8} Based on this definition, nearly all (99%) graduates who accepted jobs received full-time employment offers. However, only 78% of graduates placed in jobs reported appointments of 35 or more hours per week. Part-time work is more common among female pharmacists, which may influence the marketplace as pharmacists are increasingly female.^{7,9} This study surveyed new graduates who were more likely to seek full-time employment given their educational debt and likely fewer family obligations in comparison to pharmacists participating in broader workforce studies. Monitoring full-time employment offers over time will help to determine whether the market is shifting in this area.

Forty-eight percent of respondents applied for residency positions, which is higher than the 2013 national average of 27%.¹⁰ Ninety-six percent of applicants received an interview, and 81% of those who interviewed matched. Many students (82%) matched to their first or second choice, consistent with the national figure of 81%.¹⁰ The demand for residencies increased in recent years, with the number of graduating students participating in the first postgraduate year (PG1) ASHP residency match increasing from approximately 15% in 2006 to 27% in 2013.¹⁰⁻¹² However, the ratio of PG1 applicants per residency position filled has been stable at 1.6 applicants per position filled between 2010 and 2013, suggesting a parallel increase in the number of available residency positions. The percentage of new graduates participating in the match between 2009 and 2013 who successfully matched also has been fairly consistent, ranging from 63% to 67%.^{10,13}

Several factors can influence the supply and demand for pharmacists, including the number of pharmacists entering and leaving the work force, part-time employment, economic climate, and health services demand. Older pharmacists are staying in the profession past retirement age, and part-time work among pharmacists is increasing.⁷ Expansion of pharmacist roles, as well as increased demand for prescription services resulting from the Baby Boom population and the Affordable Care Act, also can affect the need for pharmacists. Workforce researchers hesitate to make predictions because of the complexity and unpredictability of these factors.^{9,14}

There is considerable debate in the academy regarding the increasing number of graduates and number of schools of pharmacy, and the impact those rising numbers have on the labor market.^{3,15,16} The ADI decreased from 4.3 in 2000 to 3.3 in 2010.^{2,9} In 2010, the ADI ranged from 3.0 to 3.8 in the states represented by CIC schools.⁹ The

ADI decreases 0.06 points for every 100 new graduates when all other variables remain the same.⁹ The impact of the increased number of pharmacy schools and graduates on the ADI is not yet known as some schools have yet to graduate students. Although students may not receive multiple offers, most new graduates in this study (81%) secured a position, indicating a relative balance of supply and demand.

Graduates indicated that geographic preference was important [3.4 (SD=0.8)] when making postgraduate plans. The ADI and pharmacist need vary among states.^{9,17} Students may be reluctant to move from their state of origin, but another state may offer employment options.¹⁷ Opportunity for additional professional growth [3.5 (SD=0.7)] was also important to graduates. The high percentage of students seeking postgraduate training (ie, residency, fellowship, additional schooling) is consistent with this finding. Other factors students considered important included practice setting, opportunities for advancement, past experience with the site, and family/personal experiences, indicating that personal and professional factors are important in the decision-making process. Employment-specific factors such as benefits, scheduling, staffing, salary, and prescription volume were less important considerations. These results suggest that students consider the ability to grow professionally in their desired setting to be more important than job-specific features, such as salary and benefits.

Students' self-reported debt was \$123 350, which is slightly higher than the reported average one-year salary upon graduation (\$112 270). Reported debt in this sample was lower than that reported for all schools (\$133 694) in the AACP Graduating Student Survey in 2013.¹⁸ Respondents' debt was higher in comparison to public schools (\$113 745) and lower in comparison to private schools (\$152 901). Along with tuition, student debt appears to be increasing over time, with the average debt reported as \$88 004 for pharmacists licensed in 2005-2006.^{4,19}

The results of this study may be helpful for schools as they assist students during their job or residency search process. For example, more than 60% of students who took jobs worked for the company before being hired into the position suggesting the importance of a strong work ethic and professional behavior during pharmacy internships. Although attendance at the ASHP Midyear Meeting was associated with feeling prepared for the residency interview process, attendance at the meeting was not associated with being accepted into a residency. Instead, factors associated with successful residency placement included talking to a faculty adviser or current resident and participating in school activities (eg, job fairs).

Although 80% of respondents reported feeling adequately prepared for their job or residency interviews, more guidance may be needed in specific parts of the search process. The average number of residency applications per student (8.1) appears high, suggesting that students may need more guidance on identifying programs that may be a good fit. Students accepting job offers early (29% of job applicants accepted a position before November), may indicate a trend or a push to lock in students before the ASHP Midyear Meeting. Therefore, coaching students on ways to handle a situation in which they may feel they need to commit to a job before they are ready to do so may be necessary.

While these data are helpful in understanding the landscape of postgraduation placement for PharmD graduates, there are limitations to the study. The data represent graduates from 8 public, long-standing (ie, each more than 100 years old), research-intensive midwestern schools. Consequently, the results may not be generalizable to graduating student pharmacists at other schools. In addition, while the overall response rate was high (79%), selection bias is possible in that nonrespondents may have been less likely to secure postgraduate placement. Unfortunately, we do not know the postgraduate placement outcomes of those students who reported that they had not accepted a position. Self-reported debt was subject to recall bias and did not provide an exact number; nevertheless, it indicated that students were graduating with considerable debt.

Future research can explore postgraduation placement trends over time and across multiple regions of the country. Ongoing research also may help to further define additional services that could be offered to support students in their postgraduation placement searches. Another possible area of inquiry is using predictive modeling to identify factors that lead to successful placement of graduates. Finally, tracking data over time will allow monitoring of changes in the perceived level of difficulty securing a position, part-time job placement, and percentage of applicants pursuing residency training.

CONCLUSIONS

Data from this cross-sectional study across 8 midwestern schools of pharmacy provide useful information on postgraduation placements for recent pharmacy graduates. Eighty-one percent of 2013 participating pharmacy graduates had postgraduate plans at the time of graduation. About 40% of graduates accepted jobs, primarily in the community setting, and about 40% accepted residencies or fellowships. Student satisfaction with postgraduation plans was high; 84% of graduates

were pleased with the offers received, and 86% received placement in their preferred practice setting. The perceived level of difficulty securing a position was higher for those pursuing residency vs those pursuing jobs. In addition, students who participated in a few key activities (ie, meeting with a faculty member or resident, participating in school-sponsored job functions) had a nearly sevenfold increase in successful placement in a residency.

ACKNOWLEDGMENT

The authors would like to acknowledge Jaclyn Myers, a graduate student who collated the original school questionnaires into one overall questionnaire.

REFERENCES

1. Cooksey JA, Knapp KK, Walton SM, Cultice JM. Challenges to the pharmacist profession from escalating pharmaceutical demand. *Health Aff.* 2002;21(5):182-188.
2. Knapp KK, Shah BM, Barnett MJ. The pharmacist aggregate demand index to explain changing pharmacist demand over a ten-year period. *Am J Pharm Educ.* 2010;74(10):Article 189.
3. Brown DL. A looming joblessness crisis for new pharmacy graduates and the implications it holds for the academy. *Am J Pharm Educ.* 2013;77(5):Article 90.
4. Cain J, Campbell T, Congdon HB, et al. Pharmacy student debt and return on investment of a pharmacy education. *Am J Pharm Educ.* 2014;78(1):Article 5.
5. CIC Committee on Institutional Cooperation. <http://www.cic.net/about-cic>. Accessed September 29, 2014.
6. Cohen, J. *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates, 1988.
7. Doucette WR, Gaither CA, Kreling DH, Mott DA, Schommer JC. Final report of the 2009 National Pharmacist Workforce Survey. <http://www.aacp.org/resources/research/pharmacyworkforcecenter/Documents/2009%20National%20Pharmacist%20Workforce%20Survey%20-%20FINAL%20REPORT.pdf> Accessed August 25, 2015.
8. Kaiser Family Foundation. Explaining Health Reform January 1, 2012. <http://kff.org/health-reform/fact-sheet/explaining-health-reform-how-will-the-affordable-care-act-affect-small-businesses-and-their-employees/>. Accessed August 4, 2014.
9. Taylor TN, Knapp KK, Barnett MJ, Shah BM, Miller L. Factors affecting the unmet demand for pharmacists: State-level analysis. *J Am Pharm Assoc.* 2013;53(4):373-381.
10. American Society of Health-System Pharmacists. Summary Results of the Match for Positions Beginning in 2013. <https://www.natmatch.com/ashprmp/stats/2013applstats.html>. Accessed July 29, 2014.
11. Teeters J. The current landscape of pharmacy residency training. American Society of Health-System Pharmacists. <https://www.ashp.org/DocLibrary/Accreditation/PRC2011/Current-Landscape.aspx> <http://test3-www.ashp.org/DocLibrary/Accreditation/PRC2011/Current-Landscape.aspx> Accessed August 25, 2015.
12. American Association of Colleges of Pharmacy. First Professional Degrees Conferred, 1998-2013. <http://www.aacp.org/resources/research/institutionalresearch/Pages/TrendData.aspx>. Accessed July 23, 2014.

American Journal of Pharmaceutical Education 2015; 79 (6) Article 88.

13. American Society of Health-System Pharmacists. Summary Results of the Match for Positions Beginning in 2009. <https://www.natmatch.com/ashprmp/stats/2009applstats.html>. Accessed July 23, 2014.
14. Thompson CA. Supply of pharmacists in work force has improved, government says. *Am J Health-Syst Pharm*. 2009;66(8):701-702.
15. Johnson TJ, Teeters JL. Pharmacy residency and the medical training model. *Am J Health-Syst Pharm*. 2011;68(16):1542-1549.
16. Brown D. From shortage to surplus: the hazards of uncontrolled academic growth. *Am J Pharm Educ*. 2010;74(10):Article 185.
17. Walton SM, Mott DA, Knapp KK, Fisher G. Association between increased number of US pharmacy graduates and pharmacist counts by state from 2000-2009. *Am J Pharm Educ*. 2010;75(4):Article 76.
18. American Association of Colleges of Pharmacy. Graduating Student Survey Summary Report-2013. http://www.aacp.org/resources/research/institutionalresearch/Documents/2013_GSS_summary%20report_all%20schools_113.pdf. Accessed July 23, 2014.
19. Yusuf AA, Schommer JC, Mott DA, Doucette WR, Gaither CA, Kreling DH. Association between student loan debt on graduation, demographic characteristics and initial choice of practice setting of pharmacists. *Innov Pharm*. 2011;2(3):Article 51.