Assessment of Graduate Outcomes: Focus on Professional and Community Activities

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The University of Kansas School of Pharmacy is in the process of converting to the Doctor of Pharmacy (PharmD) as the sole professional degree and implementing a new curriculum. In anticipation of these changes and in preparation for an upcoming ACPE accreditation visit, the school conducted an alumni survey of graduates from 1986-1994. The survey focused on four major outcomes: (i) practice sites; (ii) clinical activities; (iii) postgraduate and continuing education; and (iv) service to the profession and community. The survey also asked graduates to assess the school’s contribution toward the development of several key professional skills. Of 617 mailed surveys, 437 were returned for a response rate of 71 percent. Approximately 94 percent of respondents held the Bachelor of Science (BS) degree. The majority of respondents were practicing pharmacy in chain pharmacies with a primary focus on patient care. Overall, a relatively small percentage of graduates had completed postgraduate education. Graduates are involved in a number of professional pharmacy organizations. Active participation is greatest at the local and state levels, however a few graduates have obtained national recognition. Separate analysis of the PharmD graduates suggest trends toward several important differences in outcomes. The survey provides valuable baseline data on graduate outcomes which can be used for future comparison studies.

INTRODUCTION
Assessment of graduate outcomes provides a useful tool for evaluating whether a School of Pharmacy’s goals and objectives are being met. In a 1988 report, the Argus Commission recommended that Schools of Pharmacy study outcomes in order to evaluate the professional and community contributions of graduates. The American Council on Pharmaceutical Education (ACPE) also addressed the importance of measuring outcomes in the 1988 standards and guidelines for accreditation of professional degree programs. The guidelines stated that indicators for student achievement and educational outcomes should be secured, and that outcome measures should be sought to evaluate factors related to the graduate’s functioning throughout adult life. The standards also recommended that schools seek evidence of programmatic outcomes that have permitted graduates to function in a complex society. These principles have been maintained and strengthened in the most recently adopted 1997 ACPE standards and guidelines. The newly revised guidelines stress the importance of measuring outcomes through a variety of vehicles including alumni surveys. The guidelines further recommend the use of achievement indicators in a continuous and systematic process in order to evaluate outcomes and effect ongoing development and improvement.

For the past several years, the University of Kansas School of Pharmacy has conducted two separate surveys relating to the Doctor of Pharmacy (PharmD) program. The first survey instrument is sent to all students immediately following graduation and again at one year. The second survey instrument is sent to the graduates and employers approximately one year. In contrast, no prior ongoing surveys have been used with the Bachelor of Science (BS) students. The PharmD surveys were originally designed to provide feedback on the appropriateness and scope of the courses within the curriculum as well as employer satisfaction. These surveys, however, were not designed to assess outcomes relating to the ability of our graduates to function as both a health-care professional and involved citizen. As part of the University of Kansas School of Pharmacy’s self study process for an ACPE accreditation visit, the school conducted an additional alumni survey. The major objectives of this survey were to evaluate graduate outcomes with regard to practice site, clinical activities, postgraduate education, continuing education and service to the profession and community. The survey also provided graduates an opportunity to evaluate the contributions of the School’s professional program toward the development of various professional skills. In addition to preparing for accreditation, the alumni outcomes survey provided useful data for the curriculum committee at a time when the school was in the process of revising the entire curriculum and converting to the PharmD as the sole professional degree. Finally, the survey results allow comparison with data published from other Schools of Pharmacy.

METHODOLOGY

The alumni survey instrument was developed by members of the School of Pharmacy’s ACPE self study subcommittee on experimentation and evaluation. The survey was independently validated by three pharmacists prior to distribution. The survey instrument consisted of a one page, front to back, questionnaire. The survey included both forced choice and open-ended questions. For forced choice questions, one option was designated “other” with space provided for further description. In February 1995, a total of 617 surveys were sent to the alumni with responses being returned approximately one year later.
were mailed to alumni who graduated from the University of Kansas School of Pharmacy between 1986 (the date of the School’s last ACPE accreditation visit) and 1994. Along with the survey, a cover letter was sent urging alumni to provide this much needed information in order to help the school develop the new curriculum and prepare for accreditation. Alumni were selected solely on the availability of current addresses obtained from the University Alumni Association for graduates from both the BS and PharmD programs. The surveys were anonymous but were coded for tracking purposes so that reminders could be mailed to all nonrespondents after 30 days. Data collected from the surveys were entered into an in-house computerized database by a pharmacy student. The data were analyzed using descriptive statistics and the chi square test for nominal data. The level for statistical significance was predetermined at $P < 0.05$.

RESULTS

A total of 437 of the mailed surveys were returned for an overall response rate of 71 percent. It is possible that this is an underestimation of the response rate of delivered surveys since the addresses obtained from the Alumni Association could not be verified for accuracy. During the nine year study period, a total of 712 students graduated from the University of Kansas School of Pharmacy. Therefore, our study sample represents approximately 61 percent of the total number of graduates from the school during this nine year period. Moreover, our study sample includes responses from 62 percent of the BS graduates and 39 percent of the PharmD graduates during the same time period. The average age of the respondents was 29.6 years with a standard deviation of 4.27. Of the respondents, 221 (58.5 percent) were female and 157 (41.5 percent) were male. The gender distribution of the study sample is highly representative of the gender distribution for all graduates of the school during this nine year period in that the percentage of females was at least 50 percent and steadily increasing. A total of 412 (94.2 percent) respondents had obtained the BS degree while only 25 (5.7 percent) had received the PharmD degree. Once again, the study population is consistent with the survey, a cover letter was sent urging alumni to provide this much needed information in order to help the school develop the new curriculum and prepare for accreditation. Alumni were selected solely on the availability of current addresses obtained from the University Alumni Association for graduates from both the BS and PharmD programs. The surveys were anonymous but were coded for tracking purposes so that reminders could be mailed to all nonrespondents after 30 days. Data collected from the surveys were entered into an in-house computerized database by a pharmacy student. The data were analyzed using descriptive statistics and the chi square test for nominal data. The level for statistical significance was predetermined at $P < 0.05$.

A total of twenty-one alumni received degrees in fields outside of pharmacy including five Masters of Science, three Doctors of Philosophy, eight Masters degrees in Business Administration, two Doctors of Medicine, one Doctor of Dentistry and one Juris Doctorate. One alumnus had become a physician assistant.

Practice Activities

Of the respondents, 410 (93.8 percent) were actively practicing pharmacy. Of these individuals, 360 (88 percent) practice over 30 hours per week. No significant difference was found in the number of males and females practicing less than or more than 30 hours per week ($\chi^2 = 0.358$). The majority of alumni 267 (65.9 percent) practice pharmacy in the state of Kansas. The graduates practice in a variety of settings as shown in Figure 1. Chain pharmacies continue to be the major employer. The second most common site is hospital practice, and together these two settings account for over half of the graduates’ practice sites.

Independent of the practice site, the majority of responding alumni 323 (73.9 percent) listed patient care as their primary focus of practice. The primary focus was administration for 32 (7.3 percent) alumni, research for 18 (4.1 percent) and education for 20 (4.6 percent) alumni. Sixty-one graduates (14 percent) were involved in consulting activities, many as nursing home consultants. Although a relatively small percentage of graduates (less than five percent) had chosen careers in education, almost half of the graduates 184 (42.1 percent) were involved in experiential teaching for pharmacy students. When interpreting the responses for practice focus it should be noted that respondents were asked to select only one response which best described their primary focus.

Specific types of clinical and patient care activities for both BS and PharmD alumni are summarized in Table I. The most common activities were patient counseling, drug monitoring and providing drug information. Considerably fewer graduates were involved in activities such as pharmacokinetic consults, prescribing by protocol or rounding with physicians.

![Fig. 1. Practice Sites for 437 alumni. Chain = chain pharmacy; Hospital = hospital pharmacy; Independent = independently owned pharmacy; Pharm. Industry = pharmacy industry; Extended care = pharmacy in a long-term care facility; University = pharmacy faculty in a University or College; Home Health = pharmacy in a home healthcare company; HMO = pharmacy in a health maintenance organization; Mail Order = mail order pharmacy](image-url)
Table I. Clinical and patient care activities of 437 alumni

<table>
<thead>
<tr>
<th>Activity</th>
<th>AH alumni (n = 437)</th>
<th>BS alumni (n = 412)</th>
<th>PharmD alumni (n = 25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counseling</td>
<td>329 (75.3)</td>
<td>310 (75.2)</td>
<td>19 (76.0)</td>
</tr>
<tr>
<td>Drug monitoring</td>
<td>320 (73.2)</td>
<td>298 (72.3)</td>
<td>22 (88.0)</td>
</tr>
<tr>
<td>Drug information</td>
<td>316 (72.3)</td>
<td>295 (71.6)</td>
<td>21 (84.0)</td>
</tr>
<tr>
<td>DUE</td>
<td>143 (32.7)</td>
<td>134 (32.5)</td>
<td>9 (36.0)</td>
</tr>
<tr>
<td>Kinetics</td>
<td>72 (16.5)</td>
<td>60 (14.6)</td>
<td>12 (48.0)</td>
</tr>
</tbody>
</table>

Other: prescribing rounds other

143 (32.7) 36 (8.7) 5 (20.0)
31 (7.1) 22 (5.3) 9 (36.0)
38 (8.7) 31 (7.5) 7 (28.0)

Counseling = providing information on appropriate use of medications to individual patients; Drug Monitoring = monitoring of individual patient drug therapy regimens; Drug Information = providing drug information to physicians, health care professionals or the public; DUE = drug utilization review; Kinetics = providing pharmacokinetic consultations for individual patients; Protocol Prescribing = pharmacist prescribing under physician protocol; Rounds = participation in patient rounds with medical team; Other includes pharmacoeconomics and developing patient educational materials.

Professional Involvement

The School’s alumni are actively involved in professional organizations as illustrated in Table II. Alumni belong and participate in local, state and national pharmacy organizations. Active participation is greatest at the local and state level, however some graduates have achieved national recognition as committee members or elected officers of national organizations. Alumni also contribute to the profession through other activities such as professional publishing (41 alumni, 9.4 percent), professional speaking (119 alumni, 27.2 percent) and poster presentations (48 alumni, 11 percent) at local, state and national pharmacy meetings.

Thirty-two (7.3 percent) of the graduates have received an award recognizing professional achievement. Among PharmD alumni 20 percent have received awards with approximately equal recognition at the state and national levels. Among the BS alumni, 3.9 percent have received awards with the majority at the state level. Six alumni, two with PharmD degrees and four with BS degrees, have received the “Young Pharmacist of the Year” award from the state pharmaceutical association. Approximately 20 percent of graduates indicated that they were active in community service organizations including the American Diabetes Association, American Heart Association, American Cancer Society, American Red Cross, Leukemia Society of America, Hospice and Big Brothers and Sisters. Two graduates have held public office, one as a city council member and one as a precinct committeewoman.

Alumni Self-Evaluation

The alumni were asked a series of four questions designed to assess the School of Pharmacy’s contribution toward the development of the following professional skills: (i) problem-solving and decision making, (ii) communication with patients, families and other health care providers, (iii) ability to learn new developments in pharmacy practice (self-education), and (iv) ability to adapt to changes in the pharmacist’s role in health care. The questions were selected by members of the ACPE self-study committee as representative of the school’s mission and strategic plan for the 21st century. These curricular outcomes are consistent with those recommended in the AACP Background Paper II(7). The alumni were asked to rank the School’s contribution toward developing each skill using a five-point Likert scale ranging from 1 = poor to 5 = excellent. The rating frequencies along with the mean rating for each question are listed in Table III. For problem solving and decision making, 269 (63.1 percent) of respondents felt the school’s contribution was good to excellent. The ability to self-educate in order to keep abreast of new developments in pharmacy received a response of good to excellent from 322 (75.2 percent) of respondents. A good to excellent response for the ability to adapt to changes in the pharmacist’s role in health care was given by 246 of respondents (57.7 percent). In contrast only 202 (47.3 percent) of respondents felt the

Table II. Alumni involvement in professional pharmacy organizations

<table>
<thead>
<tr>
<th>Type of organization</th>
<th>Member</th>
<th>Attend</th>
<th>Committee</th>
<th>Officer</th>
</tr>
</thead>
<tbody>
<tr>
<td>All alumni</td>
<td>69 (15.8)</td>
<td>47 (10.8)</td>
<td>7 (1.6)</td>
<td>9 (2.1)</td>
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<tr>
<td>BS alumni</td>
<td>56 (13.6)</td>
<td>36 (8.7)</td>
<td>3 (0.7)</td>
<td>5 (1.2)</td>
</tr>
<tr>
<td>PharmD alumni</td>
<td>13 (52.0)</td>
<td>11 (44.0)</td>
<td>4 (16.0)</td>
<td>4 (16.0)</td>
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<tr>
<td>State organizations</td>
<td>All alumni</td>
<td>181 (41.4)</td>
<td>80 (18.3)</td>
<td>29 (6.6)</td>
</tr>
<tr>
<td>BS alumni</td>
<td>162 (39.3)</td>
<td>66 (16.0)</td>
<td>23 (5.6)</td>
<td>7 (1.7)</td>
</tr>
<tr>
<td>PharmD alumni</td>
<td>19 (76.0)</td>
<td>14 (56.0)</td>
<td>6 (24.0)</td>
<td>0</td>
</tr>
<tr>
<td>National organizations</td>
<td>All alumni</td>
<td>174 (39.8)</td>
<td>58 (13.3)</td>
<td>3 (0.7)</td>
</tr>
<tr>
<td>BS alumni</td>
<td>153 (37.1)</td>
<td>45 (10.9)</td>
<td>1 (0.2)</td>
<td>2 (0.5)</td>
</tr>
<tr>
<td>PharmD alumni</td>
<td>21 (84.0)</td>
<td>13 (52.0)</td>
<td>2 (8.0)</td>
<td>0</td>
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</table>

* Based on 437 responses including 412 BS and 25 PharmD alumni.

Table III. Alumni evaluation of the School of Pharmacy’s professional program (n=437)

<table>
<thead>
<tr>
<th>Professional skill</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>NR</th>
<th>Mean ±SD</th>
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<tbody>
<tr>
<td>Problem solving and</td>
<td>13</td>
<td>45</td>
<td>99</td>
<td>213</td>
<td>56</td>
<td>11</td>
<td>3.60±0.95</td>
</tr>
<tr>
<td>decision making</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Communication self-</td>
<td>29</td>
<td>76</td>
<td>120</td>
<td>162</td>
<td>40</td>
<td>10</td>
<td>3.25±1.07</td>
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<tr>
<td>learning</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptation to change</td>
<td>7</td>
<td>25</td>
<td>74</td>
<td>234</td>
<td>88</td>
<td>9</td>
<td>3.87±0.86</td>
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</table>

Five point Likert rating scale: 5 = excellent; 4 = good; 3 = adequate; 2 = fair; 1 = poor
NR = no response to question.
school’s contribution toward their development of communication skills was good to excellent while 105 (24.6 percent) rated it fair to poor.

DISCUSSION

At a time when the University of Kansas School of Pharmacy is undergoing many changes, the alumni survey provides a valuable database of graduate outcomes which will be used in a variety of ways. Perhaps most importantly, the survey results can be used as a baseline for future comparisons after implementation of the new curriculum and conversion to the all PharmD. The PharmD program is an entry-level degree designed to produce practitioners who can provide comprehensive pharmaceutical care and assume leadership roles in the profession. The curriculum consists of six years of academic study including two years of pre-pharmacy courses and four years of professional courses for a total of 200 credit hours. The final year of the professional program consists of nine clerkships, each four weeks in length, with faculty preceptors. The response to the survey was excellent indicating that many alumni value a method of providing input and feedback to the school.

Relatively few schools have reported graduate outcome studies, however, those data that have been published provide a means for comparison with our findings. Perhaps, the most extensive outcome data has been published by the University of California at San Francisco (UCSF) School of Pharmacy. UCSF conducted a survey of graduates between 1970 and 1981 to evaluate practice patterns, professional activities and attitudes about pharmacy(4). The 752 respondents differed from our alumni in that they had all received the entry-level PharmD degree. In addition they had trained and practiced in California where there has been a strong clinical pharmacy influence since the 1960s. In 1988, all graduates of UCSF between 1970 and 1986 were resurveyed specifically to study the influence of gender and residency training(5). The Purdue School of Pharmacy also reported the findings of a survey conducted in the early 1990s, involving a cross-section of graduates during 1978, 1982, 1986, 1988 and 1990(6). This survey focused on graduate achievement of educational outcomes as defined in the American Association of Colleges of Pharmacy (AACP) Background Paper II(7). The Purdue graduates were more similar to ours in that the vast majority, 93 percent, had obtained the BS degree and were practicing in the Midwest.

Our survey illustrates the gender shift which has gradually occurred in the University of Kansas School of Pharmacy over the past 20 years. Presently, over half of the school’s students are female. This is typical of trends reported by other schools. The UCSF researchers reported that the incidence of women graduates has steadily increased from 28 percent for 1970 graduates to 58 percent for 1986 graduates, an increase of approximately 4.6 percent per year(5). The Purdue survey reported that 62 percent of their respondents were female(6). The reasons for the greater number of women entering pharmacy are not entirely known but may reflect the general move of women into traditionally male-dominated fields and the fact that pharmacy offers greater flexibility for combining career and family than other fields such as medicine. The UCSF survey reported that men were more likely to work full-time than were females, 96 percent versus 87 percent, respectively(5). However, when the data were further analyzed, it was determined that residency training was a stronger determinant of

hours worked per week than gender alone. In our survey, no statistically significant difference was found between males or females working more or less than 30 hours per week.

The majority of alumni represented in our survey hold the BS degree in Pharmacy. This is due to the fact that the PharmD degree was not offered until 1988 and enrollment since that time has been limited by the school. Relatively few of our graduates (11.4 percent) have completed any form of postgraduate education. Only 14 of the 437 responding alumni had completed pharmacy residencies or fellowships. Of the 50 alumni completing postgraduate training, 21 or almost half have chosen to obtain degrees outside of pharmacy. Within this group, however, 11 alumni continue to practice pharmacy. Of the individuals who are no longer practicing pharmacy, four are pursuing pharmacy related careers in health administration or pharmaceutical research. The extent of postgraduate training of our alumni is significantly less than that reported at UCSF. In the first UCSF survey, 25 percent of respondents had completed residencies and another five percent had finished or were in the process of completing fellowships(4). In the more recent follow-up survey, 46 percent of UCSF graduates were involved in postgraduate education and 38 percent were completing or had completed pharmacy residencies(5). This finding is not entirely surprising however, in view of the fact that PharmD programs traditionally encourage students to pursue advanced training to a greater extent than do BS degree programs. In another report on UCSF graduates, those with advanced training reported greater job satisfaction, more advanced positions, higher salaries, more active professional organization involvement, and greater involvement in educational activities and publishing(8). Therefore, it is likely that the completion of postgraduate training will significantly impact many different graduate outcomes.

The vast majority of our graduates are practicing pharmacy full-time in the state of Kansas. This is consistent with the finding by UCSF investigators that graduates without postgraduate training were less likely to practice outside their state(8). The majority of our graduates practice in traditional sites such as chain, independent or hospital pharmacies. Within the state of Kansas, however, the primary practice site is a retail pharmacy for 53.2 percent of our graduates. This finding differs from the UCSF experience but is relatively consistent with overall national trends. Among the UCSF graduates, a majority, 60-65 percent, were employed in hospital pharmacies, with only approximately 20 percent employed in community pharmacies. This finding raises concern that a disproportionate number of graduates were entering hospital pharmacy. In contrast, the Purdue survey found that 45.4 percent of graduates were working in community pharmacies while 29 percent were employed in hospitals (6). Nationally, approximately 60 percent of pharmacists work in community settings and 24 percent in hospital practice (9). It is possible that these differences represent geographical trends, however, it is equally likely that they are the result of the availability of specific types of practices desired by BS and PharmD graduates. Since the majority of graduates from any school typically practice in or near their home state, it is important for schools to evaluate these trends in order to insure that the objectives of the school are in line with the needs of its graduates.

The typical daily activities of Kansas pharmacy graduates involve routine patient care activities such as patient
counseling and drug monitoring. These findings have important implications since, almost half are involved in experiential teaching of our pharmacy students. As the school converts to the all PharmD, one of our major challenges will be to insure that our externship preceptors are functioning at an appropriate level with regard to providing pharmaceutical care in a professional environment. In order to achieve this goal, the school now has two full-time coordinators responsible for identifying and monitoring experiential practice sites.

Although many of our graduates are involved in professional organizations, their participation is predominantly limited to membership and attendance at meetings. A relatively small number of alumni have assumed leadership roles primarily at the local or state levels. A potential explanation for this finding is that graduates at the BS level may not feel as qualified for these leadership roles as do PharmD graduates. It is also possible that due to differences in practice settings and professional responsibilities, BS graduates may not place the same importance on these activities as do PharmD graduates. In the UCSF survey of PharmD graduates by Sauer et al., a much higher percentage, 80 percent, were members of at least one professional organization (5). Of these graduates, 34 percent, had served in one or more appointed or elected positions at the local, state or national level. Overall however, a similar trend was seen in that participation was greatest and the local and state levels.

The relatively small number of PharmD graduates in our survey precludes any valid comparisons with the BS graduates. However, with this important limitation in mind, an analysis of the PharmD graduate responses in this initial survey suggests that there may be significant differences in outcomes. Almost 50 percent of the PharmD graduates have gone on to pursue postgraduate residencies or fellowships. All of the individuals who have become Board Certified in Pharmacotherapy are PharmD graduates whereas the two pharmacists who became Certified Diabetes Educators were BS graduates. Approximately 77 percent of the PharmD respondents practice in a noncommunity practice with the majority in university or hospital settings. Almost one-third list education as their primary focus. As shown in Table I, this preliminary data suggests that PharmD alumni are involved to a greater extent in clinical and patient care activities. There also appears to be greater participation of PharmD alumni in professional organizations at all levels with 32, 24, and eight percent actively involved as either a committee member or elected officer at the local, state or national levels, respectively. Approximately 80 percent of the PharmD graduates have participated in either professional speaking or publishing. It will be interesting to see if these trends continue in future surveys after we have converted to the all PharmD and finished implementation of the new curriculum.

The questions on our survey that allowed graduates an opportunity to assess the professional program’s contributions toward their professional development are unique from the rest of the survey in that these questions rely on the graduate’s perceptions rather than documentable outcomes. Overall, the assessments were positive, however there is room for improvement. In particular, less than half of the respondents felt that their communication skills had been adequately developed. The Purdue survey also found relatively high numbers of graduates who perceived that their communications skills were less than optimal (6). It is hoped that changes in the new curriculum will address this perceived inadequacy. Not only will greater emphasis be placed on communications skills, but many more opportunities for developing and practicing these skills will be integrated throughout the curriculum from beginning to end. This is significantly different from the prior curriculum where almost all of the communication skills development occurred in the final year.

Data obtained from this survey provides an important interface between the curriculum survey of recent graduates and the employer survey. First, the survey identifies the actual practice settings and daily activities of the alumni. From this it may be possible to identify weaknesses or problem areas within the curriculum. For example, over half of our graduates practice in community sites, however, in the past our clinical clerkships have been conducted primarily on inpatient hospital services. Based on the general shift in health care toward ambulatory settings, ACPE’s recommendations stress the importance of providing students practice experience in both hospital/institutional and ambulatory/community settings. Therefore, the school’s new curriculum will focus much more on ambulatory practice and additional faculty have been hired to establish practice sites in various clinic and outpatient settings. We have also increased the number of clerkships in innovative community practice sites. Second, the survey suggests that the majority of our BS graduates are involved in relatively basic levels of pharmacy practice. With the implementation of the PharmD it is hoped that graduates will develop the skills and confidence needed to undertake a greater variety of professional roles and assume leadership roles within the profession. A preliminary assessment of the relatively small number of PharmD graduates suggests important differences in outcomes. In order to achieve these goals, the new curriculum will include more therapeutics, physical assessment, laboratory assessment, and biostatistics. Students will be introduced to clinical practice and the concept of pharmaceutical care much earlier in the curriculum. Through the use of an integrated laboratory, students will be involved in active learning and role playing throughout the curriculum.

Many schools, like ours, are involved in curricular revision and conversion to the PharmD as the sole professional degree. A graduate outcomes survey provides an important database for implementing these changes and a mechanism for ongoing interaction and feedback from the alumni. These surveys can be repeated at regular intervals, for example every five years, to track the outcomes associated with curricular changes, identify strengths and weaknesses of the program and adapt to the ever changing role of pharmacy practice.


References
(4) Koda-Kimble, M.A., Herfindal, E.T., Shimomura, S.K., Adler, D.S. and Bernstein, L.R., “Practice patterns, attitudes, and activities of...


