

# Curricula Then and Now: An Environmental Scan and Recommendations Since the Commission to Implement Change in Pharmaceutical Education

## Report of the 2006-2007 Academic Affairs Committee

J. Chris Bradberry, PharmD <sup>a\*</sup>, Marcus Droege, PhD <sup>b</sup>, R. Lee Evans, PharmD <sup>c</sup>, Joseph B. Guglielmo, PharmD <sup>d</sup>, David A. Knapp, PhD <sup>e</sup>, Katherine K. Knapp, PhD <sup>f</sup>, Susan M. Meyer, PhD <sup>g</sup>, Therese I. Poirier, PharmD <sup>h</sup>, Cecilia M. Plaza, PharmD, PhD <sup>i</sup>

<sup>a</sup> School of Pharmacy and Health Professions, Creighton University, Chair\*

<sup>b</sup> College of Pharmacy, Nova Southeastern University

<sup>c</sup> Harrison School of Pharmacy, Auburn University

<sup>d</sup> School of Pharmacy, University of California at San Francisco

<sup>e</sup> School of Pharmacy, University of Maryland

<sup>f</sup> College of Pharmacy, Touro University – California

<sup>g</sup> School of Pharmacy, University of Pittsburgh

<sup>h</sup> School of Pharmacy, Southern Illinois University Edwardsville

<sup>i</sup> American Association of Colleges of Pharmacy

According to the Bylaws of the American Association of Colleges of Pharmacy (AACP), the Academic Affairs Committee shall consider

*the intellectual, social, and personal aspects of pharmaceutical education. It is expected to identify practices, procedures, and guidelines that will aid faculties in developing students to their maximum potential. It will also be concerned with curriculum analysis, development, and evaluation beginning with the pre-professional level and extending through professional and graduate education. The Committee shall seek to identify issues and problems affecting the administrative and financial aspects of member institutions. The Academic Affairs Committee shall extend its attention beyond intra-institutional matters of colleges of pharmacy to include interdisciplinary concerns with the communities of higher education and especially with those elements concerned with health education.*

Consistent with a theme of exploring how AACP might foster organizational improvement and success among its institutional members, President Marilyn Speedie asked the 2006-07 AACP Academic Affairs Committee to:

- conduct an environmental scan of what has happened in the Academy from a curricular perspective since the original Commission to Implement Change Papers, in particular Background Paper II.<sup>1-4</sup>
- consider the role of the Institute of Medicine (IOM) Core Competencies in the curricula at colleges and schools of pharmacy, specifically to what degree have colleges and schools adopted and use the IOM competencies in their curricula.<sup>5</sup> The IOM competencies state that all health professionals

should: i) provide patient-centered care, ii) work in interdisciplinary teams, iii) employ evidence-based practice, iv) apply quality improvement approaches, and v) utilize informatics.<sup>5</sup>

- examine what innovations in curricular design have taken place in the decade since the original Commission Papers were released.
- plan a Summit to continue the discussion on evolving curricular issues as a product of the Committee's work.

President Speedie asked the Committee to consider her perception that there appears to be a general sense of dissatisfaction among faculty with the current curricula and that an “amorphous energy” exists for change that is difficult to characterize.

## **PREAMBLE**

The Commission to Implement Change in Pharmaceutical Education was appointed in 1989 to develop recommendations and provide guidance for the evolution of pharmacy education in the face of changes in the profession, health-care systems, and society.<sup>1</sup> In addressing its charge, the Commission produced a series of Background Papers that, in addition to providing an environmental scan, defined the missions for the profession of pharmacy, pharmacy practice, and pharmacy education respectively. The resulting mission of the profession was to serve society, the individual needs of the patient, and to produce and distribute drug entities and knowledge related to them. The mission of pharmacy practice, in turn, was to deliver products and knowledge revolving around the rational use of medications and to provide pharmaceutical care. The mission of pharmaceutical education was to maintain a dynamic curriculum that included both a strong general liberal arts education and foundation in various facets of pharmacy necessary to prepare graduates to provide pharmaceutical care as practitioners. All 3 inter-related missions revolved around the idea of pharmaceutical care, now referred to as patient-centered care. Commission Background Paper II in particular discussed the first professional degree, curricular outcomes, and content and processes in the promotion of the mission of the profession of patient-centered care.<sup>2</sup> The Commission to Implement Change concluded that the 5-year pharmacy program was no longer sufficient and that the first professional

degree should be awarded after successful completion of a 2-year pre-pharmacy curriculum followed by a 4-year professional program and that the appropriate degree title would be the doctor of pharmacy (PharmD) degree. The impact of the work of the Commission on pharmacy curricula and the resultant major changes marked a critical milestone in pharmacy education, the influence of which can be seen in later key documents in pharmacy education and practice.

The Commission Papers served as one of several key resources in the development of the AACP Center for the Advancement of Pharmaceutical Education (CAPE) Educational Outcomes. This document provides a guide for pharmacy faculty and administrators in the revision of their respective pharmacy curricula.<sup>6-7</sup> The intent of the AACP CAPE Outcomes has been to, "...be the endpoint, the target toward which evolving pharmacy curriculum should aim," providing a framework for competency and outcomes based curricula.<sup>6</sup> The latest revision to the CAPE Outcomes included an overall simplification and revision to use similar language to that of other competency or outcomes documents such as the IOM core competencies.<sup>5,7</sup> The parallel development of the Joint Commission of Pharmacy Practice (JCPP) 2015 Future Vision of Pharmacy Practice, and the latest revision of the CAPE Outcomes resulted in the latter serving as a resource document for JCPP.<sup>7-8</sup> The JCPP vision stated that, "Pharmacists will be the healthcare professionals responsible for providing patient care that ensures optimal medication therapy outcomes."<sup>8</sup> Both the JCPP 2015 Vision and the 2004 AACP CAPE Outcomes reaffirmed patient-centered care as the essence of practice and served as background resource documents for the Accreditation Council for Pharmacy Education (ACPE) planning and development of Standards 2007.<sup>7-9</sup>

The Academic Affairs Committee, working from the above historical perspective adopted the following statements as guiding principles for the ensuing discussions and recommendations:

- 1) the educational programs leading to the PharmD degree will achieve the missions as stated in the original AACP Commission to Implement Change Background Papers, the JCPP Future Vision of Pharmacy Practice, and the AACP CAPE *Educational Outcomes 2004*;
- 2) colleges and schools of pharmacy will form, with AACP support, a collaborative consortium that collectively accomplish the guiding principles for discussion of pharmacy education. The

Academy will collectively address the challenges previously outlined and those newly identified in this document.

The Academic Affairs Committee, working under this framework, proposes the following Policy Statement for a revised pharmacy education mission statement:

**Policy Statement 1:**

*The mission of pharmacy education is to prepare graduates who provide patient-centered care that ensures optimal medication therapy outcomes and provides a foundation for specialization in specific areas of pharmacy practice; to participate in the education of patients, other healthcare providers, and future pharmacists; to conduct research; and to provide of service and leadership to the community.*

The envisioned curricular change or improvement was viewed as a target. The target is impacted by both internal and external factors. Internal factors were defined as those areas of change that have occurred within the Academy that have impacted pharmacy curricula. Areas identified as internal factors were experiential education; curricular innovations and paradigm shifts; pre-pharmacy requirements; and social, cultural, and professional issues. External factors were defined as those areas of change that have occurred in the landscape of higher and professional education as a whole. The external factors that were identified included the assessment movement in higher education, the diversity of AACP member institutions and growth in new and within existing schools, and the impact and role of the IOM Core Competencies. Taken together, the internal and external factors formed the core of the environmental scan of what has happened since the original Commission to Implement Change in Pharmaceutical Education. The environmental scan concluded with a consideration of the question: what is driving curricular change now?

**ENVIRONMENTAL SCANS**

**INTERNAL FACTORS**

The internal factors can be seen in the evolution of the topics for the AACP Institute since its inception in 1996 to assist colleges and schools of pharmacy in addressing ACPE Standards 2000. The

1996 and 1997 Institutes focused on the improvement and evaluation of curricular and pedagogical activities within colleges and schools of pharmacy. The 1998 Institute dealt with planning, implementing, and evaluating institutional curricular change followed in 1999 by change in health professions education and the changing health care delivery environments. The 2000-2003 Institutes dealt with the various facets of assessment with the 2005 Institute addressing the health professions education responsiveness to contemporary and emerging professional pharmacist roles. In response to Standards 2007, the 2006 Institute focused on experiential education and the 2007 Institute on assessment.

### **Experiential Education**

One of the most significant areas of change in pharmacy education curricula has occurred in the area of experiential education. The release of Standards 2007 marked the first time experiential education had its own Standard with the addition of Standard No. 14.<sup>9</sup> Within Standards 2007, the expectations for introductory practice experiences have increased, as have the expectations for the teaching qualifications of preceptors. In addition to the curricular changes, the number of students requiring experiential placements has also grown. In the latest installment of a longitudinal comparison of practice experience characteristics, the top two reasons listed for difficulty in securing experiential sites were the mismatch between supply and demand followed by the quality of the sites and/or preceptors in terms of desired characteristics in the site.<sup>10</sup> The changes that have occurred are significant given that experiential education through both introductory and advanced experience placements composes at least 30% of the professional pharmacy curriculum.<sup>9</sup>

Another area that has affected experiential education is the growing number of students requiring placement in both introductory and advanced experiential sites with increasing enrollments in existing pharmacy institutions and the growing number of new colleges and schools of pharmacy. In 1993, when the original Commission Papers were released there were 75 colleges and schools of pharmacy and 38,902 total students enrolled compared to fall 2005 when there were 92 colleges and schools of pharmacy with a total first professional degree enrollment of 46,527.<sup>11</sup> Based on a longitudinal comparison of practice characteristics published in 2005, for the 1994-95 academic year, the median number of rotations scheduled per institution was 210 for the PharmD as the first professional degree compared to 687 for the 2003-04

academic year.<sup>10</sup> In addition to the growing need for experiential education placements, there is concern over the, "...increasing frequency advanced experience programs are directed by non-tenure track, junior faculty members with limited experience. Also, volunteer faculty teach the majority of clinical experience rotations, and funding for these programs is still a small fraction of a school's overall budget."<sup>12</sup> The 2003-04 and 2004-05 AACP Professional Affairs Committee reports addressing the Academy's role in the development of faculty responsible for overseeing experiential programs, advancing practice, and assessing quality in experiential education led to the creation of the Academic-Practice Partnership Initiative (APPI).<sup>13-15</sup>

The purpose of APPI was to improve both pharmacy education and practice by helping to, "...identify strategies and develop resources to improve the quality of experiential education sites, expand the capacity for exemplary sites, provide resources for preceptor training and development, and streamline processes within and across colleges and schools of pharmacy."<sup>13</sup> One product resulting from the work of the APPI was an online library of resources that was created to support all levels of experiential education from the preceptor practitioner to experiential personnel. The Professional Experience Program Resource Library available on AACP's Web site ([www.aacp.org](http://www.aacp.org)), with over 400 resources and growing, is peer-reviewed, annotated, and searchable. Another major outcome from the APPI was the development of the Advanced Practice Experience Site Profiling System (APESPS), which established quality criteria for profiling exemplary practice models for both patient care and student learning. Within APESPS are both site- and preceptor-specific criteria for excellence that directly incorporate the AACP CAPE Outcomes and the IOM Core Competencies.<sup>5,7</sup>

The growing reliance on volunteer faculty to teach the continually increasing number of students and provide the necessary experiential sites has also resulted in a call for more preceptor training.<sup>14, 16-17</sup> Among numerous other recommendations, the AACP Preceptor Development Task Force called for preceptor training programming using distance education methods in addition to a "Train the Trainer" model for experiential directors or coordinators.<sup>16-17</sup> The Achieving Preceptor Excellence (APEX) program and the Expert Preceptor Interactive Curriculum (EPIC) are examples of such initiatives. The APEX

program through the University of Florida ([www.cop.ufl.edu/APEX/](http://www.cop.ufl.edu/APEX/)), a 15-hour online training program available for continuing education credit, is aimed at pharmacists at both the novice and experienced preceptor levels interested in being advanced community pharmacy practice preceptors. The EPIC program through the University of North Carolina (<http://www.med.unc.edu/epic>) is a Web-based clinical teaching curriculum for health sciences preceptors in the community setting where continuing education credit and an “Expert Preceptor” designation is awarded based on the number of 2-hour modules completed.

**Suggestion 1:** Colleges and schools of pharmacy are urged to 1) use the resources developed through the APPI to recruit, develop, and retain preceptors, and 2) contribute to the further expansion of resources and tools available through the APPI.

### **Curricular Innovations and Paradigm Shifts**

#### *Ability-based Outcomes*

The adoption of an abilities-based curriculum marked a significant paradigm shift in pharmacy education.<sup>18-20</sup> The outcome-based education movement began in the 1980s with the idea that curricula should be developed from the standpoint of desired student outcomes.<sup>6-7, 9, 21-22</sup> An ability-based outcome is defined as, “a clear statement of what the student is expected to be able to do within a particular learning environment, describing a specific activity, behavior, or performance that involves the integration of knowledge, skills, and attitudes and can be observed and measured.”<sup>23</sup> The use of ability-based outcomes, in addition to helping guide assessment, provides a clear picture to various stakeholders such as students, faculty, and the public as to what students are expected to be able to do upon graduation. The integration of ability- or competency-based outcomes has had implications for both the didactic and experiential components of the professional curriculum in how they are designed, implemented, and assessed and has become the new standard for how pharmacy students are educated across the country.<sup>20, 22-26</sup>

**Recommendation 1:** AACP should work with appropriate partners to develop performance measures to evaluate and validate the ability-based outcomes for the professional curriculum, including the development of standardized core assessments for core curricular experiences. These core assessments should include

clinical performance skills and be sufficiently specific in nature as to operationalize the tenants of patient-centered care.

### *Distance Education*

One of the most notable curricular innovations since the release of the Commission Papers has been the introduction of more and sophisticated distance education into pharmacy education. Distance learning has been defined as one where students complete all or part of an educational program at a different geographical location than the parent institution.<sup>27</sup> While distance education is not a new concept within higher education as a whole, its use in pharmacy education, as cited by Hunter and colleagues, "...is transforming the culture of professional health education by expanding access to students, introducing novel teaching and learning methods, as well as shifting the paradigm of how instructors and students interact."<sup>28</sup> Distance education features prominently in Standards 2007 with the growth in this alternate form of curriculum delivery as colleges and schools find ways to deal with the increasing demands for pharmacists.<sup>9,</sup>

29-31

Approximately 8 colleges and schools of pharmacy use synchronous distance education for a portion of their respective curricula primarily through interactive video conferencing with satellite campuses located in a different city from the main campus (telephone conversation with Ulric Chung, PhD, Assistant Executive Director, Accreditation Council for Pharmacy Education, December, 2006). Examples of some unique programs include Nova Southeastern, Creighton, and the University of Florida. The College of Pharmacy at Nova Southeastern University for example uses a synchronous format where students attend class at the same time regardless of physical location using compressed interactive video.<sup>31</sup> Currently Creighton is the only school or college of pharmacy to have a first professional degree pathway that is primarily Web-based, with the exception of 2 laboratory courses and the experiential component. It was developed to increase the total number of pharmacy graduates while maintaining graduates from the traditional program.<sup>29</sup> The University of Florida is currently the only school or college of pharmacy that uses an asynchronous format of recorded broadcast of videos to its 3 satellite campuses that also have cohorts of faculty.



As with any educational intervention or modality, there are both intended and unintended consequences to their use. Regardless of the method in which distance education is employed, the unintended consequences of these programs are not fully known. One potential unintended consequence identified by Hunter and colleagues was the effect on both the culture of pharmacy education and the profession and the need to ensure that students develop the necessary interpersonal communication skills required to engage in direct patient care.<sup>28</sup> The effectiveness of the socialization of distance education pharmacy students into the pharmacy profession has not been explored in the literature. Preliminary work at the University of Florida found no difference in the professionalism of students involved in the distance versus traditional education.<sup>32</sup>

### *Interprofessional Education*

Another paradigm shift that has occurred in health professions education since the release of the Commission Papers, has been the move towards interprofessional education.<sup>33</sup> The IOM report cites working in interdisciplinary teams through cooperation and collaboration to ensure continuous reliable care as 1 of the 5 core competencies.<sup>5</sup> Interprofessional education has been defined as, "...a planned experience for learners from more than one discipline that includes direct instruction (eg, didactics, seminars, workshops) and/or clinical experience in interprofessional care."<sup>34</sup> There are examples in the pharmacy literature of various interprofessional educational interventions. A study through the University of Minnesota examined the use of standardized patients as an interprofessional activity and found that the activity increased both student awareness and ability to function in a multidisciplinary team.<sup>35</sup> A study through the University of Cincinnati used an interdisciplinary approach to introduce professionalism and found that the educational intervention increased both student awareness and ability to function as part of an interdisciplinary team.<sup>36</sup> Gardner and colleagues, in examining interdisciplinary didactic instruction at academic health centers in the US found that the most highly rated barriers to interdisciplinary education included a lack of financial resources, administrative support, low perceived value and scheduling issues.<sup>37</sup> A study by Remington and colleagues that reviewed the literature on the influence of interprofessional education on learner-based outcomes relevant to the provision of interprofessional care found that there was

a lack of information to help guide educators in designing and implementing educational interventions to improve interprofessional education, and there was little direct evidence for long term positive outcomes.<sup>34</sup>

**Suggestion 2:** Colleges and schools of pharmacy should support and enhance interprofessional education, including interprofessional preceptor development.

### **Pre-pharmacy requirements**

The Commission Papers stipulated that the dual purpose of pre-professional or pre-pharmacy education was to prepare practitioners both with an understanding and appreciation of society and further their role within society as health care providers.<sup>2</sup> As stated in the report of the Focus Group on Liberalization of the Professional Curriculum, “For optimal educational benefit to occur, the educational focus of the liberal arts courses selected should be that which contributes to historical perspective and understanding the evolution of cultures, ideas, and philosophies so as to enable students to become more competent in understanding the world around them.”<sup>18</sup> While the 2-year pre-pharmacy curriculum was adopted as the norm after the Commission Papers were released with the move towards the all-PharmD, there has been discussion in the academy whether 2 years is sufficient. DeLander put forth 3 specific concerns regarding current pre-pharmacy curricula, making an analogy that students (“the ingredients”) were as important as the curriculum (“the recipe”).<sup>38</sup> The first concern was that current pre-pharmacy requirements were not conducive to the identification of applicants with the desired aptitude and motivation and that an undergraduate degree would not only make pharmacy students more similar to other professional degrees but also provide a tangible marker of an accomplishment of a goal.<sup>38</sup> The second concern was that a 2-year pre-pharmacy model also limited potential flexibility in the professional curriculum to have more advanced courses to prepare students for interdisciplinary practice by necessitating the placement of foundational science courses in the professional curriculum.<sup>38</sup> The third concern was that current pre-pharmacy requirements reflected the academy’s impatience in allowing students to mature and obtain a greater liberal arts education to have more well rounded students.<sup>38</sup> In a response to DeLander, DiBenedetto and Droege proposed the preparation of faculty as another factor or “ingredient” to consider in addition to student preparation in the professional curriculum or “recipe”.<sup>39</sup>

While several colleges and schools of pharmacy have moved specifically to a 3-year pre-pharmacy requirement for admission, the practical reality is the pre-pharmacy curriculum is becoming a de facto 3 year process as the number of requirements has become difficult to complete in 2 years for various reasons. The number of required courses that compose a pre-pharmacy curriculum may not be possible to complete in 2 years without exceeding the typical number of units or credits per semester for undergraduate degree programs. The availability of required pre-pharmacy courses, which often overlap with general education requirements, may also be limited due to large enrollments or high demand at some institutions. The relative availability of more specific courses may also drive pre-pharmacy curricular decisions. The question becomes whether there is a need to address a core pre-pharmacy curricula that could in fact be a bachelors degree.

**Recommendation 2:** AACP should lead the academy in a determination of appropriate credentials and prerequisites for admission into the professional pharmacy degree program and focus on the need for specific pre-pharmacy competencies and the development of an instrument to better assess appropriate preparation for admission into the professional program.

### **Social, Cultural, and Professional Issues**

There are several curricular areas such as cultural competency and professionalism that have come into greater prominence since the release of the Commission Papers that are often “hidden curricula” within the professional curriculum. While many definitions exist within the literature, cultural competency for a pharmacy graduate can be considered the ability to deliver culturally appropriate care to patient populations with diverse values, beliefs, and behaviors.<sup>40</sup> While the importance of cultural competency has been recognized by the academy given the increasingly diverse patient populations for which pharmacy graduates will provide care and the need to address health disparities, examples in the literature of the incorporation of cultural competency into pharmacy curricula have been as elective courses.<sup>41-42</sup>

Professional socialization is, “...the process by which students learn and adopt the values, attitudes, and practice behaviors of a profession...”<sup>43</sup> The issue of professionalism came to the forefront through a joint task force between the American Pharmacists Association-Academy of Students of Pharmacy (APhA-

ASP) and the AACP Council of Deans (COD).<sup>44</sup> The impact on pharmacy curricula was further seen in the Pharmacy Professionalism Toolkit for Students and Faculty put out by APhA-ASP and AACP.<sup>45</sup> Hammer and colleagues recommended that valid assessment instruments be developed and used to measure professional development across the entire curriculum.<sup>46</sup> While instruments such as The Pharmacy Professionalism Instrument and the Behavioral Professionalism Assessment Form have been published in the literature there is concern over the lack of standardized instruments to measure professionalism.<sup>43, 47-49</sup> A study by Sylvia sought to address the 4 phases of an institutional professional development plan of recruitment, admissions, educational programs, and practice in terms of both how they were implemented into the curriculum and assessed and found that 27% of institutions offered a stand-alone course on professional development (n = 52).<sup>49</sup> In examining how professionalism is assessed in experiential programs, this study found that standard instruments were used by 52% of institutions for introductory pharmacy practice experiences and by 39% for advanced pharmacy practice experiences (n = 50).<sup>46</sup> As part of a series dedicated to community pharmacy, Hammer advocated for the implementation of some measure of professionalism that would allow preceptors to better tailor their experiential site to help further develop professionalism.<sup>49</sup> Duncan-Hewitt's article titled, "The Development of a Professional Reinterpretation of the Professionalization Problem From the Perspective of Cognitive/Moral Development" challenged our conceptualization of how we develop professionalism in our junior colleagues – both students and faculty.<sup>50</sup>

What remains unclear is how curricula on a broader scale have changed as a result of the recognition of the importance of the social, cultural, and professional aspects of pharmacy education. Service learning has emerged as a potential way to integrate cultural competency and foster opportunities for interprofessional education in pharmacy curricula. More information is needed on how colleges and schools of pharmacy have developed competencies to address these areas and further how those outcomes are measured and exploration of questions such as, how can colleges and schools more formally professionalize students?

**Recommendation 3:** AACP should explore mechanisms, such as instruments, on how applicants, students and faculty are socialized and professionalized to provide guidance to colleges and schools of pharmacy.

## **External Factors**

### **The Assessment Movement in Higher Education**

The assessment movement in higher education has had a noticeable effect on pharmacy education. Assessment has been defined as a continuous, systematic process of developing and reviewing student outcomes and collecting, reviewing, and using these data to inform program improvement.<sup>19</sup> While several factors contributed to the genesis of the assessment movement, the demands by stakeholders for information on return on investment as well as the value-added by higher education were a major stimuli.<sup>51-52</sup> There has been a recent increase in the focus on the accountability component of assessment and accreditation in higher education as evidenced by the publications disseminated by the U.S. Department of Education and the National Association of State Universities and Land-Grant Colleges (NASULGC).<sup>53-55</sup> Changes in the way instruction is designed and delivered and the move from primarily “teaching-based” to “learning-based” models of student development have been driven by the need for students to demonstrate life-long learning skills and enhance professionalism. Educational reforms, such as student-centered learning, have added new challenges to conducting outcomes assessment and have moved assessment from being an “add-on” to a more naturalized approach embedded within instructional delivery.<sup>51-52</sup> The assessment movement has also helped to create what Ewell termed a “semi-profession” within higher education of individuals involved in assessment who are now becoming more formally recognized for their work.<sup>52</sup> Within the academy there appears to be a shortage of individuals with sufficient pharmacy or health sciences orientation to lead this movement thereby hindering meaningful implementation.

The impact of the assessment movement on pharmacy education can be seen in changes within the academy as well as Standards 2007. More colleges and schools pharmacy are beginning to hire or create positions dedicated in part or completely to assessment activities ranging from assistant professor to associate dean level appointments. In 2006, AACP expanded their Academic Affairs and Institutional Research portfolio to include a formal staff position responsible for addressing assessment within member colleges and schools. ACPE Standards 2007 in the revision process from Standards 2000 placed a greater emphasis on how colleges and schools of pharmacy assess students’ achievement of professional

competencies.<sup>9</sup> Standard No. 15 states that colleges and schools of pharmacy, "...must develop and carry out assessment activities to collect information about the attainment of desired student learning outcomes. The assessment activities must employ a variety of valid and reliable measures systematically and sequentially throughout the professional degree program. The college or school must use the analysis of assessment measures to improve student learning and the achievement of the professional competencies."<sup>9</sup> While Standards 2007 clearly calls for measures of student accomplishment of professional competencies, the extent to which educational outcomes can truly be specified and measured is a difficult task.

**Recommendation 4:** AACP should work closely with ACPE as well as encourage member institutions to publish a summary document of "Lessons Learned" concerning the state of the academy based on both Standards 2000 and now with Standards 2007 in a manner that would not violate the confidentiality of colleges and schools of pharmacy but help institutions learn from collective knowledge concerning areas that are strengths and those needing improvement.

**Recommendation 5:** As part of a broader examination of assessments employed by colleges and schools of pharmacy as related to accountability and as first steps leading to broader goals, AACP should examine how many colleges and schools of pharmacy have both adopted and developed methods to assess ability-based outcomes to ultimately encourage their utilization and adoption in the academy.

#### **The Diversity of AACP Member Institutions and Growth in New and within Existing Schools**

While the relative proportion of private to public institutions has not changed, the total number of colleges and schools of pharmacy has risen dramatically from 75 institutions in fall 1993 when the Commission to Implement Change Papers were released to 96 institutions in fall 2006.<sup>11</sup> For 2006-07, while a few colleges and schools of pharmacy offer more than 1 track for program length, approximately 82% of institutions offer a "traditional" 4-year program with 2 to 3 years of pre-pharmacy education required prior to admission.<sup>56</sup> Approximately 14% offer a 6-year program with no pre-pharmacy requirement prior to admission and the remainder of colleges and schools of pharmacy offer some form of an accelerated 3-year alternative block program.<sup>56</sup> Approximately 42% of colleges and schools of

pharmacy are affiliated with an academic health center.<sup>56</sup> Approximately 68% of colleges and schools of pharmacy have a graduate program in the pharmaceutical sciences that offers an MS and/or PhD and approximately 19% of schools/colleges offer some form of a dual degree program (eg, PharmD/PhD, PharmD/MBA).

The diversity of and growth in the number of AACCP member institutions impacts the professional pharmacy curricula in numerous ways. Growth in number of new colleges and schools as well as within existing institutions needs to be examined relative to the ability to deliver professional curricula with decreased faculty resources. ACPE projections, spanning from 2005 and into 2008, estimate a 36.5% increase in student enrollments, 84.4% of which are due to existing colleges and schools of pharmacy and 15.6% attributed to the 14 newest colleges and schools of pharmacy.<sup>57</sup> With the increase in the number of colleges and schools of pharmacy has come an increase in the number of faculty. In fall 1993 there were 2,869 full-time and 380 part-time pharmacy faculty compared to fall 2006 with 4,340 full-time and 534 part-time pharmacy faculty.<sup>58</sup>

Based on the 76 out of 91 (83.5%) institutions that responded to the 2006 AACCP Faculty Vacancy Survey, there were 429 vacant positions (includes non-shared, shared, and lost positions), 90.7% of which were full-time appointments.<sup>59</sup> The 3 disciplines with the most vacant positions were pharmacy practice (53.4%), pharmaceuticals (15.9%), and medicinal chemistry (11.4%).<sup>59</sup> By academic rank, 43.3% of all vacant positions were at the assistant professor rank.<sup>59</sup> When asked to indicate challenges to recruitment efforts for searches that exceeded an institution's projected timeline to fill a vacant position, 29.6% of respondents did not report any factors, 20.4% cited an inadequate number of qualified candidates in the desired discipline, 12.3% indicated a lack of response to position announcements, and 10.5% indicated that budget limitations affected the ability to offer a competitive salary and/or start-up package.<sup>59</sup> While growth in both the number of new colleges and schools and enrollments within existing institutions continues to address the shortage of pharmacists, thus taxing the available pool of faculty, the shortage in both faculty and pharmacists are critical issues that must be addressed.

The shortage of pharmacy faculty can impact the curricula by potentially driving curricular changes based on availability of faculty to teach in certain disciplines rather than basing curricula on desired student learning outcomes. The disappearance of medicinal chemistry from the professional curricula at some new colleges and schools of pharmacy marks a major shift in the way that pharmacy students are educated. The appeal of higher salaries in both practice and industry further complicate the issue of recruiting pharmacy graduates to pursue academic careers. The AACP Council of Faculties (COF) and Council of Deans (COD) Task Force on Faculty Workforce, which continues to work on establishing pipelines for the next generation of faculty, has developed a series of possible strategies to address the impact of faculty shortages on colleges and schools of pharmacy ([www.aacp.org](http://www.aacp.org)). The question becomes: how do we best deliver our curricula with decreased faculty resources? One possible solution would be the creation of consortia to teach certain fundamental courses such as pharmaceutical calculations through alternative means of delivery, such as Web-based courses that several colleges and schools could share. The creation of consortia would call for a paradigm shift away from the traditional conceptions of course ownership.

### **Impact and Role of Institute of Medicine Core Competencies**

The IOM Core Competencies state that all health professionals should: i) provide patient-centered care, ii) work in interdisciplinary teams, iii) employ evidence-based practice, iv) apply quality improvement approaches, and v) utilize informatics.<sup>5</sup> Not intended to be an exhaustive list, the 5 core competencies were meant to span all the health professions and provide a common vision across disciplines for meeting patients' needs with each discipline operationalizing these competencies in its own way.<sup>5</sup> These core competences are echoed both in the AACP CAPE *Educational Outcomes 2004* and the ACPE Standards 2007.<sup>6-7,9</sup> Framing these core competencies in pharmacy terms, both the AACP CAPE *Educational Outcomes 2004* and Standards 2007 state that graduates must be competent to: i) provide patient-centered care, ii) provide population-based care, iii) manage human, physical, medical, informational, and technological resources, iv) manage medication use systems, and v) promote the availability of effective health and disease prevention services and health policy. The extent to which these competencies have been embraced and implemented as tangible curricular changes on a wide scale within the academy is unclear. In



a preliminary study examining the integration of IOM competences across pharmacy, medicine, nursing, and physical therapy found that the top 3 barriers to the implementation of the core competencies were the difficulty of adding additional hours in the curriculum, administrative challenges, and limited availability of other health professions programs.<sup>60</sup>

**Suggestion 3:** Colleges and schools of pharmacy should map the IOM core competencies within their respective curricula to determine where and to what extent they are being addressed, incorporated, and implemented in a meaningful fashion into the professional curriculum.

### **WHAT IS DRIVING CURRICULAR CHANGE NOW?**

Based on the internal and external factors in the environmental scan, the Committee considered the question: what is driving curricular change now? In the 1990s if colleges and schools of pharmacy did not change to an all PharmD curriculum they were faced with losing their accreditation. The current state of the academy has no such incentive or consequence for engaging in major curricular change so the question became a consideration of what is driving curricular change now. Several potential areas were identified as potential drivers for curricular change: integrated outcomes-based curricular assessment as part of curricular delivery, changes in experiential education, perceived dissatisfaction with graduates, and changes in curricular delivery methods.

#### **Integrated outcomes-based curricular assessment**

The effects of the assessment movement and the move towards greater accountability within higher education are all reflected in Standards 2007. Colleges and schools of pharmacy are faced with how best to incorporate programmatic assessment into their curricula and move from assessment as an “add-on” within a program to an integrated component of institutional culture. Characteristics of effective outcomes assessment require stakeholder buy-in throughout planning, implementation, and improving and sustaining phases of assessment.<sup>61</sup> While assessment programs often begin when needed or when required by accreditors, they still need time to develop a clear plan with purposes related to an institution’s goals and objectives.<sup>61-63</sup> The added assessment requirements stipulated in Standards 2007 arguably reduce the time for the development of an effective outcomes assessment plan as colleges and schools of pharmacy work to

integrate newer elements such as student portfolios into expanded assessment plans. As colleges and schools of pharmacy begin to integrate assessment more fully as a part of their curricular process, the cautionary note becomes that, “Assessment is more than the collection of data. To make assessment work, educators must be purposeful about the information they collect. As a basis for data gathering, they must clarify their goals and objectives for learning and be aware of where these goals and objectives are addressed in the curriculum.”<sup>63</sup> The integration of various assessment components will pose a challenge to colleges and schools of pharmacy and eventually require curricular reform.

### **Changes in experiential education**

The increased focus on experiential education in Standards 2007 also poses a unique challenge to colleges and schools of pharmacy with regard to the identification, creation, and implementation of introductory experiential sites for students while simultaneously maintaining and expanding advanced experiential site capacity. Standards 2007 call for introductory experiences to comprise 5% (300 hours) of the professional curriculum. The uncertainty about what can or cannot comprise an introductory experience creates potential obstacles for colleges and schools as they make room in their respective curricula for the incorporation of experiential aspects into what has previously been primarily didactic. There has been debate in open forums within the academy about whether introductory experiences can take the form of service learning with the goal of developing the more social, cultural, humanistic, and potentially interprofessional side of pharmacy education or whether they must be under the supervision of a pharmacist. Another debate has occurred with regard to the use of simulations as introductory experiences.

Desired outcomes need to be agreed upon so that effective introductory experience curricula can be developed by colleges and schools. From a curricular perspective, concerns have been raised as to whether there is enough empirical evidence that introductory experiences prepare students for advanced experiences and that 300 hours in the curriculum is the right amount to do so considering there is no consensus on the most effective length for advanced experiences. Although the mean length of rotations was 4.8 weeks (SD = 0.9) and ranged from 4 to 8 weeks (n = 73) it is not known what the optimal length of advanced experiential rotations is to maximize learning and also provide sufficient variety of experiences.<sup>10</sup>

## **Graduates**

There has been perceived dissatisfaction within some parts of the academy and pharmacy practice concerning the abilities of graduates upon graduation to enter practice.<sup>64</sup> An American College of Clinical Pharmacy (ACCP) Position Statement suggested that postgraduate pharmacy residency training was a prerequisite for direct patient care because colleges and schools of pharmacy were not producing graduates with the level of ability needed to manage complex drug therapy.<sup>65</sup> The original Commission Papers differentiated between generalists and specialists, where both would have a role in providing patient-centered care but that complex drug cases would be referred to specialists.<sup>2</sup> The goal of the first professional degree in pharmacy is to produce generalists and those that desire to become specialists would acquire additional training in an appropriate venue such as a residency program.<sup>2,65</sup> As stated in Commission Paper II, “Specialization in pharmacy has meaning only around a strong generalist core,” with the understanding that the generalist graduate could provide direct patient-care.<sup>2</sup> An examination of all elements of pharmacy education needs to be conducted if graduates are not prepared to enter practice as entry-level generalists upon graduation. Rather than adding additional years of training at the completion of pharmacy school, a critical examination of the pre-pharmacy curriculum would provide a starting place to re-examine if the current pre-professional and professional curricula are meeting the needs for practitioners of patient-centered care.

**Recommendation 6:** Given that PharmD graduates can provide generalist direct patient-centered care, AACP should work with appropriate stakeholders to identify and define under what circumstances a post-graduate residency should be required for more specialized direct patient-care.

### **Changes in curricular delivery methods**

Another consideration is whether curricula have kept pace with changes in curricular delivery and if the views of the academy are too limited in relation to how curricula should or could be delivered. The use of ability-based outcomes, active learning strategies, distance education, service learning, and faculty shortages have affected the way the professional curriculum is delivered. The rapid expansion of technology since the release of the original Commission Papers has created opportunities for new learning

environments that did not exist before. For example, requiring all students to have laptops for use in the classroom can change the pedagogical techniques used in the entire professional curriculum. Students are also more technologically savvy than ever before in how they learn. Current methods of curricular delivery need to be considered in light of how students today and in the future learn best.

**Overarching curricular recommendation**

Collectively the recommendations and suggestions are intended to begin to flesh out strategies to achieve the proposed policy statement of a revised mission for pharmacy education.

**Recommendation 7:** AACP should form a small planning group to examine the feasibility and logistics of conducting a Summit on Curricular Change to address what those in academic pharmacy have done well, what needs to be improved, and how we reconcile both our areas of strengths and those needing additional work with the new ACPE Standards.

## REFERENCES

1. Commission to Implement Change in Pharmaceutical Education. Background paper I: What is the mission of pharmaceutical education? *Am J Pharm Educ.* 1993; 57: 374-376.
2. Commission to Implement Change in Pharmaceutical Education. Background paper II: Entry-level, curricular outcomes, curricular content and educational process. *Am J Pharm Educ.* 1993; 57: 377-385.
3. Commission to Implement Change in Pharmaceutical Education. Entry-level education in pharmacy: Commitment to Change. *Am J Pharm Educ.* 1993; 57: 366-374.
4. Commission to Implement Change in Pharmaceutical Education. The responsibility of pharmaceutical education for scholarship, graduate education, fellowships, and postgraduate professional education and training. *Am J Pharm Educ.* 1993; 57: 386-399.
5. Greiner AC, Knebel E. *Health Professions Education: A Bridge to Quality.* Washington, DC: The National Academies Press; 2003.
6. American Association of Colleges of Pharmacy. *Educational Outcomes.* Alexandria, VA: Center for the Advancement of Pharmaceutical Education Outcomes; 1998. Available at: [www.aacp.org](http://www.aacp.org). Accessed November 27, 2006.
7. American Association of Colleges of Pharmacy. *Educational Outcomes 2004.* Alexandria, VA: Center for the Advancement of Pharmaceutical Education Outcomes; 2004. Available at: [www.aacp.org](http://www.aacp.org). Accessed November 27, 2006.
8. Maine LL. The class of 2015. *Am J Pharm Educ.* 2005; 69: article 56.
9. Accreditation Council for Pharmacy Education. *Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree.* The Accreditation Council for Pharmacy Education Inc. Available at: [http://www.ACPE\\_Updated\\_PharmD\\_Standards\\_Adopted\\_Jan152006.pdf](http://www.ACPE_Updated_PharmD_Standards_Adopted_Jan152006.pdf). Accessed on December 5, 2006.
10. Plaza CM, Draugalis JR. Implications of advanced pharmacy practice experience placements: a 5-year update. *Am J Pharm Educ.* 2005; 69: article 45.
11. Academic Pharmacy's Vital Statistics. Alexandria, VA: American Association of Colleges of Pharmacy. Available at: [www.aacp.org](http://www.aacp.org). Accessed on December 5, 2006.
12. Harralson AF. Financial, personnel, and curricular characteristics of advanced practice experience programs. *Am J Pharm Educ.* 2003; 67: article 17.
13. Pilot Project to Profile Exemplary Advanced Practice Experience Sites: Academic-Practice Partnership Initiative. Alexandria, VA: American Association of College of Pharmacy. Available at: [www.aacp.org](http://www.aacp.org). Accessed on December 5, 2006.
14. Littlefield LC, Haines ST, Harralson AF, et al. Academic pharmacy's role in advancing practice and assuring quality in experiential education: report of the 2003-2004 professional affairs committee. *Am J Pharm Educ.* 2004; 68: article S8.

15. Reynolds JR, Briceland LL, Carter JT, et al. Experiential education delivery – ensuring success through support and development of the faculty and administrative team: report of the 2004-2005 professional affairs committee. *Am J Pharm Educ.* 2005; 69: article S9.
16. Smith G, Boyle C, Bradberry C, et al. AACP Pharmacy Practice Section/Professional Experience Programs Special Interest Group Preceptor Development Task Force Report, July 2003. Available at: <http://www.aacp.org/site/page.asp?TRACKID=&VID=1&CID=807&DID=5296>. Accessed December 9, 2006.
17. Boyle CJ, Carr-Lopez S, Kawahara NE, Kieser MA, See CJ, Smith GB. Report of the preceptor development task force subcommittee two. *Am J Pharm Educ.* 2002; 66: 42S-43S.
18. Chalmers RK, Grotzinger JJ, Hollenbeck RG, et al. Ability-based outcome goals for the professional curriculum: a report of the focus group on liberalization of the professional curriculum. *Am J Pharm Educ.* 1992; 56: 304-309.
19. Abate MA, Stamatakis MK, Haggett RR. Excellence in curriculum development and assessment. *Am J Pharm Educ.* 2003; 67: article 89.
20. Monaghan MS, Jones RM. Faculty Case Writing Teams. Designing an assessment for an abilities-based curriculum. *Am J Pharm Educ.* 2005; 69: article 19.
21. Spady WG. *Outcome-Based Education: Critical Issues and Answers.* Arlington, VA: American Association of School Administrators;1994.
22. Anderson HM, Moore DL, Anaya G, Bird E. Student learning outcomes assessment: a component of program assessment. *Am J Pharm Educ.* 2005; 69: article 39.
23. Nemire RE, Meyer SM. Educating students for practice: educational outcomes and community experience. *Am J Pharm Educ.* 2006; 70: article 20.
24. Monaghan MS, Gardner SF, Schneider EF, Grady AR, McKay AB. Standardized patients: an ability-based outcomes assessment for the evaluation of clinical skills in traditional and nontraditional education. *Am J Pharm Educ.* 1997; 61: 337-344.
25. Draugalis JR, Slack MK, Sauer KA, Haber SL, Valliancourt RR. Creation and implementation of a learning outcomes document for a doctor of pharmacy curriculum. *Am J Pharm Educ.* 2002; 66: 253-260.
26. Hammer DP, Paulsen SM. Strategies and processes to design an integrated, longitudinal professional skills development course sequence. *Am J Pharm Educ.* 2001; 65: 241-248.
27. Distance Learning Glossary. *United States Distance Learning Association.* Available at: <http://www.usdla.org/html/resources/dictionary.htm#d>. Accessed on December 12, 2006.
28. Hunter TS, Deziel-Evans L, Marsh WA. Assuring excellence in distance pharmaceutical education. *Am J Pharm Educ.* 2003; 67: article 94.
29. Malone PM, Glynn GE, Stohs SJ. The development and structure of a web-based entry-level doctor of pharmacy pathway at Creighton University Medical Center. *Am J Pharm Educ.* 2004; 68: article 46.

30. Ried LD, McKenzie M. A preliminary report on the academic performance of pharmacy students in a distance education program. *Am J Pharm Educ.* 2004; 68: article 65.
31. Kennedy DH, Ward CT, Metzner MC. Distance education: using compressed interactive video technology for an entry-level doctor of pharmacy program. *Am J Pharm Educ.* 2003; 67(4): article 118.
32. Riffie WH, Williams JS. The business of distance education. Podium presentation at the 2007 American Association of Colleges of Pharmacy Meeting, February 4, 2007.
33. Maine LL. The continua of learning – cross disciplinary lessons. *Am J Pharm Educ.* 2005; 69: article 17.
34. Remington TL, Foulk MA, Williams BC. Evaluation of evidence for interprofessional education. *Am J Pharm Educ.* 2006; 70: article 66.
35. Westberg SM, Adams J, Thiede K, Stratton TP, Bumgardner MA. An interprofessional activity using standardized patients. *Am J Pharm Educ.* 2006; 70: article 34.
36. Brehm M, Breen P, Brown B, et al. An interdisciplinary approach to introducing professionalism. *Am J Pharm Educ.* 2006; 70: article 81.
37. Gardner SF, Chamberlin GD, Heestand DE. Interdisciplinary didactic instruction at academic health centers in the United States: attitudes and behaviors. *Adv Health Sci Educ Theory Pract.* 2002; 7: 179-190.
38. DeLander GE. Optimizing professional education in pharmacy: are the ingredients as important as the recipe? *Am J Pharm Educ.* 2005; 69: article 35.
39. Di Benedetto LM, Droege M. Pharmacy education: a student's perspective. *Am J Pharm Educ.* 2006; 70: article 72
40. Shaya FT, Gbarayor CM. The case for cultural competence in health professions education. *Am J Pharm Educ.* 2006; 70: article 124.
41. Assemi M, Cullander C, Humon KS. Implementation and evaluation of cultural competency training for pharmacy students. *Ann Pharmacother.* 2004; 38: 781-786.
42. Evans E. An elective course in cultural competence for healthcare professionals. *Am J Pharm Educ.* 2006; 70: article 55.
43. Hammer D. Improving student professionalism during experiential education. *Am J Pharm Educ.* 2006; 70: article 59.
44. APhA-ASP/AACP-COD Task Force on Professionalism. White paper on pharmacy student professionalism. *J Am Pharm Assoc.* 2000; 40: 96-102.
45. Pharmacy Professionalism Toolkit for Students and Faculty (Version 1.0, 2004), American Pharmacists Association Academy of Students of Pharmacy and American Association of Colleges of Pharmacy Committee on Student Professionalism. Available at: [http://www.aacp.org/Docs/MainNavigation/ForDeans/6428\\_PharmacyProfessionalToolkitv.1.pdf](http://www.aacp.org/Docs/MainNavigation/ForDeans/6428_PharmacyProfessionalToolkitv.1.pdf). Accessed on January 12, 2007.

46. Hammer DP, Berger BA, Beardsley RS, Easton MR. Student professionalism. *Am J Pharm Educ.* 2003; 67: article 96.
47. Purkerson Hammer D, Mason HL, Chalmers RK, Popovich NG, Rupp MT. Development and testing of an instrument to assess behavioral professionalism of pharmacy students. *Am J Pharm Educ.* 2000; 64: 141-151.
48. Chisholm MA, Cobb H, Duke L, McDuffie C, Kennedy WK. Development of an instrument to measure professionalism. *Am J Pharm Educ.* 2006; 70(4): article 85.
49. Sylvia LM. Enhancing professionalism of pharmacy students: results of a national survey. *Am J Pharm Educ.* 2004; 68(4): article 104.
50. Ducan-Hewitt W. The development of a professional: reinterpretation of the professionalization problem from the perspective of cognitive/moral development. *Am J Pharm Educ.* 2005; 69: article 6.
51. Ewell PT. National trends in assessing student learning. *Journal of Engineering Education.* 1998: 107-113.
52. Ewell PT. An emerging scholarship: a brief history of assessment. In: Banta TW, ed. *Building a Scholarship of Assessment.* San Francisco: Jossey-Bass; 2002: 3-25.
53. U.S. Department of Education. *A Test of Leadership: Charting the Future of U.S. Higher Education.* Washington, DC, 2006.
54. McPherson P, Shulenburg D. Improving student learning in higher education through better accountability and assessment. National Association of State Universities and Land-Grant Colleges. Available at: [http://www.nasulgc.org/Accountability\\_DiscussionPaper\\_NASULGC.pdf](http://www.nasulgc.org/Accountability_DiscussionPaper_NASULGC.pdf). Accessed on December 4, 2006.
55. McPherson P, Shulenburg D. Elements of accountability for public universities and colleges. National Association of State Universities and Land-Grant Colleges. Available at: [http://www.nasulgc.org/Accountability\\_DiscussionPaper\\_Revised\\_NASULGC.pdf](http://www.nasulgc.org/Accountability_DiscussionPaper_Revised_NASULGC.pdf). Accessed on December 4, 2006.
56. *Pharmacy School Admission Requirements 2007-2008.* Alexandria, VA: American Association of Colleges of Pharmacy. Available at: [www.aacp.org](http://www.aacp.org). Accessed on January 18, 2007.
57. Vlasses PH. Accreditation standards and guidelines relevant to experiential education. Presentation at AACP Institute on November 11, 2006. Available at: [www.aacp.org](http://www.aacp.org). Accessed on January 18, 2007.
58. *2006-2007 Profile of Pharmacy Faculty.* Alexandria, VA: American Association of Colleges of Pharmacy. Available at: [www.aacp.org](http://www.aacp.org). Accessed on January 18, 2007.
59. *2006 Survey of Vacant Budgeted and Lost Faculty Positions.* Alexandria, VA: American Association of Colleges of Pharmacy. Available at: [www.aacp.org](http://www.aacp.org). Accessed on January 30, 2007.
60. Droege M, Litwin B, Rosenthal RS, Anderson-Worts. Designing interdisciplinary health professions curricula for the future. *Am J Pharm Educ.* 2006; 70: Article 65.



61. Banta TW. Characteristics of effective outcomes assessment. In: Banta TW, ed. *Building a Scholarship of Assessment*. San Francisco: Jossey-Bass; 2002: 261-283.
62. Suskie L. *Assessing Student Learning: a Common Sense Guide*. Bolton, MA: Anker Publishing Company, Inc.; 2004.
63. Palomba CA, Banta TW. *Assessment Essentials: Planning, Implementing, and Improving Assessment in Higher Education*. San Francisco: Jossey-Bass; 1999.
64. Campbell WH. PharmD accreditation standards 2007: much is implied, little is required. *Ann Pharmacother*. 2006; 40: 1665-1671.
65. Murphy JE, Nappi JM, Bosso JA, et al. American College of Clinical Pharmacy's Vision of the future: postgraduate pharmacy residency training as a prerequisite for direct patient care practice. *Pharmacotherapy*. 2006; 26(5): 722-733.
66. Schwinghammer TL. Defining the generalist pharmacy practitioner. *Am J Pharm Educ*. 2004; 68(3): article 76.