Development of a Professional Pharmacy Outcomes Assessment Plan Based on Student Abilities and Competencies

David M. Scott, Dennis H. Robinson, Samuel C. Augustine, Edward B. Roche and Clarence T. Ueda

College of Pharmacy, University of Nebraska Medical Center, 986045 Nebraska Medical Center, Omaha NE 68198-6045

A critical component of the PharmD curriculum reform process at the University of Nebraska was the development and implementation of an educational assessment plan to monitor programmatic abilities and competencies. A two-phase strategy was used to develop and implement this plan. Phase 1 surveyed other college/schools of pharmacy regarding methods used to evaluate student abilities and competencies. The results of this survey are described. Phase 2 utilized this, and other information to formulate the educational assessment plan. Implementation of this plan, together with the methods used to identify and correct omissions of programmatic abilities and competencies are described. The purpose of the educational assessment plan is to continuously monitor and improve the professional curriculum.

LITERATURE REVIEW

Considerable work has been published defining desired curriculum outcomes in health and pharmacy education. In the late 1980s, the American Association of Colleges of Pharmacy (AACP) Argus Commission reviewed the need for renewal in pharmaceutical education and initiated discussions concerning curricular outcomes. In 1990, a Focus Group on Liberalization of the Professional Curriculum was appointed by AACP President John Biles to develop a ten-year agenda for renewal in pharmaceutical education[1,2]. The AACP Focus Group delineated its findings concerning the concepts of outcome goals and educational processes in the Commission to Implement Change in Pharmaceutical Education: Background Paper 11[3]. The Commission reported that the mission of pharmacy practice is to render pharmaceutical care. Accordingly, entry-level pharmacy practice, for which pharmaceutical education prepares its students, is described within the concept of pharmaceutical care[3]. Hence, the concept of pharmaceutical care in the mission of pharmacy practice and of ability-based goals were both endorsed by AACP.

The University of Michigan's Professional Preparation Network Project (1988) conducted a survey of 2,230 faculty members from 346 different United States colleges. Ten professional programs, including pharmacy at both the undergraduate/professional and master levels, were surveyed. Identified general outcomes included: conceptual, technical, integrative, contextual, interpersonal communication, and adaptive competences[4]. The AACP Commission to Implement Change in Pharmaceutical Education reviewed this listing and concluded that four broad minimum competencies were identifiable for professional education: conceptual competence, technical competence, integrative competence and career marketability[3].

The AACP Commission listed major entry-level functions/activities that comprise pharmaceutical care at the entry level. Then, it offered recommendations for educational outcomes

and competencies that are necessary to perform pharmaceutical care. Background Paper II categorized these outcomes as general ability-based outcomes and divided them into six categories: (*i*) thinking abilities; (*ii*) communication abilities; (*iii*) facility with values and ethical principles; (*iv*) personal awareness and social responsibility; (*v*) self-learning abilities and habits; and (*vi*) social interaction and citizenship[3].

As a result of the University of Nebraska College of Pharmacy (UNCP) reforming its Doctor of Pharmacy curriculum, an Educational Outcomes Committee (EOC) was created and charged with the development of a plan to assess educational outcomes. A two-phase strategy was developed. In Phase 1, the UNCP EOC sent an assessment survey to each college/school of pharmacy in the United States to obtain information regarding tools developed to assess student abilities and competencies. Information obtained in Phase 1 was used to adapt "the best" assessment approaches received into the development of an educational assessment plan. This paper describes the Plan and how the pertinent components from Phase 1 were integrated into the educational outcomes assessment program.

PHASE 1. NATIONAL COLLEGES OF PHARMACY EDUCATIONAL OUTCOMES ASSESSMENT

Like many colleges and schools of pharmacy in the United States, the faculty of the University of Nebraska College of Pharmacy is reforming its Doctor of Pharmacy curriculum to emphasize educational outcomes using a student-centered, active learning environment. Critical to the success of this initiative is the development of effective methods to assess educational outcomes. Because of the lack of useful assessment-based health professions literature (including pharmacy), the College's EOC on January 6, 1998 sent a letter (survey) to the

dean of each college/school of pharmacy (COP) in the United States. The purpose of the survey was to gather data from each college/school regarding any tools developed "to assess or measure student abilities and competencies."

Response Rate. The initial mailing resulted in a 30.8 percent response rate (24 of 78 schools). A second letter and third mailing was sent to non-respondents that increased the response rate to 64.0 percent (50 of 78 schools). Several deans, or their representatives (associate dean of professional curriculum or chair of a curriculum assessment committee), responded in writing, by telephone or both.

Results. Responses to the survey were categorized into five primary areas: (*i*) assessment center approach; (*ii*) objective structured clinical examination (OSCE); (*iii*) educational outcomes assessment surveys; (*iv*) clerkship outcomes assessment; and (*v*) combination assessment approach.

Assessment Center Approach. The assessment center model applies a standardized procedure in which multiple assessment techniques (*i.e.,* situational exercises and job simulations) are used to evaluate employee performance. In pharmacy education, Purkerson and Mason at Purdue University described a project focused on the assessment of four ability-based educational outcomes including group interaction, problem solving, written communication skills, and interpersonal communication skills. Results of this project showed that students did well in the exercises and believed their participation in the project was beneficial(5).

Objective Structured Clinical Examination (OSCE). The second category is the OSCE or "standardized patient" and has been used at the University of British Columbia by Fielding and co-workers(6) to assess pharmacists' continuing competence. Fielding's OSCE assessment consisting of 20 stations involved an average time of 2.5 hours per pharmacist. Monaghan and co-workers(7) assessed pharmacy student performance using this model as a clinical skills evaluation method. Monaghan believes that using the standardized patient may be the most comprehensive means of evaluating clinical skills in third and fourth professional years(7).

Educational Outcomes Assessment Surveys. A third category is a survey by students to assess their program's educational outcomes that were used by many schools either alone or in combination with other methods. Feldman, from the University of Georgia, sent a booklet titled, "Assessment of Teaching and Learning: Documentation and Strategies," that contains findings from three surveys administered to the first year (n=54 items), second year (n=119 items), and third year (n=166 items) professional students(8). A listing of instructional objectives for each year of the pharmacy curriculum was compiled and rated by the students. Upon completion of each year of the program, the survey asked the respondent whether they were "taught" and "can perform" each listed objective(8).

Clerkship Outcomes Assessment. A fourth category used by the University of Wisconsin was described by May and co-workers as an ability-based assessment program to facilitate the transition of physical therapy students from classroom to clinic(9). This program model was initially developed at Alverno College in Milwaukee, Wisconsin during the 1970s(10). Students rated their own levels of competency in each generic ability before and after their 18-week clinical internship. Instructors in their final clinical rotation also rated the student in each ability(9). Rodriguez[1] at the University of

Minnesota developed a similar approach in which the clerkship students self-assess their level of competency in sixteen general course competencies at the beginning of each clerkship rotation. Each preceptor examines the students' portfolio on the first rotation day to see what areas are in need of improvement, and from this determines focus areas.

Combination Assessment Approach. The fifth category is a combination of several different approaches. Davis[2] at the University of Texas provided a copy of their 1997 Accreditation Self-Study Section on Evaluation via Outcomes that included: (*i*) NAPLEX results over a ten-year period; (*ii*) evaluation of degree outcomes using an alumni survey; (*iii*) retention rates of pharmacy graduates in rural area; (*iv*) internship performance evaluation by preceptors; and (*v*) students' evaluation of preceptors during internships.

Summary and Discussion of Phase 1. While considerable work has been done in defining educational outcomes in colleges/schools of pharmacy throughout the United States, education outcomes assessment still has a long way to go. Responses generally showed that most of the colleges/schools are in the beginning stages of the educational outcomes assessment, and therefore, had very little quantitative information to share. At the time of this assessment (1998), program respondents were most commonly employing the survey approach to assess educational outcomes, followed by the combination assessment approach, clerkship outcomes assessment, assessment center approach and the OSCE.

A limitation of the UNCP survey is that it provides only qualitative results. In 2000, Bouldin and Wilkin published the survey results of programmatic assessment in U.S. schools and colleges of pharmacy(11). They reported that 71 percent of respondent schools had approved a list of general education abilities and the most frequently cited instrument for programmatic assessment was the NAPLEX. While the present survey provided insight into the scope of programmatic assessment, future research should address quantifiable assessment methods and approaches.

Phase 2 describes the UNCP EOC's plan and how pertinent components from Phase 1 were integrated into the educational outcomes assessment program. Some of the components were used because of philosophical agreement and ease of use (*i.e.,* assessment surveys, clerkship outcomes assessment). Others were not used due to resource requirements (*i.e.,* assessment center approach), and some are currently being considered (*i.e.,* OSCE).

PHASE 2. REFORMED PHARMD CURRICULUM AND ASSESSMENT METHODS

Systematic review of curriculum structure, content, and outcomes is managed by the Curriculum Committee (CC), in conjunction with the EOC and the Educational Reform Steering Committee (ERSC). The CC is responsible for content and assessment affecting the professional educational programs of the College, and ultimately, all actions by the CC must be approved by the Faculty. The CC is also responsible for reviewing course and programmatic assessment data to insure that expected abilities and competencies are being met in each year of the Program.

The EOC is responsible for matters related to instructional assessment techniques and assessment of educational outcomes of the professional program. Currently, the EOC is developing instruments and procedures for assessment of programmatic outcomes and methods for annual performance-

---

[1]*Personal communication:* Dr. Raquel Rodriguez, Assistant Director for Experimental Education, University of Minnesota, July 27, 1998.

[2]*Personal communication:* Dr. Patricia Davis, Associate Dean, University of Texas, March 22, 1998.

Table I. Communication ability (*e.g.,* mapping courses)

Communication ability	N P-1	P-2	P-3	Total[a]	Mean[b] P-1 n=67	P-2 n=62	P-3 n=62	P-1 to P-3 change[c]
A1. Write, speak and use data, media and computer technology accurately and clearly during communications with peers and teachers, patients, and other health care practitioners.	4	7	4	18	3.36	3.95	4.10	0.74
A2. Interpret ideas, thoughts, and feelings communicated through reading, listening, aesthetic forms of communication, data, media, and computer technology.	9	7	3	19	3.42	3.87	4.10	0.68
A3. Identify personal strengths, weaknesses, barriers, and preferences in all modes of communication.	8	3	3	14	3.52	3.98	4.07	0.55
B1. Use writing, speaking, data and media creatively to convey convincing messages.	8	7	4	19	3.30	3.71	4.00	0.70
C1. Choose communication methods that are appropriate for the purpose of the interaction.	9	7	3	19	3.48	3.95	4.16	0.68
C4. Interpret ideas, thoughts, and feelings with sensitivity to the cultural background of the sender.	8	5	3	16	3.42	3.57	3.92	0.50
Total (mean)	46 (7.7)	36 (6)	20 (3.3)	105 (17.5)				

[a]Mapping procedure sums the number of courses in which a particular programmatic ability was cited in the First, Second or Third Year Student Self-Assessment Survey conducted in 2001.
[b]Student self-assessment survey response scale: 1, for poor preparation to 5, for excellent preparation.
[c]Improvement from P-1 year (mean) to the P-3 year (mean).

based assessment of students' knowledge, skills and attitudes. This information is then provided to the CC to manage and continuously improve the curriculum.

The ERSC was formed in 1996 to develop the plan to initiate, guide and monitor the educational reform process. The ERSC is chaired by the Dean and includes five faculty members, including the Associate Dean for Academic Affairs. The current curricular structure and course content originated through faculty/student work groups and were reviewed and approved by the ERSC prior to forwarding to the CC for approval. Once the four-year curriculum is fully implemented, the work of the ERSC will be completed and the responsibilities for monitoring the professional curriculum will be assigned to the CC.

Reformed PharmD Curriculum. Structure of the reformed curriculum is given in Appendix A. Each course syllabus contains pertinent abilities and competencies from the Professional Program Curriculum Abilities and Competencies Guide (Appendix B). Both the Early Practice Experience (EPE) Program and the Advanced Experiential Program (AEP) are currently being phased-in and were developed based on expected curricular programmatic ability and competency outcomes. The purpose of the EPE Program is to expose students early in their education to the fundamentals of pharmacy practice in order to develop the attitudes, skills, and competencies needed for the AEP program and their professional pharmacy careers. Required activities throughout the first three years include aseptic technique training, "preceptor shadowing" experiences in community and institutional pharmacy, EPE clerkships in community pharmacy, institutional pharmacy and drug information, and experience-related tasks addressing professional responsibilities. The AEP is a series of ten, 40 hours/week clinical clerkships taken in the P-4 year that

emphasize pharmaceutical care. Accordingly, the core curriculum is designed to address the programmatic abilities and competencies in a longitudinal manner. Thus, the curriculum core and the practice areas are in concert with each other.

The Professional Program Curriculum Abilities and Competencies Guide (Appendix B) was adapted from Background Paper II that listed major entry-level functions/activities that comprise pharmaceutical care at the entry level together with recommendations for competencies necessary to perform pharmaceutical care(3). The CAPE Advisory Panel on Educational Outcomes Report(12) was used to develop the general education abilities. Both the Background Paper II and the CAPE Report were used to develop the initial list of general abilities categorized into abilities (knowledge and attitude based) and competencies (skills). Workgroups of faculty members wrote specific category items within their areas of expertise and scope of practice that were reviewed by the CC, and then discussed and prioritized by the ERSC. The list was circulated to the faculty for their input and then refined. The final list was approved by the faculty. Faculty generally found the development and approval of the specific abilities and competencies a long and a difficult process. While the Guide (final listing) has been approved, a Continuous Quality Improvement (CQI) process is being used by the CC and the EOC (Appendix C) to further refine the abilities and competencies.

Assessment Methods Using the Curriculum Mapping Procedure. Annually, students complete a Self-Assessment Survey that lists the abilities and competencies that were documented in course syllabi to be addressed throughout the year. Assessment items were selected through a curriculum mapping procedure that counts the number of courses where a specific programmatic ability or competency is indicated in the course syllabus. The Student Self-Assessment Survey was administered

Table II. Pharmaceutical care competency (*e.g.,* mapping courses)

Pharmaceutical care competency	N P-1	N P-2	N P-3	Total[a]	Mean[b] P-1 n=67	Mean[b] P-2 n=62	Mean[b] P-3 n=62	P-1 to P-3 change[c]
A2. Provide pharmaceutical care in a professional manner	3	3	0	6	2.36	3.52	4.07	1.71
A2a. Dress and speak in ways that convey a professional image	4	2	0	6	3.57	4.25	4.34	0.77
A2b. Maintain a personal self-control and professional decorum	4	2	0	6	3.63	4.16	4.31	0.68
B1. Collaborate with patients/or their care givers, physicians and/or other professionals.	4	3	2	9	2.21	3.23	3.76	1.55
B2. Collect accurate and comprehensive baseline information to create a patient-specific information base.	4	4	3	11	2.52	3.53	3.86	1.34
B3. Use basic knowledge to formulate patient care plans and respond to patient requests.	4	4	3	11	2.28	3.36	3.82	1.54
B3a. Understanding the pathogenesis, natural history and etiology, pathophysiology, epidemiology, risk factors, signs and symptoms, and clinical course of specific diseases	4	1	4	9	1.81	3.10	3.68	1.87
C3. Evaluate laboratory test results and pharmacokinetic data	4	4	3	11	1.64	3.31	3.68	2.04
Total (mean)	31 (3.9)	23 (2.9)	15 (1.9)	69 (8.6)				

[a]Mapping procedure sums the number of courses in which a particular programmatic competency was cited in the First, Second or Third Year Student Self-Assessment Survey conducted in 2001.

[b]Student self-assessment survey response scale: 1, for poor preparation to 5, for excellent preparation.

[c]Improvement from P-1 year (mean) to the P-3 year (mean).

to the P-1, P-2 and P-3 classes at the end of the 2000-2001 academic year. If a programmatic ability is addressed in three more courses in the first pharmacy professional (P-1) year, it becomes an assessment item for each of the class surveys. The decision to use three or more courses as the criteria for inclusion in the class survey was to limit the number of assessment survey items, and that the survey should delineate ability items that were emphasized in at least three courses in that academic year.

Table I lists the number of identified "Communication Ability" domain items that were addressed in the P-1 year and the number of times this item was also listed in course syllabi in the P-2 and P-3 years. The average (mean) scores for each year in the program are also listed. For each item on the Student Self-Assessment Survey, each student was requested to rate each ability on a Likert response scale from 1 (poor) to 5 (excellent). For these abilities, the P-1 students mean scores ranged from 3.30 to 3.52, suggesting an "average to good" preparation. For each succeeding year of the professional program, mean scores improved and ultimately ranged from 3.92 to 4.16 by the end of the P-3 year, equivalent to a "good" preparation level.

Table II lists the identified competency items under the "Pharmaceutical Care Competency" domain. If a programmatic competency is addressed in three or more courses in the first pharmacy professional (P-1) year, it becomes an assessment item. Similar to the abilities items on the Student Self-Assessment Survey, each student rated the competency on a Likert response scale from 1 (poor) to 5 (excellent). For these items, the P-1 student mean scores ranged from 1.64 to 3.63,

suggesting a "poor" preparation in these areas. For each succeeding year of the professional program, the mean scores improved and by the end of the P-3 year ranged from 3.68 to 4.34 level, which is a "good" preparation level. Although not exhaustive, Table II provides some items that are included in the pharmaceutical care domain. Some of the items are "appearance" statements (A2a and A2b) instead of pharmaceutical care items. One problem is the "double-barreled" nature of some items (B1, B3a in Table II), where the student is requested to respond to more than one component. This problem suggests a need to refine those items.

Currently, the CC and EOC are using the mapping process for CQI. The mapping process is being used to identify abilities and competency areas that are not being met by the new curriculum, need refinement and/or require further development. Once identified, the curriculum can be modified to address these deficiencies. While considerable time and effort went into the design of the curriculum, the mapping process will need refinement. The feedback loop is a major element of the CQI process, and the EOC and CC are using it to refine the list of abilities and competencies. One CQI example is the refinement of the competency items such as the "double-barreled" nature of some pharmaceutical care items.

Course and Instructor Assessment Methods. Students evaluate faculty members who teach three or more lectures in a course using an Instructor Evaluation Form. Students also evaluate each course using a Course Evaluation Form. Instructors are encouraged to use a Fast Feedback Form as a means of addressing learning and instructional issues on a formative basis. The Fast Feedback Form is optional and instructors

are free to use other mechanisms such as student focus groups to accomplish the same purpose. The College also provides an Examination Evaluation Form so that instructors can receive feedback on their examinations. In addition to student self-assessments, faculty members are required to submit annual self-assessments for each of their courses, which is a general assessment concerning the management of the course and any proposed changes in delivery and/or content.

Course and instructor evaluations are required assessments administered at the end of each semester. While a considerable amount of time is spent collecting all this information, its use is crucial to develop and maintain the curriculum. Once tabulated, copies are sent to the instructor and to the Departmental Chair. At the UNCP, teaching evaluations are tied to merit salary increases, so teaching evaluations are reviewed at the faculty members' annual performance reviews. During the reviews, positive and negative aspects of the evaluation summaries are reviewed, and goals to improve teaching performance are recommended.

2000 AACP Assessment Institute Impact. The authors attended the "2000 AACP Institute: A Guide to Program Assessment: Developing a Plan"(13). Informational sessions and feedback at the AACP Institute combined with meetings before and during the Institute lead to the development of an Educational Assessment Plan (Appendix C). The EOC is in the process of implementing the Plan. For example, the EOC is developing performance-based assessments for the first three years of the curriculum and for the clerkship curriculum. The Early Practice Experience Program is a new component of the curriculum, and the Advanced Experiential Program (clerkship) has been substantially revised, necessitating the need to develop assessment instruments to effectively measure the students' progression from basic to intermediate to advanced ability and competency levels. The EOC is also addressing methods of assessing recent graduates regarding their preparation for practice, and assessments to be completed by employers, residency directors, etc., regarding the preparation of UNCP graduates for practice.

The EOC will be using the Astin Model of assessment, the input-environment-outcome (I-E-O) model in the development of the educational outcomes assessment process(14,15). Input variables will be personal qualities that each student brings to the program at admission and reflects the characteristics or talent level at baseline. Environmental variables will be experiences the students receive during the educational program. This is the educational process that each student goes through, and what the educator controls and manipulates to develop the students' abilities and competencies to achieve the stated outcomes. Outcome variables will be the abilities and competencies that are desired in the students as products of the environment/educational program. Some outcomes to be measured are graduation rate, board examination scores and passing rate, alumni satisfaction survey results, and quality of job offerings. The I-E-O model has been adapted to show components of the Plan (Appendix D).

SUMMARY

Through the educational reform process, the University of Nebraska professional pharmacy curriculum has become outcomes-based with appropriate assessment measures in place and/or under development. The shift toward a student-centered curriculum, with students having more responsibility for learning, is a work in progress. The complete change from the traditional teaching and learning processes will require nurturing and additional time to develop and implement.

Faculty and student assessments that have been discussed address the teaching and learning processes. The faculty use feedback obtained from the curriculum mapping process to improve instruction and student learning. As part of the CQI process, instruments are reviewed and amended by the EOC. Additional instruments to assess educational outcomes are currently being developed by the EOC.

Assessment of a professional pharmacy curriculum **is** a continuous activity that all colleges and schools of pharmacy must address. The process reported herein describes the process used at the UNCP and may be of assistance to those colleges/schools that are developing or reforming their professional curriculum.

References
(1) Chalmers, R.K., Grotpeter, J.J., Hollenbeck, R.G., Nickman, N.A., Wincor, M.C., Loacker, G. and Meyer, S.M., "Ability-based outcomes goals for the professional curriculum: A Report of the Focus Group on Liberalization of the Professional Curriculum," *Am. J. Pharm. Educ.,* **56,** 304-309(1992).
(2) Chalmers, R.K., Grotpeter, J.J., Hollenbeck, R.G., Nickman, N.A., Somni, R.W., Zlatic, T.D., Loacker, G. and Meyer, S.M., "Changing to an outcome-based assessment-guided curriculum: A Report of the Focus Group on Liberalization of the Professional Curriculum," *ibid.,* **58,** 108-115(1994).
(3) Commission to Implement Change in Pharmaceutical Education, "Background Paper II. Entry-level curricular outcomes: Curricular content and educational process, *ibid.,* **57,** 377-385(1993).
(4) Stark, J.S. and Lowther, M.A., "Strengthening the ties that bind: Integrating undergraduate liberal and professional study," Board of the Professional Preparation Network, The University of Michigan, Ann Arbor, Michigan (1988).
(5) Purkerson, D.L., Mason, H.L., Chalmers, R.K., Popovich, N.G. and Scott, S.A., "Evaluating pharmacy students's ability-based educational outcomes using an assessment center approach," *Am. J. Pharm. Educ.,* **60,** 239-248(1996).
(6) Fielding, D.W., Page, G.G., Rodgers, W.D., O'Byrne, C.C., Schulcer, M., Moody, K.G. and Dyer, S., "Application of objective structured clinical examinations in assessment of pharmacists continuing competence," *ibid., **61,** 117-124(1997).
(7) Monaghan, M.S., Vanderbush, R.E., Gardner, S.F., Schneider, E.F., Grady, A.R. and McKay, A.B., "Standardized patients: An ability-based outcomes assessment for the evaluation of clinical skills in traditional and nontraditional education," *ibid.,* **61,** 337-344(1997).
(8) Feldman. S., "The University of Georgia College of Pharmacy Report. Assessment of Teaching and Learning: Documentation and Strategies," Athens GA (Fall 1998).
(9) May, W.W., Morgan, B.J., Lemke, J.C., Karst, G.M. and Stone, H.L., "Model for ability-based assessment in physical therapy education," *J. Physical Ther. Educ.,* **9,** 3-6(1995).
(10) Alverno College Faculty, "Assessment at Alverno College," Milwaukee WI (1979).
(11) Bouldin, A.S. and Wilkin, N.E., "Programmatic assessment in U.S. schools and colleges of pharmacy: A snapshot," *Am. J. Pharm. Educ.,* **64,** 380-387(2000).
(12) Center for the Advancement of Pharmaceutical Education Advisory Panel, "Educational Outcomes," AACP, Alexandria VA (1994).
(13) 2000 AACP Institute, " A Guide to Program Assessment: Developing a Plan," AACP, Leesburg VA, (May 19-23, 2000).
(14) Chase, P., "A Case Study in Developing a Program Assessment Plan," *2000 AACP Institute: A Guide to Program Assessment: Developing a Plan,* Leesburg, Virginia, (May 19-23, 2000).
(15) Astin, A., *Assessment for Excellence,* Orynx Press, Phoenix AZ (1991).

APPENDIX A. 2000-2001 COURSE OF STUDY

UNMC COLLEGE OF PHARMACY
PHARMD PROGRAM (approved 8-16-2000)

FIRST YEAR (P1) Class of 2004
1st Semester (18 credits)

BIOC 512	Basic Biochemistry	3
CBA 552	Human Anatomy	5
PHYS 306	Physiology	6
PHSC 550	Introduction to Pharmacy	3
PHPR 554	Professional Development	1

2nd Semester (18 credits)

BIOC 514	Applied Biochemistry	2
PAMM 509	Immunology	2
PAMM 550	Microbiology	3
MTEC 552	Microbiology Lab	1
PHPR 552	Pharmaceutical Care Lect/Lab	2
PHPR 560	Pharmacy and Health Care	3
PHSC 570	Pharmaceutical Sciences I Lect/Lab	5

SECOND YEAR (P-2) Class of 2003
3rd Semester (19 credits)

PAMM 690	Biology of Disease	5
PHAR 680	Pharmacology I	5
PHSC 626	Medicinal Chemistry I	3
PHSC 670	Pharmaceutical Sciences II	3
General Electives		3

4th Semester (19 credits)

PHAR 682	Pharmacology II	4
PHPR 684	Pharmacotherapy I	9
PHSC 628	Medicinal Chemistry II	3
PHSC 672	Pharmaceutical Sciences III	3

THIRD YEAR (P-3) Class of 2002
5th Semester (19 credits)

PHPR 662	Pharmacy Practice Management	3
PHPR 660	Legal and Ethical Principles	4
PHPR 686	Pharmacotherapy II	9
Professional Electives		3

6th Semester (19 credits)

PHPR 622	Drug Literature Evaluation and Research Methods	3
PHPR 688	Pharmacotherapy III	9
Professional Electives		7

FOURTH YEAR (P-4) Class of 2001
40 Weeks of Required and Selective Clerkships = 40 Sem Hours

General Elective Hours	10
Professional Elective Hours	10
Total Elective Hours	20

Clock Hours of Practice Experience:

Early Practice Experience	160
Advanced Practice Experience	1600
Total Required Clock Hours	1760

Requirements for Graduation:

First Three Years	112
Senior Clerkships	40
Pre-Pharmacy	60
Total Semester Hours	212

APPENDIX B. PROFESSIONAL COMPETENCIES AND ABILITIES (ABBREVIATED LIST)

The general abilities and professional competencies that guide curriculum development are given below and are shown in detail. The specific abilities and competencies that are addressed in each course are provided in the individual course syllabi.

General Abilities

I. Thinking Abilities:
The student shall find, understand, analyze, evaluate and synthesize information, and shall make informed, rational, responsible and ethical decisions.

II. Communication Abilities:
The student shall read, write, speak, listen and use data, media and computer technology to effectively send and respond to communications for varied audiences and purposes. The student shall use each of these forms of communication to improve their understanding of what they are responsible for learning. Development and enhancement of communication skills must be integrated throughout the curriculum.

III. Responsible Use of Values and Ethical Principles:
The student shall recognize different value systems while holding strongly to his/her own ethical principles. The student shall recognize the moral dimensions of his/her decisions and accept responsibility for the consequences of his/her actions.

IV. Social Awareness and Social Responsibility:
The student shall demonstrate a basic understanding of the strengths and problems of cultural diversity and explain how social, cultural, historical, economic, political and/or scientific issues impact upon a health care situation.

V. Self-Learning Abilities and Habits:
The student shall effectively self-assess and satisfy learning needs on an ongoing basis.

VI. Social Interaction and Citizenship:
The student shall demonstrate effective interpersonal and inter-group behaviors in a variety of situations; will elicit the views of others and seek appropriate conclusions; know how to get things done in committees, team projects and other group efforts; develop leadership abilities; display an empathetic, caring approach in personal interactions.

VII. Accepts personal responsibility and accountability for one's actions.

VIII. Acts in a manner displaying self-confidence.

Professional Competencies

I. Provide Pharmaceutical Care to Individual Patients:
Conduct direct patient-care activities using a consistent approach that reflects the philosophy of pharmaceutical care. These activities must be performed at a level of quality that optimizes patient health and well-being.

II. Participate in and Manage Medication Distribution and Control Systems:

Function effectively in medication distribution and control systems. Identify and use expert resources needed to develop, implement or improve medication distribution and control systems.
III. Manage the Pharmacy:
Practice pharmacy management using principles and skills that are needed to function effectively in a competitive, rapidly changing health care and business environment.
IV. Manage Medication Use Systems:
Participate in management of medication use systems using both individual patient and population-based approaches to practice.
V. Promote Public Health:
Conduct pharmaceutical care activities that promote public awareness and understanding of health and disease prevention.
VI. Provide Drug Information:
Efficiently and effectively respond to drug information requests from patients and health care practitioners.
VII. Outcomes Management:
Use individual patient and population-based outcome data to make optimal decisions in the design and development of drug therapy protocols and guidelines, and for individual patient drug therapy management.
VIII. Provide Education on Pharmacy and Health-related Topics:
Develop oral and written educational materials, and present pharmacy and health-related topics to patients, health-care providers, and the general public.

APPENDIX C. PROFESSIONAL PROGRAM OUTCOMES ASSESSMENT 2000-01 COMMITTEE'S PLAN

I. Review and revise Professional Program Abilities and Competencies Guide
II. Programmatic Curriculum Outcomes Assessment
   A. Assessments
   - Definitions (*e.g.,* longitudinal, performance-based, etc.)
   - Performance-based – first three years of the curriculum
   - Performance-based – experiential/clerkship curriculum
   - Early Practice Experience and Advanced Experiential

Programs (with a progression from basic to intermediate to advanced ability and competency levels)
   - Plan Design (Miller's Taxonomy – "Knows, knows how, shows how, does")
   B. Methods
   - Astin I-E-O Model
   - Identify who will be surveyed (e.g., pharmacy associations, alumni, residency/fellowship directors, employers, industry)
   - Mechanisms
     - Types of survey instruments (mail, telephone, internet)
     - Types of performance-based assessments
       - Milestone examinations
       - OSCE
       - Capstone courses
   - Timelines
   - Survey design and validation
     - Student performance assessment
       - Faculty Assessment
       - Self-Assessment
       - Peer Assessment
     - Faculty performance assessment
       - Self-Assessment
       - Student Assessment
       - Peer Assessment
   - Program outcomes assessment
   - Develop assessment databases (*e.g.,* longitudinal)
   - Identify process(es) to address remediation
III. Benchmarking
   A. Definition
   B. Identify and establish curriculum standards
   - NAPLEX (including link to competencies)
   - BPS Certification
   - DSM Certificates
   - Peer program comparisons
IV. Continuous Quality Improvement
   A. Develop the Program
   - Student learning and performance
   - Curriculum
   B. Communication plan/strategies
   C. Implement Program

APPENDIX D. ASTIN'S (IEO) MODEL OF UMCP ASSESSMENT PLAN

INPUTS
Grade Point Average
Prerequisites
Preparation (*e.g.,* educational background characteristics)
Interview
    Verbal and written communication abilities

ENVIRONMENT
Orientation
Professional abilities and competencies
    Student assessment

Curriculum sequence/instructional methods
    Required courses
    Elective courses
    Early Practice Experience
    Advanced Experiential Program
Student professional organizations

Misc.: financial aid, employment status,
marital status, extracurricular activities, etc.

SOURCE(S) OF DATA
Admissions Committee
Admissions Committee
Admissions Committee

Admissions Committee

SOURCE(S) OF DATA
Academic Affairs Office
Curriculum Committee
    Student self-assessment surveys
    Faculty advisor assessment form
    Preceptor assessment form
Curriculum Committee
    Course evaluation form
    Instructor evaluation form
    Fast feedback student form-lecture/course section
    Examination assessment form
Dean's Student Advisory Committee/faculty advisors/memberships/
    community service/awards/reputation
    Academic Affairs Office/faculty advisors

OUTCOMES	SOURCE(S) OF DATA
Progression (Learning assurance, remediation, etc.)	Academic Performance and Standards Committee
Achievement of College Outcomes	Board passing rates Grading Standards Faculty Advisors Preceptor evaluations Annual student performance assessment Benchmarks
Quality of educational program	Student self-assessment surveys Dean's Student Advisory Committee Alumni/preceptor/employer surveys
Reputation of College (compared to Peer Institutions)	Board passing rates Number of students completing residencies, fellowships, graduate school, specialty certification Number of students entering practice and quality of job offerings

---