

# Maryland's Nontraditional Pathway to the Doctor of Pharmacy Degree: Development and Improvement

Mary Lynn McPherson, Robert A. Kerr, Donald O. Fedder, R. Gary Hollenbeck and David A. Knapp

*School of Pharmacy, University of Maryland, 20 N. Pine Street, Baltimore MD 21201-1180*

The University of Maryland School of Pharmacy faculty decided in 1989 to move to the Doctor of Pharmacy as the entry-level degree, admitting the first class of PharmD-only students in the Fall of 1993. Concomitantly, a non-traditional (NTPD) pathway was established to permit practitioners the opportunity to earn the PharmD degree. This article summarizes the NTPD Pathway as it was originally designed, including the underlying premises. The Curriculum Committee has recently completed a formal evaluation of the NTPD Pathway, and made recommendations for improvement to more closely meet the terminal performance objectives of the PharmD degree, and to better meet the needs of the students enrolled, including: eliminate practice-specific versions of courses, institute a readiness assessment course designed to optimize students' success in the pathway, more fully develop the therapeutics sequence of courses, institute a Principles of Pharmaceutical Sciences course, and create elective opportunities within the pathway.

## INTRODUCTION

As the concept of pharmaceutical care was introduced and developed and it was evident that pharmacy education must change, the University of Maryland School of Pharmacy faculty voted in 1989 to consolidate the School's BS in pharmacy program with its post-baccalaureate Doctor of Pharmacy program. The new program was developed in the early '90's, and the first class of PharmD-only students was admitted in the Fall of 1993. The new program was not without controversy for many reasons such as increased length of the entry-level program (from three years to four), increased tuition (although previous levels were very low at this state institution), and continued ability to meet the demand for newly educated pharmacists. Pharmacists in Maryland were naturally concerned that new graduates would emerge with a different set of knowledge, skills and abilities than those from the baccalaureate program, and would also have a new degree.

Responding to these concerns, a joint committee of faculty and practitioners was formed to study the issues. Since requirements for the two degrees were different, grandfathering alumni with baccalaureate degrees or exchanging baccalaureate degrees for Doctor of Pharmacy degrees were not options. This committee felt that pharmacists wanted to learn more about pharmaceutical care, and to obtain the academic credentials that they perceived would be beneficial. The problem was that very few were in a position to stop working for a year or two to go back to school to earn the degree, nor would the School be able to accommodate a large influx of full-time day students wishing to study for a year to obtain a doctorate as an add-on degree.

The joint committee proposed the development of a non-traditional pathway to the Doctor of Pharmacy degree that would require that students meet the same terminal performance objectives as those established for the four year PharmD

degree (see Appendix). The goal of the program was to enhance the ability of pharmacists to provide pharmaceutical care within their current practice setting. The nontraditional pathway proposal was based on a set of guiding principles:

1. Pharmacists who are students in the NTPD Pathway would be able to complete degree requirements without taking extended leave from their employment.
2. Students would be allowed, and in fact required, to complete the majority of experiential learning requirements in their own practice setting to better enhance their ability to provide pharmaceutical care in that current practice setting.
3. Admission to the program was contingent upon having completed an accredited baccalaureate program and be actively practicing with access to patients. Applicants were required to obtain documented validation of their ability to interact with patients in their practice setting or an alternate practice setting, as evidenced by their supervisor's signature.
4. An important part of the program would be the assessment of prior learning for which academic credits could be granted.
5. Due to the nontraditional aspects of this pathway, and a dynamically changing practice environment, it was recognized that continuous course and pathway assessment would be essential.

The first course offered in the nontraditional pathway, Principles of Pharmaceutical Care, was taught in the Spring of 1992, a year before the new PharmD program was implemented. The course was available for continuing education credits, but students could also choose to enroll as "special students" earning credits that could eventually be petitioned to transfer into the nontraditional pathway once the Doctor of Pharmacy

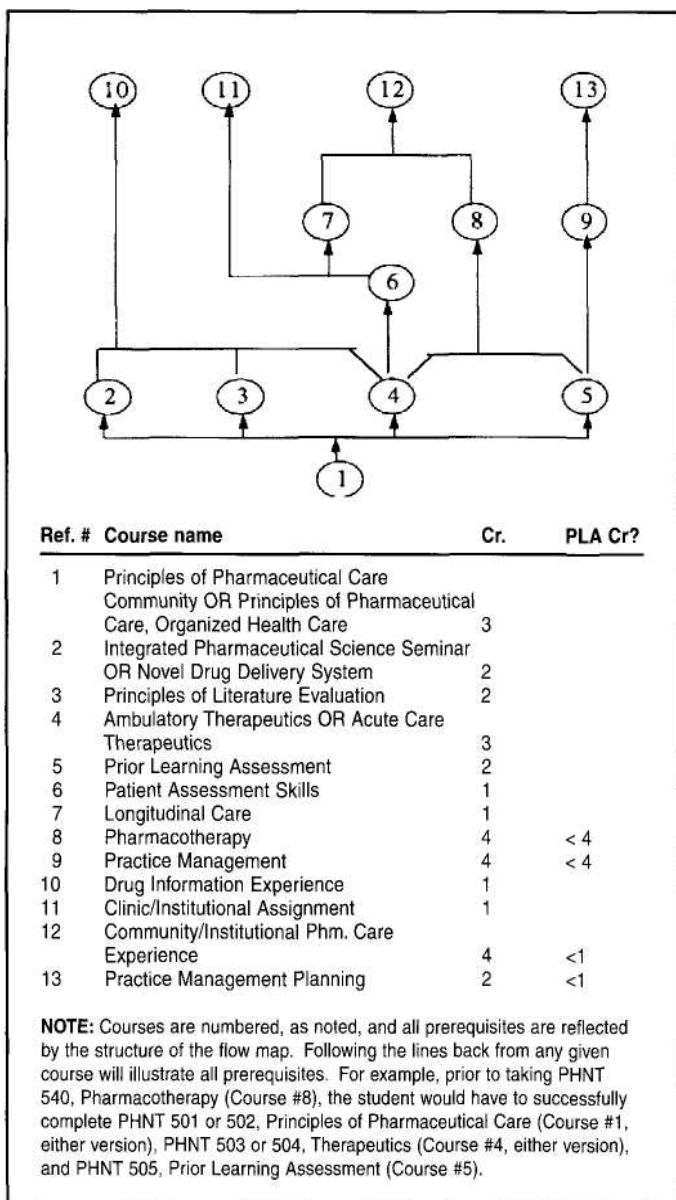


Fig. 1. Original program design.

program began. Fifteen students took the initial offering of the course, anticipating that the Doctor of Pharmacy degree program would eventually be in place, and that their academic credit could be transferred.

#### ORIGINAL PATHWAY

The nontraditional Doctor of Pharmacy (NTPD) Pathway was officially approved by the faculty in January 1994. The program of study consisted of a minimum of 30 academic credits, as required by the University of Maryland, of which up to 10 could be achieved through Prior Learning Assessment (PLA). A requirement of 30 credits was also consistent with completion of a two year Master's degree, and the additional year of study in the PharmD program. Of the 30 credits, 20 were required didactic course work, and the remaining 10 were required experiential learning. If a student chose to take an elective course or rotation, it was in addition to the required 30 credits. Admission was limited to graduates of BS Pharmacy

programs, accredited by ACPE. Candidates were required to be licensed and practicing in Maryland, the District of Columbia or an adjacent state to be able to access both courses and the program's mentoring system. Candidates were also required to document access to patients, to assure they could complete programmatic requirements. Through the Fall of 1994, pharmacists who met these criteria and expressed interest were admitted to the program. As knowledge of this program became widespread, the number of applicants continued to grow. Faculty established a maximum entering class size of 60 students; 30 community candidates, and 30 hospital/organized health care practitioner candidates (the maximum number of students we could accommodate given our resources and concomitant launching of the entry-level PharmD program). Up to 30 applicants were selected for admission based on their affiliation with the School as a preceptor, as part of the School's ongoing commitment to preceptor development. However, due to the large number of applicants, and the diversity of the applicant pool, a lottery was tried in order to ration admission for the remaining 30 positions, with the expectation that all qualified applicants would eventually be accepted. The lottery approach met with unanimous disfavor, was quickly discontinued and was replaced by a more traditional criteria-based admissions process (evaluation of previous academic performance, interview, and evaluation of communication skills).

The original nontraditional pathway is shown in Figure 1, and major learning outcomes for each course are available from the corresponding author. Consistent with the goal of enhancing the ability of pharmacists to provide pharmaceutical care within their current practice setting, the Principles of Pharmaceutical Care course was offered in two versions, one for community practitioners, and one for practitioners in hospitals and other organized health care settings. Students also registered for either Ambulatory Care Therapeutics, or Acute Care Therapeutics, depending upon their area of practice. The only other required didactic course that was tailored to the student's practice was Pharmacotherapy, in which students were asked to select six therapeutic modules from a menu of 10 for in-depth study. Students were given two choices for fulfilling the pharmaceutical science requirement in the program, taking either Integrated Science Seminar, or Novel Drug Delivery Systems. The goal of these courses was to enable students to apply new scientific knowledge to help solve therapeutic problems and to comprehend new developments in science related to pharmaceutical care.

Students completed all but one experiential rotation in their practice setting. This provided the opportunity for students to enhance their own practice setting by developing their pharmaceutical care skills on their own patient population. In addition, pharmacists were not forced to take time off from their practice to complete experiential rotations.

Each student was assigned a faculty mentor for the experience portion of the pathway who met with the student at least once a month for patient presentations and feedback. Mentors frequently met more often with the students, or remained in contact by phone or electronic mail between meetings. Students were required to complete one external rotation: the Clinic/Institutional Assignment. During this rotation, students developed pharmaceutical care plans, triage and discharge plans, and performed patient counseling during 15 weekly, half-day, faculty-supervised pharmaceutical care sessions. Students selected 11 weeks in an ambulatory clinic or in a hospital; they were assigned to the alternate practice setting

for the remaining four weeks. It was originally thought that students would find this one-credit rotation onerous, since it required time away from their practice. In fact, students frequently asked to extend their time on this rotation.

### EVALUATION OF THE NTPD PATHWAY

While each course was refined and improved by participating faculty based on feedback and course evaluations, the entire pathway was not evaluated until after each course had been taught once. A subcommittee was appointed in the Fall semester, 1996, by the Curriculum Committee to accomplish this pathway evaluation and recommend needed improvements. The Pathway Director was a member of this subcommittee and was charged with obtaining feedback from participating faculty members. Feedback was obtained from the faculty of all non-traditional Doctor of Pharmacy pathway courses, not only by the Pathway Director, but also in group sessions, also attended by the Chairman and Vice Chairman of the Department of Pharmacy Practice and Science. Individual course evaluations completed by students as well as a programmatic evaluation administered to students by the Associate Dean for Academic Programs were also considered. Prior to presentation to the Faculty Assembly, recommended changes were reviewed by the Nontraditional Doctor of Pharmacy Pathway External Advisory Board, composed of graduates and students in the pathway. This process extended over two semesters, with findings and recommendations presented to the faculty for approval and implementation in the Fall 1997 semester.

**Evaluation Results.** Several issues were identified by the NTPD Curriculum Subcommittee. Originally it was assumed that practitioners obtaining the PharmD degree via this pathway would do so to significantly enhance their ability to provide pharmaceutical care in their own practice setting. The program was not designed to encourage changes in practice setting. However, many of the enrollees wanted to obtain the PharmD degree for just this reason. To accomplish this, students in the pathway needed a perspective of pharmaceutical care that was not site-specific (e.g., community or hospital). Also, approximately 15 percent of students did not fit easily into either the community OR the organized health care Principles of Pharmaceutical Care and Therapeutics courses (e.g., pharmacists in home infusion, long term care consulting, or managed care). Additionally, the courses as originally designed did not emphasize population-based pharmaceutical care and managed care.

Along with requests for increased breadth of therapeutics knowledge, students also desired additional material in therapeutics. Some had already enrolled in elective courses over and above degree requirements. Students desired elective courses in their areas of interest that would count toward their degree, and these electives needed to be available conveniently to the adult learner.

Prior Learning Assessment (PLA) had been designed as a required course, where students developed a portfolio of evidence of documented learning, to petition for and receive academic credit. To receive academic credit, the student was required to document learning that corresponded to learning outcomes based on specific aspects of the pathway. After Prior Learning Assessment was taught for several years, it became clear that students were entering the program with less practice experience (i.e., 18.2 years experience in the 1993 class, down

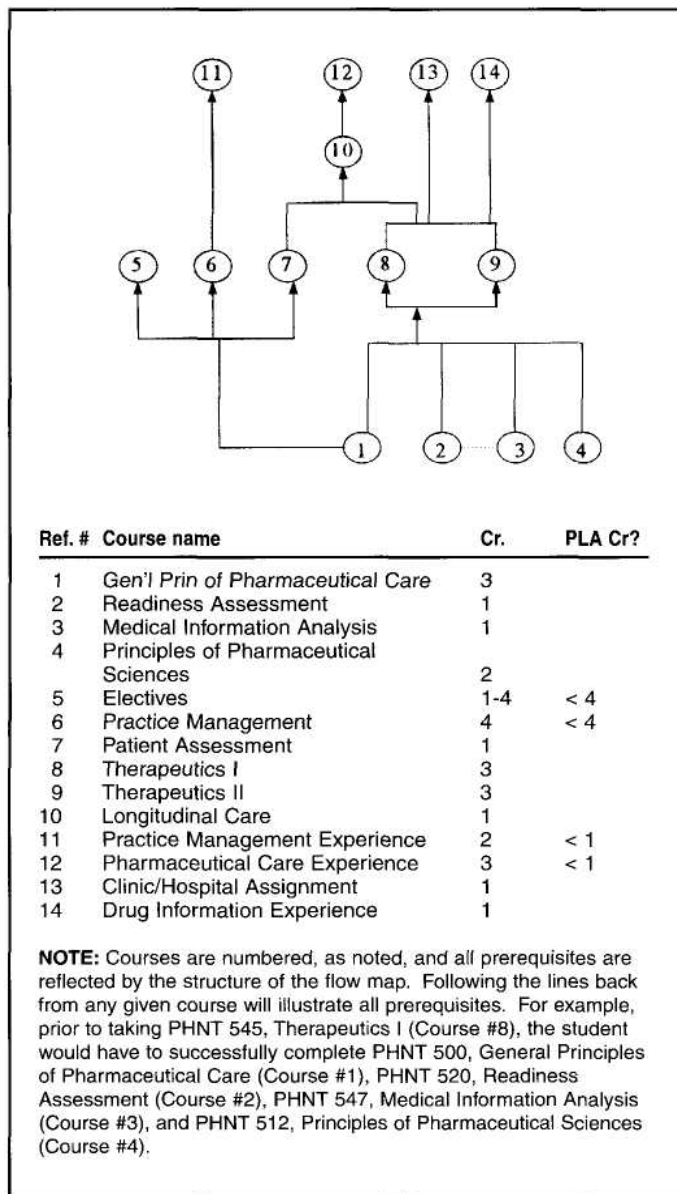


Fig. 2. New program design.

to 10.4 years experience in the 1995 class) and learning in eligible areas, and thus earned fewer credits through the complex PLA process. The student's portfolio was also intended to be used by the mentor as a tool to identify strengths and weaknesses, and assist in guiding experiential learning. But, mentors found that student portfolios added little to regular meetings and discussions. The results of course evaluations indicated that an increasing number of students felt that the PLA course should no longer be a required course (i.e., 58 percent of students in 1993 thought PLA should be an elective; 78 percent shared the same opinion in 1996). Many of those students who thought PLA should be moved to elective status commented that they would prefer to use the time learning new material. The NTPD Curriculum Subcommittee concurred.

A pivotal issue identified by faculty and students alike was the range of knowledge of students entering the program. The didactic and experiential coursework within the nontraditional pathway were designed based on assumptions that entering stu-

dents would possess a similar requisite knowledge base (*e.g.*, anatomy, physiology, pathophysiology and pharmacology). Experience seemed to indicate that not all enrollees possessed this requisite knowledge base because of job specialization, or the explosion of new biomedical information. The faculty perception was that students deficient in baseline knowledge tended to be poor performers in courses such as Principles of Pharmaceutical Care, Therapeutics, and Pharmacotherapy. Thus, attention to readiness for these courses was deemed necessary, and will be systematically assessed in the future.

The programmatic evaluation also discovered that the two-credit Principles of Literature Evaluation course, which originally contained significant emphasis on statistics and study design, had been altered since its inception to more closely resemble the one-credit Medical Information Analysis, taught in the four-year PharmD program.

The last issue raised by the NTPD Curriculum Subcommittee concerned the pharmaceutical sciences courses. While the original intent of the courses was to analyze and evaluate new scientific developments, these courses did not link smoothly with other aspects of the curriculum, nor did they cover similar content, leaving students with a differing preparation in current concepts of pharmaceutical sciences. Therefore changes were in order.

#### RECOMMENDATIONS FOR PATHWAY REVISION

The following recommendations were made by the NTPD Curriculum Subcommittee, and subsequently approved by the faculty for implementation in the Fall 1997 semester.

1. Eliminate the "paths" (*e.g.*, community vs. organized health care) that existed in the Principles of Pharmaceutical Care courses. Offer one introductory course, General Principles of Pharmaceutical Care, which all 60 entering students will take. Units that deal specifically with general principles of pharmaceutical care, and therapeutics, as well as individualized and population-based pharmaceutical care will be covered. The unit on Principles of Drug Information was moved to the Medical Information Analysis course.
2. Similarly, eliminate the two versions of the Therapeutics course, and eliminate the required course Pharmacotherapy. Instead, students will be required to take two, three-credit Therapeutics courses (I and II), and may elect to take four additional credits in Pharmacotherapy (Pharmacotherapy I and Pharmacotherapy II, 2 credits each). This will give each student a broader spectrum of therapeutics, and will allow the student interested in pursuing pharmacotherapy in greater detail to obtain up to 10 credits in this area. Pharmacotherapy I and Pharmacotherapy II are currently offered as electives in the four-year PharmD pathway (fall and spring semesters, respectively), in three sections of 20 students each. We will offer the same elective, with a fourth section in the evening for the students in the nontraditional pathway.
3. To optimize the students' likelihood of success in Therapeutics and Medical Information Analysis, a new one-credit self-study course entitled Readiness Assessment was designed, and will be required for all newly admitted students effective Fall 1997. As part of course requirements, students must complete the 2nd

Module of the Drug Information Clinical Skills Series published by the American Society of Health Systems Pharmacists. Not only is this a requirement of Readiness Assessment, it is a prerequisite to Medical Information Analysis. Second, students must successfully pass two multiple-choice examinations assessing the content areas taught in the therapeutics sequence. For each content area, anatomy, physiology, pathophysiology and pharmacology will be assessed. Students are provided an extensive list of recommended self-study resources, including books, articles, computer programs, and so forth. Students are required to achieve a passing score on the readiness assessment before proceeding in the Therapeutics sequence (I and II are assessed separately). Upon admission to the program, students are immediately eligible to sit for the exam. Both Parts I and II will be offered in August and again in January, before the start of the semester. Students are permitted to repeat either or both parts of the exam if needed.

4. It was determined that the one-credit Medical Information Analysis course was educationally more appropriate, and a recommendation was made to offer this course in lieu of the two-credit Principles of Literature Evaluation. Completion of the Medical Information Analysis course and the prerequisite Drug Information module from ASHP would more closely approximate the terminal performance objectives.
5. The two courses that originally fulfilled the pharmaceutical sciences requirement (Integrated Pharmaceutical Science Seminar and Novel Drug Delivery Systems) will be moved to elective status. In their stead, a new course, Principles of Pharmaceutical Sciences will be required. This course will be a prerequisite for the therapeutics sequence, and will cover principles of science that link to pharmaceutical care problem solving.
6. Through the various changes discussed above, and a reduction in credits assigned to the Pharmaceutical Care rotation, the students will now take four elective credits in the 30-credit pathway. The course Prior Learning Assessment will be moved to elective status. Electives will be offered in the evening to accommodate nontraditional pathway students.
7. The mentoring process, and other courses will remain as originally planned and implemented. The major learning outcomes for new and revised courses are available from the corresponding author.

#### WHAT DOES THE FUTURE HOLD?

Since its inception, 36 pharmacists have earned the Doctor of Pharmacy degree through the nontraditional pathway. As of the Fall 1997 semester, there are approximately 300 pharmacists enrolled in the program. We have offered selected courses by interactive video to pharmacists located several hours from the School of Pharmacy, and plan to continue to develop this nontraditional method of education. There is a group of approximately 15 pharmacists located two hours from the campus, who have been participating in the courses by viewing videotapes of classes held on campus, with the assistance of a trained facilitator. This group of pharmacists perform as well or better aca-

demically than the students on campus. This is an avenue we will continue to explore.

The School of Pharmacy is committed to continual programmatic assessment. While we have not conducted a formal evaluation of these changes yet, anecdotal feedback from both faculty and students are positive. One eventual revision to the nontraditional pathway will be a transition to curricular-based life-long learning that is non-degree related, as fulfillment toward our mission to provide meaningful continuing professional education.

**Acknowledgment.** A program such as the Nontraditional Doctor of Pharmacy Program is accomplished through the work of many individuals. The authors acknowledge the members of the Nontraditional Doctor of Pharmacy Steering Committee, who conceived and developed the pathway, including: Donald O. Fedder, chair, Larry L. Augsburg, David Arrington, Lisa Heber, Crystal King, Kathryn Kucharski, Dorothy Levy, Ralph Quarles, Ken Whittemore, Jr., Beverly Yachmetz, Ilene H. Zuckerman. We also acknowledge those who worked on the Pathway evaluation and revision. Robert A. Kerr, chair, Rebecca Finley, Erkan Hassan, David Mays, Mary Lynn McPherson, Robert Michocki, David Roffman,

*Am. J. Pharm. Educ.*, **63**, 139-144(1999); received 10/26/98, accepted 3/10/99.

## APPENDIX. TERMINAL PERFORMANCE OBJECTIVES - NTPD PATHWAY

### Category I - Pharmaceutical Care Functions

#### Patient Level

- I. Participate in the development of a patient-specific therapeutic plan:
  - A. Assess patients, based on available objective and subjective data, to make appropriate therapeutic decisions. Examples include:
    1. A triage recommendation
    2. An intervention such as an OTC recommendation
    3. A referral to a source for medical care
    4. Obtaining further information necessary to perform any or all of the above options.
  - B. Assist practitioners and patients in establishing therapeutic or diagnostic objectives.
  - C. Determine an appropriate patient-specific therapeutic intervention based on:
    1. The problem addressed
    2. The medication selected
    3. The setting-specific parameters
    4. Concomitant disease states
    5. Concomitant treatment modalities
    6. Barriers to adherence (*e.g.*, knowledge, skills, attitudes, cost, dosage form selection)
  - D. Recommend appropriate drug entities to use in specific patients.
  - E. Define treatment goals for the individual patient.
- II. Select the appropriate dosage form, formulation, administration and/or delivery system of specific drug entities:
  - A. Participate with prescribers and patients in selection process.
  - B. Select the route and method of administration.
  - C. Establish a plan for assessing clinically significant problems, such as:
    1. Drug-drug interactions
    2. Drug-disease interactions

3. Drug-nutrient interactions
  4. Inappropriate duration of therapy
  5. Inappropriate dose or dosing schedule
  6. Barriers to adherence
- III. Determine the dose and dosage schedule:
    - A. Apply pharmacokinetic principles to the determination and recommendation of appropriate doses and dosing schedules for patients.
    - B. Assess concomitant dosage schedules and recommend modifications as needed.
  - IV. Prepare medication, including compounding when appropriate to meet specific patient care needs.
  - V. Dispense drug products to patients:
    - A. Develop and supervise management systems to ensure that adequate supplies of drug products are available to meet patient care needs.
    - B. Ensure that drug products are delivered to patients in a timely, safe and efficient manner.
  - VI. Assess therapeutic objectives and make recommendations to ensure desired outcomes:
    - A. Communicate specific treatment goals to the patient and/or caregiver.
    - B. Develop and implement patient-specific therapeutic monitoring plans.
    - C. Monitor the continuing effectiveness of therapeutic plans.
    - D. Assess the patient for toxic effects of treatment.
    - E. Develop appropriate recommendations to revise the therapeutic plan.
  - VII. Detect and address adverse drug reactions and drug interactions:
    - A. Monitor patients to detect incipient adverse consequences of drug therapy.
      1. Determine preventive measures that identify patient and drug-related variables that place individuals at increased risk for adverse reactions or disease occurrence.
      2. Identify appropriate monitoring for early detection of adverse effects.
      3. Develop recommendations to revise therapeutic plans to reverse or prevent these adverse events.
    - B. Communicate the identified risk to the patient, caregiver and/or health care practitioners as appropriate.
  - VIII. Counsel patients to maximize outcomes:
    - A. Provide patients with specific instructions to follow the therapeutic regimen.
    - B. Assess patients' ability to follow the regimen.
    - C. Obtain patients' agreement to follow instructions.
    - D. Provide patients or their agents with information to understand the importance, nature and scope of the therapeutic plans being implemented. Include both benefit and risk information.
    - E. Provide patient-specific instructions to follow if a problem occurs.
    - F. Implement monitoring plan for compliance.
    - G. Develop systematic follow-up of patients with compliance problems.
  - IX. Access and evaluate medical information received through formal (*e.g.*, scientific literature and seminars) and/or informal (*e.g.*, newspapers, magazines, TV) sources.
    - A. Maintain and update personal knowledge base.
    - B. Communicate relevant information to patients, caregivers and/or health care practitioners in written or oral form.

#### Public Health System Level

- I. Participate in public health promotion/disease prevention programs:
  - A. Implement appropriate public health programs at the practice site.
  - B. Participate in the development and implementation of community-based health promotion/disease prevention programs, including those for specialized populations (*e.g.*, elderly, minority, adolescent, disadvantages).

- C. Collaborate with established community health agencies (e.g., American Heart Association, American Cancer Society, local health departments).
- II. Participate with health professionals in the decision making processes related to therapy:
  - A. Provide educational programs to health professionals regarding drug therapy.
  - B. Participate in pharmacy and therapeutics committee deliberations.
  - C. Participate in and perform drug use evaluations.
- III. Select the drug product source of supply:
  - A. Judge the quality of products and select manufacturers based on appropriate data, such as biopharmaceutics, economic and quality control information.
  - B. Ensure the security of the drug product inventory.
  - C. Ensure that medications are labeled appropriately.

### Category II - Management and Organizational Behavior

Candidates shall demonstrate the ability to assess their practice and market new services determined to be important for the delivery of pharmaceutical care. Content areas include organizational development and behavior, conflict resolution, economic forecasting, cost-benefit analysis and systems management. The ability to measure service value and establish reimbursement policies is an important component in the development of these areas.

#### Patient Level

- I. Establish a mission statement with short- and long-term goals and objectives for the delivery of pharmaceutical care.
- II. Develop outcomes management techniques to support therapeutic monitoring, including DUR.
- III. Document service delivery in terms of patient benefit and cost.

#### System Level

- I. Determine what specialized information is necessary for decision making and provide for its collection, manipulation and integration into the facility's operation (e.g., computer system, procedures manual).
- II. Purchase and control the inventory for a pharmaceutical facility in a cost effective and efficient manner.
- III. Establish and maintain an effective system for financial management and accounting inputs.
  - A. Identify and collect data required for financial statements.
  - B. Evaluate financial performance.
  - C. Evaluate individual services provided by the facility.
- IV. Develop a system for human resources management.
  - V. Document the value of innovative services and programs.
- VI. Exercise proper risk management techniques.

- A. Develop a policies and procedures manual.
- B. Screen future employees.
- C. Monitor and evaluate current employees.
- D. Evaluate insurance needs.
- VII. Perform an economic analysis of specific components of the practice using sound professional philosophy, competitive influences and financial theory.
  - A. Create a profitable fee structure for fee-for-service clients.
  - B. Evaluate options such as participate in a third party prescription program or managed care network.
- VIII. Formulate a marketing plan for pharmaceutical care services.

### Category III - Experiential (Clerkship) Training

Candidates will demonstrate their ability to deliver pharmaceutical care by managing a representative sample of patients at their own practice site whenever possible. Since evaluation is performance based, this component is an open-ended learner activity that incorporates a broad range of skill and knowledge demands, as elicited previously in this document. Specific performance objectives will be determined individually, in concert with a faculty mentor, based upon the elective site and patient mix. The following is a partial list of educational outcomes to accomplish the practice functions entailed in pharmaceutical care (patient and system levels are integrated).

- I. Demonstrate confidence and competence in managing patients and their therapy (practice specific).
- II. Demonstrate proficiency in the acquisition and integration of knowledge using health-related literature and problem-solving experiences.
- III. Demonstrate understanding and control of behavior through effective patient education and counseling activities.
- IV. Participate in policy formation/professional governance:
  - A. Take an active role in shaping policies, practices and future directions of the profession of pharmacy by working through local, state and federal governments; private organizations and institutions; and professional associations and groups.
  - B. Scan the environment of pharmacy and the health care system in order to prepare, plan and shape change and set a course for future direction.
  - C. Deal analytically with financing, delivery, reimbursement, access, quality and regulation of drugs and pharmaceutical services from a policy as well as from a practice perspective.
- V. Develop a "professional demeanor" and a sense of responsibility for the practice of pharmacy as a patient-oriented profession.