

2006 marked the 40th year of publication for *The Annals*. Throughout its history, *The Annals* has provided important contributions to the development of clinical pharmacy. In 2007, we are continuing to publish articles reflecting on the history of clinical pharmacy through the eyes of practitioners, including those pioneering clinical pharmacy, as well as those who have more recently entered the profession and a well-established specialty. In addition, we are presenting articles and editorials from the early history of *The Annals* that have given direction and shape to the practice of clinical pharmacy (see page 1056).

A Perspective on 45 Years in Clinical Pharmacy Education

Robert P Rapp

I graduated from the University of Kentucky College of Pharmacy with a BS degree in 1963 and accepted a job as a staff pharmacist at the University of Kentucky Hospital, at a salary of \$7500 per year. The director of pharmacy was Dr. Paul Parker. Under Dr. Parker's leadership, we developed the first hospital-wide unit-dose drug distribution system and began clinical pharmacy services in the years between 1965 and 1970. The first resident arrived at the University of Kentucky in 1969. This was my first experience in the education of pharmacists who were to become the clinical pharmacists of the future. Dr. Parker, working with Dr. Charles Walton, planned and developed the first clinical pharmacy education programs at the University of Kentucky. Dean Joseph Swintosky was very supportive of these efforts. These programs were to include "clinical clerkships" on various clinical services within the University of Kentucky Hospital where pharmacists were practicing. Unfortunately there were no "clinical pharmacy faculty" to teach either residents or students. In 1967, Drs. Walton and Parker chose 5 staff pharmacists to enter what they called the University of Kentucky College of Pharmacy PharmD program.

I was fortunate to be chosen to pursue this program. My early practice was with the general surgery service, and I continued for many years as the "surgery clinical pharmacist" during my PharmD program. Our classroom work consisted of the second-year College of Dentistry pathology course, statistics, drug information/drug literature evaluation, and sitting with Dr. Walton on a daily basis discussing human pharmacology. Finally, in 1970, we graduated with the PharmD degree and became assistant professors of clinical pharmacy practice. We graduated when Dr. Walton thought we were ready. After graduation, under Dr. Walton's direction, we began classroom and clinical clerkship teaching of pharmacy residents and bachelor's degree students. At that time, these clinical activities were electives in the University of Kentucky College of Pharmacy BS program, and to get into the PharmD program, a student had to be accepted into the combined residency/PharmD program (3 years). The BS program at the University of Kentucky was still steeped in tradition, with course offerings such as pharmacognosy, pharmaceutical calculations, pharmacy law, and traditional pharmacology courses. Organic and inorganic chemistry were also part of the 3 year curriculum. We were at the beginning of the era of pharmacokinetics and pharmacodynamics, which were slowly making their way into the curriculum.

During the next 35 years or so, dramatic changes took place in pharmaceutical education in the US. In my opin-

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ion, most of these changes were needed to propel the profession to higher levels of practice. The major changes during the 1970–2007 time line include the following, in no particular order:

1. the all-PharmD degree 4 year curriculum,
2. the addition of specific courses in kinetics and dynamics,
3. the development of pharmacotherapy and other practice-related courses,
4. rapid advances in information technology, including drug distribution systems and drug literature evaluation,
5. the tremendous demand for clinical trained pharmacists,
6. the more recent demand for pharmacy specialists,
7. the development of pharmacy practice residencies and then specialty residencies,
8. research reports demonstrating that clinical pharmacy services are of great value in enhancing patient safety and contributing to positive patient therapeutic outcomes,
9. the development of problem-based college of pharmacy curricula,
10. the development of sophisticated PharmD clerkships,
11. the hiring of many clinical pharmacists with PharmD degrees as college of pharmacy department chairs and deans,
12. the unbelievable proliferation of new private colleges of pharmacy in the past 5 years or so,
13. the salary escalation for practicing pharmacists to the \$100 000 per year and higher range (however, the salary escalation for faculty was much slower),
14. the tremendous increase in the number of new prescriptions written and filled and the rapid expansion of pharmacy chain stores,
15. the hiring of “educational specialists” on college of pharmacy faculties, and
16. the deemphasis of pharmacology and related courses in the curricula of colleges of medicine.

Within the framework of an editorial such as this, it is impossible to discuss each of the major changes in the pharmacy education process. Therefore, I will focus on 2 areas: the move to self-learning curricula and the proliferation of private (as opposed to publicly funded) colleges of pharmacy.

In some colleges of pharmacy, there is renewed emphasis on the integration of general educational outcomes with professional outcomes to prepare patient-oriented pharmacy practitioners for the future. This effort has been led by “educational specialists” who believe that self-learning is best and that students need only be guided in the right direction to learn what they need to learn. In other words, there is really no basic core of information that one needs

to learn in order to practice patient-oriented pharmacy. Much of this, of course, relies on computer/Internet access. In fact, we use the Internet for everything now in pharmacy education. After graduation, however, 70% of our graduates practice in chain pharmacies where computer access is either denied or very limited during working hours. I wish somebody would figure this one out for me. My expertise is in the area of infectious disease pharmacotherapy and microbiology. I am told that there is little to no need for students in the computer age to obtain basic information in the classroom setting (ie, the traditional lecture).

I confess that I am a bit uncomfortable with that concept. In my opinion, it is quite useful to know what an MIC, MBC, Gram stain, acid-fast stain, zone of inhibition, innoculum effect, porin channel, *mecA* gene, and many other resistance genes are all about. It is nice to be able to interpret an antibiogram and a susceptibility report as well as counsel a patient who has to begin taking a fluoroquinolone. It is also nice to be able to pronounce the names of bacteria, fungi, and viruses. What appears to be emphasized now is critical thinking, decision making, ethics, social interaction, citizenship, and self-learning. While I agree with all of these concepts, it sure would be nice to obtain a bit of basic information first. I am told that the “products” of these new curricula and teaching methods are much better prepared than were students in the past, but that evidence is apparently hard to come by.

Secondly, I see so many new colleges of pharmacy beginning that I cannot keep up with them. Many seem to be in smaller, liberal arts colleges and they all say that the demand for pharmacists is so great that they are helping to solve the problem. While this may be correct and, in 10 years, the shortage of pharmacists will be solved by the increasing number of graduates, I am amazed that some of the class sizes planned are in the 100–200 student range. Some of the new colleges of pharmacy will allow a student to finish the 4 year curriculum in 3 years by attending classes year-round, which, in their minds, justifies a \$35 000 per year tuition. Therefore, that one year of work at the \$100 000 salary pretty much pays for the 3 years of tuition—not a bad deal. Additionally, let’s see—200 students per class, with each student required to do 10 clerkships, equals 2000 clerkships per year. I wonder where their students are going to get their clinical experiences. I also wonder who is going to serve as clerkship preceptors and what will be the quality of those clerkships. It is amazing that they can do all of this with only 15 faculty members, but I also wonder whether they will be able to find truly qualified faculty. But I can do the other math as well—200 students per class for 4 years equals 800 students at \$35 000 per year. Compare that with most colleges of pharmacy at public universities, where tuition is usually in the \$10 000–\$14 000 range. I will confess, however, that tuition is rapidly increasing at public universities,

while state government support for them erodes. I will be interested to see how well many of these new institutions fare with their accreditation visit from the American Council on Pharmaceutical Education (ACPE). If they receive ACPE accreditation, I guess they can claim that they are as good as we are, since they met the accreditation standards. At any rate, they can afford to pay for those clerkships. I wonder where that leaves our public universities. I think I will stop at this point, before I really get into trouble.

Educational systems for training pharmacists have undergone revolutionary changes in the past 30–40 years, and most have been for the better. Examples include a curriculum that focuses on the patient rather than solely on drug products, tremendous progress by pharmacists in pharmacokinetics and pharmacodynamics, and new emphasis on outcomes research. I am happy to say that students at the University of Kentucky continue to receive what I regard as an excellent educational experience and are still able to obtain the basic information necessary for professional practice. In addition, our students are very successful after graduation. I am very much worried, however, about the recent proliferation of some colleges of pharmacy where the sole motive seems to be making money. Only time will tell whether the “products” of these educational programs will continue to push the profession to higher standards of practice.

For the future, I hope that pharmaceutical education continues to improve the focus on the pharmaceutical care of the individual patient and that collaborative care continues to thrive and becomes the predominant method of patient care. I also hope that we find ways to interest the graduates of our PharmD programs in graduate programs. I am already concerned that many of our basic science faculty do not have pharmacy backgrounds and cannot bring the proper professional focus to teaching pharmacology, chemistry, statistics, and other major elements of professional education. I really do not know the solution to this, but I would be willing to bet that pharmacists make up less than 15% of all graduate students at colleges of pharmacy throughout the US.

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