Pharmacy Education and Pharmacoeconomics

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Curricular planning is a dynamic process in colleges of pharmacy. The purposes, activities, and structure of the curricula are responsible for preparing drug use experts. Minimally, four types of competence have been stated: conceptual competence, technical competence, integrative competence, and career marketability (1). Integration of clerkship experiences and didactic course work is an essential ingredient in the process. A desired outcome is the cultivation of a well-rounded individual with the capability of pursuing a career in any area of pharmacy. Pharmacy offers a variety of careers, including community, hospital, home health care, and industry. Although many subspecialties are emerging (e.g., pediatrics, oncology, psychopharmacy), a common link joining the profession and touching upon the work of every pharmacist is a concern for costs. It is impossible to ignore the importance of health care economic issues in our society. The health care sector's increasing

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share of the gross national product, the movement toward prospective payment systems, and the growth of health maintenance organizations (HMOs) and preferred provider organizations (PPOs) are examples of changes reflective of economic forces (2). A new branch of pharmacy, pharmacoeconomics, has arisen to meet the challenge of maximizing health care dollars in the pharmaceutical arena.

Pharmacoeconomics has been defined as "the description and analysis of the costs of drug therapy to health-care systems and society" (3). In a broader sense, pharmacoeconomic research assesses costs and consequences of various alternatives to aid decision makers in choosing the most cost-effective option (4). This field of research is beginning to grow as textbooks emerge, more studies are undertaken, academic fellowships evolve, and pharmaceutical companies dedicate entire departments to this relatively new form of inquiry. With such an emphasis being placed on economics in our society, it seems inevitable that pharmacoeconomics will play a major role in the near future. For this reason, including pharmacoeconomics in the curricula of colleges of pharmacy becomes a critical issue. It seems clear that pharmacists will need the ability to examine cost-effectiveness data, enabling them to make decisions regarding drug therapies. It will be essential, therefore, for professionals to have the ability to critique the literature and to identify aspects of a well-designed study. Just as pharmacy students are taught to recognize the limitations of clinical trial reporting and published literature, they must be aware of the possibility of misleading results in pharmacoeconomic studies. Pharmacists must be clinically astute, obtaining the most accurate information possible. Curricular inclusion of the analysis of pharmacoeconomic studies, as they are being performed in conjunction with clinical studies or via retrospective methods, will be as important as addressing the interpretation of clinical trial data.

The costs of drug therapies may not always be emphasized in course work. Pharmacy has traditionally focused on drug effectiveness, side effects, monitoring methods, interactions, and contraindications. In our experience, even when cost is discussed, it receives the lowest priority for learning. However, drug costs are a major concern to patients. It is important to realize that the least expensive medication/treatment is not necessarily the most cost-ef-

fective one. For example, although diuretics are considered inexpensive, they can be responsible for electrolyte disturbances, diagnostic workups, lab work, and supplemental medication such as potassium. Unexpected costs such as these can make an inexpensive medication a very costly therapy. Students should be trained to look ahead to the consequences of any therapy to foresee possible problems. Optimizing resource use to provide maximum benefits requires concern beyond simple acquisition cost comparisons. Cost saving does not necessarily imply cost-effective (5).

There are many health care professionals in decision-making positions. Formulary committees in hospitals and HMOs rely on pharmacists to determine the most cost-effective medications to use in their organizations. Community pharmacies, as well as hospital pharmacies, are called upon daily by physicians to recommend therapies for patients. Consequently, pharmacists can play a large role in promoting cost-effective treatments. Pharmacists who represent pharmaceutical companies also have a great deal of influence over physicians' prescribing behavior. Illustrating the economic advantages of drug regimens could enable clinicians to select the most appropriate medications for their patients. Regardless of the setting, pharmacists are faced with issues concerning costs every day, whether it be making administrative decisions or listening to complaints about prescription prices. Because pharmacists will likely be in positions to participate in cost-effectiveness decisions, educators must accept the responsibility of preparing students for this new role.

Beyond the costs of therapy are the outcomes. These consequences can be assessed via pharmacoeconomic methods. A number of authors have stated the need to make the provision of pharmaceutical care more patient centered. Assertions relevant to pharmacoeconomic topics include:

1. "Any drug-related problem may interfere with the optimal outcome of therapy" (6).
2. Beyond simply providing services, practitioners of pharmaceutical care are concerned with outcomes, such as patients' quality of life (7).
3. Whenever medications are given, the potential exists to decrease a patient's quality of life (8).

4. Pharmacy leaders are directed to use energy and creativity to focus on our societal responsibility. Rational drug therapy must include not only cost-effectiveness but patient welfare as well (9).

A mission statement for the pharmacy profession proposed by the American Pharmaceutical Association's Board of Trustees reads: "The mission of pharmacy is to serve society as the profession responsible for the appropriate use of medications, devices, and services to achieve optimal therapeutic outcomes" (10). "Appropriate" was deemed to go beyond the pharmacist's responsibility to assure that a medication be tailored for an individual patient based on accepted clinical and pharmacological parameters. The regimen should also be evaluated to assure maximum safety, cost-effectiveness, and patient compliance (10).

It is important for pharmacists (and pharmacy students) to understand why changes in pharmacy have evolved. The future will undoubtedly see many changes as a result of pharmacoeconomic inquiry. Economic evaluation is potentially useful at many stages during drug therapy decision making. This may range from the drug development perspective of a manufacturer to a prescribing judgment from the clinician, third-party payer, and patient viewpoints.

Introduction to economic evaluative techniques could be addressed in research methods or drug literature review courses. Topics could include an overview of the methods (cost-benefit analysis, cost-effectiveness analysis, cost minimization analysis, and cost utility analysis), variables in pharmacoeconomic analysis (identification and valuation of costs and consequences), and case studies from the literature. *Current Concepts: Pharmacoeconomics* (Upjohn) is a primer suitable for use in this introductory approach (11). A text now available, *Principles of Pharmacoeconomics*, provides a more extensive approach to the topic (12). According to the prepublication announcement, the text is of interest to practitioners, researchers, and students. The book presents techniques and tools to evaluate the economic profile of drug therapies at both a policy level and an individual patient level.

Another concern in pharmacoeconomics is the assessment of quality of life. It is important to remember that selecting the least

expensive therapy is not the desired goal. Improving or maintaining outcomes in the least costly fashion is the true focus. When costs are considered in isolation, with disregard for patient factors, disease factors, and other issues, the risk of reducing quality exists. Quality of life measurement is included in one type of economic analysis (cost utility analysis, or CUA). Quality or utility is valued as the patients' satisfaction with a particular therapy or health state as compared to perfect (or usual) health (13). "It is assumed that one year of life that is valued as having a quality half as good as perfect health is equivalent to six months of life in a state of perfect health" (14). Considering quality of life allows the researcher to adjust the study outcome to reflect patients' well-being. By adjusting for quality, we also get a better picture of the true benefits or consequences of a treatment/program.

Quality of life assessment is of vital importance to the pharmacist. It forces health care professionals to recognize that they are treating people, not diseases; it humanizes the therapy. Pharmacy students are taught interpersonal skills such as the importance of body language (e.g., making eye contact), empathy, listening, and effective communication. Studying quality of life measurement scales and learning to determine patient preferences would be worthy additions to this course work. Studies comparing disease states can help pharmacists, as well as others in health care, to understand how patients' lives are affected by different health states. For example, the Medical Outcomes Study (MOS) compared chronic medical conditions with regard to functioning (both physically and socially) and well-being. Authors of the MOS noted that "there is a tendency for many clinicians to view the limitations associated with depression as more subjective or of less clinical significance than those [limitations] associated with major chronic medical conditions" (15). However, with the exception of coronary heart disease, results indicated that patients with depressive symptoms have significantly worse physical, social, and role functioning, as well as more bodily pain and days in bed, than every chronic condition assessed. Perhaps results such as those found in the MOS will aid in changing how health care providers view disease states. No doubt studies examining quality of life will enhance our knowledge and contribute to delivering the best possible care to all patients.

In providing the best possible care, one of the most important issues facing a pharmacist is patient compliance. Therapy can only be successful when the patient receives the full benefit of treatment. Assessing quality of life may help to identify why patients fail to adhere to medication regimens. When therapy results in uncomfortable side effects or interferes with patients' activities, there is a greater chance for noncompliance. Adherence can also be reduced when a regimen is complex, inconvenient, or expensive (16, 17). Virtually all medications have adverse effects of some kind; it is how each individual patient reacts to these side effects that is important. For example, levels of pain tolerance, as well as incomes, differ among patients. The expense of a particular therapy may seem quite reasonable to one patient, while to another who earns half as much, the same treatment cost may seem excessive. This example illustrates the importance of talking with patients. Through consultation, the pharmacist may be able to recognize that medication cost may be interfering with compliance. Where possible, the pharmacist could assist the physician in choosing a less expensive treatment for the patient. Many factors may have an influence on poor adherence; however, regardless of the reason, noncompliance can as much as double costs (18). This can result from emergency room visits and hospitalizations for complications of untreated disease. These additional expenditures illustrate that compliance is crucial not only to treatment success but also to the cost-effectiveness of treatment.

Adding pharmacoeconomics to the pharmacy curricula may seem an unrealistic goal. The curricula are already crowded. But pharmacoeconomics could be incorporated into existing courses rather than taught in a separate class. As previously mentioned, there are courses that develop the students' interpersonal skills. Quality of life would be an appropriate topic to include in these. Research methods courses could be arranged to devote time to economic analyses. Guest lecturers involved in pharmacoeconomics could demonstrate the utility of economic research, giving students a realistic outlook. These courses would be responsible for the formal training, but every area of study could emphasize pharmacoeconomic principles where they apply. For example, pharmacology and therapeutics courses could bring out issues of cost and

could include study results from economic analyses, when available. Pharmacokinetics courses could explore studies performed on the cost-effectiveness of pharmacokinetics services (e.g., therapeutic drug monitoring). Pharmacoeconomic methods have also been used to assess and/or justify other clinical pharmacy services (19). Results of these inquiries should be presented to pharmacy students in didactic professional practice management courses and in experiential rotations. Research clerkships in pharmacoeconomics could be made available for elective rotations.

In the future, it may be deemed necessary to dedicate an entire course to the study of pharmacoeconomics. Until that time, these are a few suggestions for incorporating pharmacoeconomics into existing pharmacy curricula. Trends in society lead us to believe that pharmacoeconomics will play a significant role in the health care decisions of the future. Pharmacists should be prepared to accept their new roles in using pharmacoeconomic tools to provide the best pharmacy services possible. Pharmacoeconomics brings together three of the most important aspects of pharmaceutical care: effectiveness, quality of life, and cost. By increasing student awareness of these issues, teachers can make the practice of pharmacy more rewarding for patients and pharmacists alike.

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