A variety of external forces, including newly developing technology and governments who are questioning the role and reimbursement of pharmacists, are requiring the profession to change. In response to this stimulus the profession has arrived at the consensus that pharmaceutical care should be the way of practice for pharmacists. Faculties of Pharmacy, as the component of the profession having major responsibility for the education of students for practice, must therefore assume their responsibility by developing curricula which prepare graduates capable of providing pharmaceutical care. There are many administrative and planning issues which need to be addressed when designing such a curriculum. Our experience in dealing with these curricular design issues is presented.

INTRODUCTION
The educational preparation of a pharmacist is continually changing. In 1991, Newton discussed three major reforms which had taken place throughout the history of pharmacy education in the United States during the twentieth century(1). Newton concluded that these reforms had failed to significantly enhance the profession because there had been no “systematic approach to linking the intended outcomes of educational reform to a progressive and generally accepted mission of professional practice.” She also pointed out that an important step was occurring in the process of educational reform. This was the growing consensus among all major pharmacy organizations that pharmaceutical care represented a justifiable and viable mission for the profession of pharmacy. She emphasized, however, that the next steps required were the detailing of the functions and responsibilities required of pharmacists to provide pharmaceutical care and the subsequent explicit linking of these functions and responsibilities to the curricula of pharmacy schools. She proposed that this linkage occur by ensuring...
that the intended educational outcomes of pharmacy curricula be directly related, if not identical, to the functions and responsibilities required of pharmacists providing pharmaceutical care.

Although several groups have recognized the need to link pharmacy practice functions and educational curricula, the most recent to undertake this task was the American Association of College of Pharmacy’s (AACP) Commission to Implement Change in Pharmaceutical Education. The Commission was established to:

1. define the missions of the profession, pharmacy practice and pharmacy education (Background Paper I) and,
2. describe an entry level degree, curricular outcomes, curricular content and education processes (Position Paper)(3).

The result was the most comprehensive approach to implement change in pharmaceutical education offered of late. Pharmaceutical care was the concept on which the change was to be based. The Commission’s work is now complete and has been presented(3).

The concept of pharmaceutical care also stimulated significant interest at the Faculty of Pharmacy at the University of Toronto, as it provided a possible solution to many issues surrounding curriculum reform. For the first time in recent history, there was a clear articulation of a set of principles which could serve as a foundation for a model of pharmacy practice. This model, in turn, could serve as the basis for curricular reform. As has been pointed out by Newton(1), a link between practice and education is essential if educational reform is to have a positive impact on the profession.

Approximately one year into the work of the AACP Commission, colleagues at Toronto began to develop a curriculum which taught pharmacy students to deliver pharmaceutical care as it was described by Hepler and Strand(4). At that time, we assumed it would take approximately six months to develop such a curriculum and that this curriculum would include a minimal amount of new curricular content. After working on this project for over two years, however, it is clear that we did not fully understand the nature or the magnitude of the task at hand. Because it was so challenging, we thought it would be useful to discuss the issues encountered during the process. These issues can be categorized into administrative issues that need to be dealt with in a Faculty, and substantive issues surrounding the design of the curriculum content and the educational processes utilized within the curriculum.

DESIGNING A PHARMACEUTICAL CARE-BASED CURRICULUM

Background Work. We chose to begin the process of developing a pharmaceutical care-based curriculum by working with a small number of faculty members involved in either or both the Curriculum Committee and daily pharmacy practice. Although this group’s original task was to develop an educational model based on the provision of pharmaceutical care, as Newton predicted, it was rapidly realized that this would be impossible unless each member had a clear understanding of exactly what it meant to provide pharmaceutical care on a very practical level. The group, therefore, diverted from the original task to the development of a pharmaceutical care-based practice model which explicitly described the functions and responsibilities required of pharmacists providing pharmaceutical care.1 The model developed describes the ideal practice of pharmaceutical care as defined by Hepler and Strand(4) and does not address either the barriers preventing this practice or an implementation plan which is necessary for gradual changes in individual practice. As such, it is meant to function as a visionary document. Importantly, however, in order to retain a sense of reality, several practicing pharmacists tested portions of this model as they were developed and provided invaluable, practical feedback to the development group.

About two years later, once this practice model was complete and the working group had developed a consensus on what it meant to provide pharmaceutical care, the members returned to their original task of developing an educational model. As the group studied this way of practice and considered its relationship to a Faculty of Pharmacy curriculum, it became clear that a foundation on which to build the curriculum would have to be put in place so the Faculty could move logically and systematically from the pharmaceutical care practice model to a pharmaceutical care curriculum. This foundation took the form of:

1. a mission statement for the profession of pharmacy,
2. a mission statement for the practice of pharmacy,
3. a mission statement for pharmacy education,
4. a description of the expected outcomes of the curriculum relating to the provision of pharmaceutical care, and
5. a description of the curricular content, educational processes and assessment techniques needed to achieve the pharmaceutical care-specific educational outcomes.

The following sections briefly describe each of these elements as developed by the small working group.

Mission Statement for the Profession. Although similar in scope to the mission statement developed by the Commission, our mission statement for the profession went beyond a statement about the general needs of society and the patient. We felt it important to state explicitly that the profession accepts responsibility for meeting the drug-related needs of patients in society. It is important to note that within the profession it is the individual pharmacist who assumes responsibility for a patient’s drug-related needs and that the pharmacist will perform whichever functions are necessary to fulfill his/her responsibility for meeting patients’ drug-related needs, be it at the patient specific, the professional or the societal level. The following mission statement for the pharmacy profession resulted:

The mission of the profession is to accept responsibility for the drug-related needs of patients in society. These needs are met by pharmacists fulfilling their responsibilities at:

1. the patient specific level through the practice of pharmacy (specifically, pharmaceutical care);
2. the professional level through education, research and the development of policies and standards; and
3. the societal level through research, public education, and policy development.

Although this mission statement indicates that pharmacists have practice responsibilities at the patient specific level, it does not define clearly enough the parameters of these patient specific responsibilities. Hence, the need for a practice mission statement.

1 Winslade, N.E., Strand, L.M., Pugsley, J., Perrier, D.G., “Practice functions required for the delivery of pharmaceutical care,” Faculty of Pharmacy, University of Toronto.
Mission Statement for Practice. Given the purpose of the practice mission statement, we felt that this statement had to clearly define those practice activities for which a pharmacist was to be responsible. Therefore, our mission of pharmacy practice is as follows:

The mission of pharmacy practice is to assure that a pharmacist meets each individual patient's drug-related needs through the delivery of pharmaceutical care.

From this mission statement it is clear that, unlike the Commission's statement(3), we have limited the practice mission to those activities which relate directly to what occurs between a specific patient and a pharmacist, that is, to direct patient care. We have not included: (i) the provision of training programs for students, practitioners, the public and other health professionals about drug use; (ii) the development, evaluation and dissemination of new knowledge regarding drug therapy and pharmaceutical care systems; and (iii) the technical responsibilities implicit in the filling and dispensing of a prescription(3). We are defining the practice of a healthcare profession and the functions and activities of a healthcare provider. Therefore, we have limited our definition of the practice to those activities/functions which are relevant to such. These activities include; clinical judgement, decision making, problem solving, and collecting and integrating information for the sake of identifying, preventing and resolving a unique set of patient-specific problems requiring a uniquely held body of knowledge, set of skills and values. Although most licensing bodies still require that the pharmacist assume ultimate responsibility for the technical functions associated with filling and dispensing a prescription, it is our hope that this will change soon. In our opinion, drug distribution does not meet the above criteria and these purely technical functions can be appropriately undertaken by pharmacy technicians. It must be pointed out, however, that given current legal requirements and present pharmacy practice, these technical functions continue to be discussed within the curriculum. Significant debate continues at the Faculty surrounding this issue.

By defining pharmacy practice as those activities which relate directly to the care provided by one pharmacist to one patient, pharmacy practice and education can focus on meeting specific health-care needs of individual patients. It should be emphasized that other health-care providers have been defining their practices this way since their inception (5-6). This focus, however, does not mean that the importance of the other responsibilities such as education, research and management is diminished. Instead, we have attempted to place the professional and societal responsibilities in perspective to the central, patient-care role of the profession of pharmacy. That is, the primary role of a pharmacy practitioner is to take responsibility for the specific drug-related needs of an individual patient. This responsibility needs to be clearly differentiated from the professional and societal responsibilities which a pharmacist also has as a health-care professional. With the definition of the mission statements for the pharmacy profession and practice, and a clear understanding of the philosophy of pharmaceutical care, the foundation was laid for the development of a mission statement for pharmaceutical education.
Mission Statement for Pharmaceutical Education. A mission statement for pharmaceutical education was necessary to establish the link between pharmacy practice and educational outcomes (Figure 1). As Newton points out, our ability to link these two is essential if the delivery of pharmaceutical care is to become a reality and not just remain a set of words(1). The educational mission statement we developed followed directly from our profession and practice mission statements, and was instrumental in directing our efforts.

Since it was our belief that the goal of undergraduate education is, first and foremost, to prepare graduates to enter the profession of pharmacy, the following mission statement resulted:

The mission of pharmaceutical education is to provide a curriculum, which by its content and presentation, enables the student to learn the knowledge, skills and values necessary to meet the drug-related needs of patients in society. This primarily occurs in practice when the pharmacist delivers pharmaceutical care to a patient, thereby meeting an individual patient’s drug-related needs. It also occurs at the professional level through education, research and the development of policies and standards, and at the societal level through research, public education and policy development, all directed toward the prevention of drug-related morbidity and mortality.

The first priority in this mission statement is for students to learn the knowledge, skills and values necessary to meet a specific patient’s drug-related needs in practice through the provision of pharmaceutical care. This flows from the practice mission statement and is the first priority due to the strong belief that the practice of pharmacy is the primary responsibility of the profession, and hence of the pharmacy graduate. Since the provision of pharmaceutical care is the priority, time and personnel must be allocated accordingly within the curriculum. The second and third educational priorities, which follow from the mission statement for the profession, deal with fulfilling the pharmacists’ professional and societal responsibilities. However, the principles underlying the concept of pharmaceutical care also need to serve as guiding principles for the education, research, policy and standards development within the professional and societal components of the curriculum.

Given the central importance of pharmacy practice and the provision of pharmaceutical care to pharmacy education, the working group included in its education model a clear articulation of the functions and responsibilities of pharmacists who are providing pharmaceutical care. The functions and responsibilities were taken directly from the pharmaceutical care practice model which had been developed previously.

Functions and Responsibilities Associated with the Provision of Pharmaceutical Care. Significant differences between the Commission’s work and the efforts at the University of Toronto became apparent in the list of practice functions and responsibilities developed by the two groups. Figure 2 represents the work by the University of Toronto. Initially it was quite tempting for our working group of practitioners and faculty members to focus on a list of pharmacist functions which described the current practice of clinical pharmacy, as included in the Commission’s work.

These functions are:

- participating in the process of drug use decisions;
- selecting the drug product dosage form;
- determining the dose and dosage schedule;
- preparing the drug product for patient use;
- providing the drug product to the patient;
- providing drug information to the patient;
- monitoring the patient to detect adverse drug reactions and drug interactions; and
- monitoring the patient to enhance the probability that therapy proceeds in accord with patient care objectives.

However, following the extended work and practical experience with the pharmaceutical care practice model, the working group was convinced that pharmacists who fulfilled only these practice functions would not be providing pharmaceutical care. Given this strong belief and the critical importance of these practice functions to developing a pharmaceutical care-based curriculum, the following brief summary and rationale for our practice functions and responsibilities is presented.

In our pharmaceutical care practice model1 adopted from Strand and co-workers’ original work(7), the pharmacist’s primary patient care responsibilities are to:

- identify all of a patient’s existing and potential drug-related needs;
- solve all of the actual drug-related problems identified for which responsibility is to be assumed; and
- prevent all of the potential drug-related problems identified from developing.

With a clear understanding of and commitment to fulfilling these responsibilities, the functions to be performed were determined. We believe the only list of functions which can and should be standardized are those general functions which describe the pharmaceutical care process. These functions should not change with practice site or type of patient, since pharmaceutical care refers to the patient care functions and not to the dispensing functions and/or clinical functions traditionally defined as the pharmacist’s responsibilities. While the functions should not change, the specific
The six categories of drug-related problems

The patient is experiencing or may experience an undesirable event because (s)he is:

- taking/receiving a drug for no medically valid indication
- needs pharmacotherapy but is not receiving it
- taking/receiving the wrong drug
- taking/receiving too little of the right drug
- taking/receiving too much of the right drug
- taking/receiving drug inappropriately
- experiencing an adverse drug reaction
- experiencing a drug interaction

Activities required of a pharmacist and the clinical services utilized vary from patient to patient, since every patient has different drug-related needs. The functions common to all pharmacists providing pharmaceutical care are described in Figure 2.

The first function is the establishment of a covenantal relationship with the patient, which is a trusting relationship (partnership, agreement or promise) between a patient and a pharmacist. Within this covenant the pharmacist agrees to contribute knowledge and skills, while the patient agrees to contribute his/her knowledge and skills toward addressing mutually agreed upon problems, outcomes and interventions. This relationship allows each to fulfill responsibilities to the other, and hence should allow for a free, honest exchange of information, knowledge, needs, recommendations and results. This relationship should evolve through the care process as the patient becomes more comfortable with and confident in the pharmacist. Without this relationship pharmaceutical care cannot be well delivered.

The second, third and fourth functions require the pharmacist to collect relevant drug, disease and patient information, interpret this information and identify if the patient has any health-care needs which are drug-related. In the pharmaceutical care model, there are eight general ways in which drugs can cause patients to experience actual or potential problems (Table I). Although these functions may be undertaken almost simultaneously by experienced pharmacists, pharmacy students find each of these tasks a challenge. Accomplishing these steps requires that students learn how to recognize, obtain and process relevant drug, disease and patient information in a problem-solving format. In addition, students must learn how to make appropriate decisions and sound clinical judgements.

The fifth function requires the pharmacist to work in conjunction with the patient and other health professionals to prioritize the patient’s drug-related problems and to determine the problems for which (s)he will assume responsibility. Once these responsibilities have been determined, the pharmacist must then develop a pharmacy care plan in conjunction with the patient and other health-care professionals. Initially, desired clinical and pharmacotherapeutic outcomes are identified for each drug-related problem. Specific desired endpoints are then developed which can be used to document that the desired outcomes have been attained and the patient’s drug-related problems have been solved or prevented. The construction of a pharmacy care plan continues with the next two steps in the pharmaceutical care process, which are the development of therapeutic and monitoring plans. The covenantal relationship with the patient continues to be of fundamental importance at these stages as the pharmacist works with the patient, with possible input from other health-care providers, family, friends and other care-givers of the patient. A pharmacy care plan includes a structured and organized assessment of therapeutic alternatives which may attain the desired outcomes and endpoints, specific therapeutic recommendations and a detailed monitoring plan, including desired and undesired endpoints for each drug-related problem, details of who will collect the required information (e.g., the patient, the nurse, the pharmacist), times/dates for follow-up and mechanisms of follow-up (e.g., in person or via telephone).

Finally, pharmaceutical care requires implementation of the pharmacy care plan and follow-up of the patient to assess if the positive outcomes desired by the patient and the pharmacist have been achieved and undesired outcomes are not occurring. Reassessment of the patient is also undertaken during this follow-up in order to determine if new or additional drug-related problems are developing.

When comparing these functions and their rationale with the list provided by the Commission (above), it is clear that significant differences exist. First, and most importantly, the Commission’s functions do not mention the identification of patient specific drug-related needs. Since the management of individual patient’s drug-related problems is the cornerstone of pharmaceutical care, without this critical step it is difficult to relate the Commission’s functions to Hepler and Strand’s model of pharmaceutical care(4). Second, we find functions such as “participating in the process of drug use decisions” and “monitoring patients” nebulous and open to interpretation, and therefore difficult to put into practice. Furthermore, it is unclear how these functions directly link to the central goal of pharmaceutical care which is to identify and solve individual patient’s drug-related problems. Third, although we agree that the provision of drug information to the patient is an important function, in our model this activity has a specific goal — it is provided when needed to implement a pharmacy care plan. Finally, the remainder of the functions listed by the Commission relate primarily to dispensing functions, which as previously mentioned, are not included within our model of pharmaceutical care. Experience with the pharmaceutical care practice model has proven that pharmaceutical care can be provided independently of the dispensing or distribution of medications. (8). It is therefore difficult to comprehend how dispensing functions can be integral to the provision of pharmaceutical care. Given these differences, it was agreed that the Commission’s functions were not consistent with our vision of a revised pharmaceutical care-based curriculum. Therefore, work from our pharmaceutical care practice model was utilized as a framework for the functions and responsibilities required of pharmacists who provide pharmaceutical care. With this foundation, the working group began developing the specific educational outcomes required of a pharmacy graduate, with a focus on his/her responsibilities at the patient specific level through the provision of pharmaceutical care.

Educational Outcomes. We designed our desired educational outcomes to reflect what a graduate should actually be able to do upon completion of our pharmacy program. Development of these outcomes was a critical step, since if the goal of a curriculum was to prepare students to provide pharmaceutical care and to meet their additional responsibilities, then these intended educational outcomes had to
Relate directly to the practice functions required of graduates. In the education model developed, these outcomes described, in a very general manner, the abilities that students needed to meet their societal, professional and practice responsibilities. These outcomes are shown in Table II. The group then proceeded to focus on the pharmaceutical care-related outcomes by successively breaking down this broad desired educational outcome into more narrowly defined educational outcomes. Illustrative results are shown in Figure 3. This figure presents the first broad desired educational outcome, followed by the second level of outcomes for this first outcome, then the third level of outcomes for second level (item three only), and lastly the fourth level of outcomes for only one of the third level outcomes. As all of the respective levels of outcomes were being developed for the pharmaceutical care-related general educational outcome, an attempt was made to identify the knowledge, skills and values required to achieve these outcomes. It was quickly realized, however, that the group was becoming enwrapped in layers of desired educational outcomes and associated knowledge, skills and values. In addition, as more detail was added to the model, the direct linkages of the educational outcomes to the practice functions were being blurred. Since these problems were similar to those experienced by earlier faculty groups who had worked on behavioral objectives, the group halted its work on defining specific intended educational outcomes and associated knowledge, skills and values. Given the significant information already developed and contained within the education model and the difficulties that were being encountered, it was decided that it was appropriate to introduce the education model to a larger group of faculty members.

Introduction of Background Work to the Faculty. We chose to initially introduce this concept to the Curriculum Committee, rather than by developing a faculty consensus. This direction was selected for several reasons: a major change was required, the concept of pharmaceutical care was only beginning to evolve, and the intricacies of this model of practice were just beginning to be understood. It was recognized that, in reality, we were attempting to create a curriculum for a concept that was only minimally in practice. Consequently, the danger existed that we could readily become diverted and produce a curriculum different than the one we set out to produce. As a result it was extremely important to have a small core of individuals on the Curriculum Committee who had an in depth understanding of the pharmaceutical care concept to respond to questions and concerns and to assure all decisions being made were consistent with the pharmaceutical care practice model. In turn, it was absolutely critical that the Curriculum Committee gain a clear understanding of pharmaceutical care in order to design a new curriculum, and that this occur before introducing it to the entire faculty.

In addition to these individuals well-versed in pharmaceutical care, it was also imperative that the profession be well represented on the Curriculum Committee. The input of these practicing pharmacists was invaluable as they aided our Curriculum Committee in keeping things in perspective by pointing out what knowledge, skills and values were essential from a practitioner’s point of view and what was irrelevant to practice. Their greatest contribution came in the development of the structured practical experience component of the program. Subcommittees were formed

<table>
<thead>
<tr>
<th>Table II. The major categories of educational outcomes associated with the three levels of professional responsibilitya</th>
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<tr>
<td>Upon completion of a pharmacy curriculum the student should be able to:</td>
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<tr>
<td>I. Provide pharmaceutical care (i.e., patient specific responsibilities) by:</td>
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<tr>
<td>• correctly identifying, satisfactorily solving and effectively preventing the drug-related problems from the eight categories which are most commonly occurring, are most likely to cause the greatest harm, and are able to cause harm most quickly.</td>
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<tr>
<td>II. Improve the profession, its organizations and institutions (i.e., professional responsibilities) by:</td>
</tr>
<tr>
<td>• shaping policies, practices and education</td>
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<tr>
<td>• promoting the profession to other professionals and society in general</td>
</tr>
<tr>
<td>• designing, conducting and utilizing drug therapy research</td>
</tr>
<tr>
<td>III. Better society (i.e., societal responsibilities) by:</td>
</tr>
<tr>
<td>• promoting health and well being</td>
</tr>
<tr>
<td>• playing an active role in shaping health-care policies, practices and education</td>
</tr>
<tr>
<td>• conducting research to further the knowledge needed to advance health-care generally and medicine use specifically</td>
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</tbody>
</table>

a Does not include general educational outcomes expected of a university education or outcomes associated with pharmacy support systems.

for each of three areas of practice; community pharmacy, hospital pharmacy and pharmacy in extended care facilities/nursing homes. Each was chaired by a practitioner from the respective area and practitioners formed the majority of each subcommittee’s membership.

Practitioners were also represented on the Curriculum Committee by members from the licensing body, the provincial professional associations and the alumni association. In terms of Curriculum Committee composition it should also be mentioned that the committee was composed only of those faculty members who wanted to sit on the committee, and hence each member had a genuine interest in the affairs of the committee. Consequently, they represented their own ideas and not those of a specific division or department. Fortuitously, most interest areas were represented. There were also three undergraduate students on the committee.

The Curriculum Committee began its work with an all-day retreat, followed by ongoing explanation and discussion of the concept of pharmaceutical care at subsequent meetings. Only with time and through considerable discussion did the committee become comfortable with its understanding of the concept of pharmaceutical care and the direction of the curriculum. This process was greatly assisted by the availability of copies of the pharmaceutical care practice model1 and the insight of various practitioners who were testing this model in daily practice.

A question from a student representative on our Curriculum Committee illustrates the difficulties encountered when curricular design is not based on a clear rationale. When the idea of basing future curriculum changes on a pharmaceutical care practice model was introduced to the committee, the student asked “What model have you been using up to now?” Embarrassingly, the faculty members had to admit that no clearly articulated model of practice existed, hence the curriculum that students were being exposed to had little rational base. Rather, it was a collection of courses, with a practical training component, that previ-
ous committees and faculty believed met the needs of graduating students.

Throughout this process of deliberation, the Curriculum Committee regularly reported their discussions and decisions to the faculty via both informal faculty meetings and formal Faculty Council meetings. Since changing the focus of the curriculum would affect all aspects of the program, it was recognized that this would cause discomfort for some faculty members. Faculty members, therefore, needed to understand how his/her individual expertise fit into the new curriculum. This in turn required that all faculty members have a general understanding of the concept, functions and responsibilities of pharmaceutical care and how the concept would impact their area of teaching. The regular reports from the Curriculum Committee helped to accomplish this goal. In addition, an open seminar was held on pharmaceutical care and its impact on the curriculum. This seminar was given by the Dean and all members of the Faculty were invited to attend. For such a major change to occur the Dean of the Faculty must be not only supportive of the change, but be an active participant in the process of change. In our case the Dean attended all Curriculum Committee meetings, was part of all formal Faculty discussions concerning the change and as mentioned above, presented the open Faculty seminar on the issue. It is suggested that the Dean’s active involvement in this undertaking is important for the success of the curriculum changes.

Through these methods, the Curriculum Committee, and eventually the members of the Faculty, reached consensus on three issues. These were:
- the primary role of undergraduate pharmacy education is to graduate students for the practice of pharmacy;
- the practice responsibilities will be met through the delivery of pharmaceutical care; and,
- the profession has responsibilities at the societal level, the professional level and at the patient level (practice).

Although these issues may appear quite general on the surface, they impact all aspects of the curriculum. By adopting these issues as priorities, a consensus was developed within the faculty that the Curriculum Committee revise the curriculum towards the concept of pharmaceutical care. Given the significant revisions that were anticipated, and ongoing changes in admissions policies at the Faculty, it was decided to develop a proposal that outlined an expanded,
pharmaceutical care-based undergraduate curriculum. This proposal outlined a transition from a four-year university program that accepted students directly from high school, to a one-plus-four program which required applicants to have a minimum of one year of university education, including specific courses, prior to admission to the four-year program. Some of the current first-year courses became prerequisites for admission to the undergraduate program. Hence, the essential components of the first year of the old program were made prerequisites and one professional year of education was added to accommodate the increase in emphasis on practice within the curriculum.

The three priorities approved by the faculty and the broad categories of intended educational outcomes developed in the education model (Table II), served as the basis for the proposed curriculum changes. Ultimately, if funding and approval were received, then the Curriculum Committee would return to the issue of developing specific intended educational outcomes and refine the revised curriculum as necessary to ensure that these outcomes were addressed. As this process has just been undertaken, it is addressed later in the paper.

**Curricular Content and Educational Processes.** Four general principles guided the Curriculum Committee’s re-evaluation of the curriculum. They were that:

- the content and educational processes utilized in delivering the curriculum must directly link to the three priorities agreed to by the faculty and the broad categories of intended educational outcomes described in Table II;
- the revised curriculum should ensure that all areas required to attain the intended educational outcomes be addressed, including knowledge, skills and values, versus the emphasis which was previously on knowledge;
- each course included in the revised curriculum should specify the intended educational outcomes, content and educational processes to be utilized and that the course coordinator justify how these specific educational outcomes contributed towards the broad intended educational outcomes for the program; and
- minimal repetition of material occur through appropriate coordination and sequencing of courses.

The process was therefore somewhat inverted in that, rather than the Curriculum Committee decreeing the specifics that must be taught in each course, course coordinators were asked to re-evaluate and then justify the educational content and processes utilized in his/her course.

Figure 4 illustrates the template used by the Curriculum Committee when re-evaluating the curriculum. Although the committee did not attempt to “fill-in” this template, it served as a reminder that the revised curriculum must focus on all broad intended educational outcomes and address all areas of knowledge, skills and values. Support systems such as management are included in this template since, while pharmaceutical care is the direct patient care responsibility of the pharmacist, support systems are essential to facilitate the provision of pharmaceutical care. It is interesting that the Commission concluded that “with minor modifications and additions, [the] curricular elements [of the APhA Task Force on Pharmacy Education] are as valid today as they were in 1984”(3). Even without the availability of specific intended educational outcomes, the proposed revised curriculum developed by our faculty differed significantly from the previous curriculum. Changes were proposed in the content and teaching methods in all areas of the curriculum, including those dealing with social/administrative pharmacy, basic pharmaceutical sciences and professional practice. The following provides detailed examples of the suggested changes in three areas; structured practical training/clerkship, therapeutics/nonprescription drug use and pharmaceutics. Details of changes already implemented in the area of pharmaceutics and therapeutics are available in publications by Duncan-Hewitt (9) and Winslade (10). Appendix I provides a listing of additional significant changes proposed for the new curriculum.

The structured practical experience (SPE) and clerkship components of the proposed curriculum were believed to be critical in the translation of the knowledge, skills and values learned into practice. The series of working groups that addressed these areas focused on achieving the first broad educational outcome: that being that during the SPE/clerkship, students must practice providing pharmaceutical care to patients who are experiencing common, severe and/or urgent drug-related problems. With this goal, the subcommittees recommended that a SPE component be introduced during each year of the four years of the proposed curriculum and that post-coursework clerkships change from a two-week block of time in teaching hospitals to four blocks (each four weeks long) in community pharmacy, community hospital, long term care and tertiary care. Within each year, a number of one-half day rotations were required in community, hospital and long term care sites to reinforce the learning undertaken during the year. The duration of time in each area increased every year, as was required by the specific goals outlined for each year of the SPE program. The general sites selected for the SPE and clerkships reflected the belief that pharmacists have a significant role to play in providing pharmaceutical care to ambulatory patients, those in community hospitals and patients in long term care facilities. Therefore, the focus on the provision of pharmaceutical care mandated the inclusion of SPE and clerkships in these sites in the new curriculum.

<table>
<thead>
<tr>
<th>Practice outcomes</th>
<th>Delivery of pharmaceutical care</th>
<th>Support systems</th>
<th>Professional outcomes</th>
<th>Societal outcomes</th>
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<tr>
<td>Knowledge</td>
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<td>Skills</td>
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<td>Values</td>
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Fig. 4. Template for the development of a curriculum
A second area of significant change in the curriculum related to courses such as therapeutics, introduction to clinical pharmacy, and nonprescription drug treatment. Previously, each of these courses was taught separately with somewhat arbitrary lines drawn between content included in one course versus another. In addition, originally these courses did not teach students how to provide pharmaceutical care to individual patients. Although significant revisions had occurred in recent years (10), the revised curriculum recommended combining four separate courses previously offered in third and fourth year into a series of pharmaceutical care specific courses which followed a format already implemented at the Faculty and described in an earlier publication (10). Briefly, these courses would focus on the application of the pharmaceutical care process initially to mild or self-limiting conditions, followed by application to progressively more complex drug-related problems in more complex patients. The courses would utilize a problem-based, student-centered approach, which allows students to acquire many of the skills (e.g., self-directed learning, problem identification and problem solving) and values (e.g., accepting responsibility) required to meet the broad educational outcomes of the revised curriculum (10, 11). In these courses, as with the previously revised therapeutics course at the Faculty, the focus of the problem would be a paper or simulated patient experiencing one or more drug-related problems that the students must identify and solve or prevent. The assessment methods utilized in these courses would also be nontraditional, evaluating the students on all of drug knowledge, the pharmaceutical care process and writing skills. Given this format, the assessments would include both formative and summative components, as previously tested in the therapeutics course (10). Importantly, the Curriculum Committee also recommended that the pharmaceutical care philosophy be introduced in the first year of the program (introduction to the profession of pharmacy) and application of the process begin during second year and continue throughout the remainder of the curriculum. Although this represented a significant expansion of these courses, the priorities placed on pharmaceutical care by the Faculty mandated this expansion.

Regarding changes in pharmaceutics, originally two courses focussed on the of dosage forms and laboratory experiments to illustrate physical/chemical properties of dosage forms. Now, one problem-based course is to offered which utilizes small group tutorial and laboratory work to allow students to investigate and apply basic physical/chemical principles as they develop and test the quality of dosage formulations (9). The students are required to produce a report by the end of the course where they rationalize and justify all steps/processes used in the development of their dosage form and in the testing of it for quality, including final packaging. Further reinforcement and application of these principles occurs in relevant professional practice courses.

As mentioned previously, prior to approval of the proposed curriculum, various faculty members implemented a number of the changes included in the revised curriculum (9, 10). Experience demonstrated that changing teaching content and methods from the traditional instructor-centered, subject-based to student-centered, problem-based with a focus on pharmaceutical care required a major commitment by the Faculty. Regarding problem-based learning, we began with a weekend retreat followed by a series of educational development seminars for faculty. In addition, the assistance of Health Sciences faculty from McMaster University in Hamilton and from an educational consultant to work directly with those willing to change to this method of instruction proved to be very valuable. It was also discovered that students may initially object to the student-centered, problem-based method of instruction, primarily because they are being required for the first time to take responsibility for their own learning. This can be quite frustrating for both the students and the staff member. The latter may at times question whether or not it is worth all of the aggravation. Under such circumstances it is essential that the Dean provide support. This may require going to the class to demonstrate the Faculty’s commitment to this method of instruction and assuring the staff member that negative course evaluations, which may result from the students’ dissatisfaction, will not jeopardize the individual’s annual performance assessment. From our experience, once the students become comfortable with problem-based teaching, the majority agree that it is the most effective way to learn (10).

It also needs to be mentioned that problem-based teaching can occur in large classes and can be applied to all courses. Examples of the types of classes where this method is being used include pharmaceutics (9), self-medication, statistics, professional practice/dispensing and therapeutics (10). All have approximately 160 students per class.

A final point that must be emphasized is that assessment methods must be consistent with the methods of instruction, and both must be designed to achieve stated outcomes, as students understandably generally learn information in a style similar to how they are examined rather than how it is presented. It is important to recognize that assessments consistent with problem-based teaching are more labour intensive (10). As with content, it is the educational outcome which should guide the selection of the method/process used in educating and evaluating the students and not by other less defensible variables. Our faculty were provided assistance through seminars presented by external professors experienced in alternate forms of assessment. One example of these seminars included a session on the use of multiple choice questions to assess higher order thinking. Assistance was also obtained through contacts with the Department of Health Sciences at McMaster University in Hamilton, Ontario. Finally, in situations where writing or communication skills are an educational outcome being addressed in a specific course, expert assistance needs to be sought. This expertise is frequently external to the Faculty.

University approval and funding for a modified version of the proposed curriculum was attained in mid 1993. Planning for implementation of the new curriculum by individual course coordinators began immediately, with a strong focus on the development of the required practice sites. Great care is being taken in choosing these sites. Pharmacists who want to become student preceptors must be willing to make a real commitment to change their practice to pharmaceutical care. This change in practice is very difficult for virtually all practitioners regardless of their practice site. The Faculty has made a significant commitment to assisting these pharmacists in making this transition and is beginning this process by developing an education and reward system for preceptors. This change also requires changes in many different aspects of professional practice, and will involve not just the pharmacists concerned but also, for example, third party payers, the licensing bodies and professional
organizations. Our Faculty has assumed a primary role in fostering this change.

**Developing the Specific Intended Educational Outcomes.**

As planning for the implementation of this curriculum continues by individual course coordinators, the Curriculum Committee returned to the task of delineating the specific intended educational outcomes of the revised curriculum. While this may not be logical, as mentioned previously, this was necessary from a timing and practical point of view. Following a review of relevant literature on defining roles, functions, competencies and outcomes of professionals, it was decided that our approach to resolving the earlier problems with intended educational outcomes was for a small group of practising pharmacists and faculty members to complete a modified DACUM analysis(12). The goal of this analysis was to reconfirm and further define both the critical functions of future pharmacy graduates and the desired educational outcomes that directly related to these functions. Participants were selected to allow some continuity with work previously completed by the initial small group and the Curriculum Committee, but also to ensure that ‘group think’ did not prevail. Three members of the original small group (who were also Curriculum Committee members) and the chair of the Curriculum Committee were therefore asked to participate in the analysis in combination with twelve additional members. Participants of the analysis were asked to focus on realistic roles of the pharmacist in the future (within the next 10-15 years). It was also emphasized that the participants were analyzing the roles and subsequently outcomes expected of baccalaureate graduates and not pharmacists with several years of work experience.

A two-day retreat was organized, preceded by a preliminary introductory meeting at which time the goals and procedures of the retreat were outlined. The process followed was based on work by the Australian Department of Employment, Education and Training’s National Office of Overseas Skills Recognition(12). This group has published an excellent review of the methods which can be used to define professional competencies(12). Although the Australians used the term competency, and are clear that their documents were not meant to mandate a professional curriculum, the guidance provided fully addressed the difficulties we encountered when defining the various levels of desired educational outcomes. These documents review three approaches which can be utilized. The one we chose was a mixed approach, where those areas of professional practice are identified in which it is critical to demonstrate minimum competence. These functions (or competency units) are then broken down into competency elements which are relatively complex activities which incorporate the required knowledge, skills and values. The key to this approach is that the analysis is limited to the critical functions and stops the subdivision of tasks at a fairly complex level. It is stated that attempts should never be made to analyze each function down into discrete activities that are easy to assess via tick-boxes. This is because it should not be possible to break professional functions into these activities — if it is possible, then the question must be asked as to why a professional is doing these functions/activities and not a technician. Finally, a very important point is made that it should be possible to fully characterize most professions with a list of 30-40 competency elements.

Based on this approach, the functions, responsibilities and competencies/outcomes required of graduates were developed by this group. The functions in decreasing order of priority which were determined by the Curriculum Committee are listed below:

- meet clients’ medication-related needs;
- collaborate with other care professionals to meet clients’ health-care needs;
- teach clients, health-care providers, students and peers;
- contribute to health promotion;
- continuously improve his/her professional competence;
- be an employee who recognizes the importance of practice management skills;
- contribute to institutional policy development and public policy debate;
- undertake research, development and assessment; and
- contribute to the renewing and advancing of the profession of pharmacy.

It is interesting to note that, as anticipated, all participants reconfirmed that patient-specific practice responsibilities were the highest priority within the nine functions listed. Although the group did not arrange the functions into the categories used by the original working group (patient-care, professional and societal responsibilities), the functions listed are similar to those outlined within these categories. If that grouping were to be done, functions one, two, three and five relate to the practice/direct patient-care responsibilities, functions three, four, five, six, seven, eight and nine relate to the professional responsibilities and functions three, four, seven and eight relate to the societal responsibilities of pharmacists. The patient care specific functions were more clearly articulated through the addition of functions related to collaboration with other care providers, teaching of clients and continuing competence. The functions of teaching, research, policy development, health promotion and involvement with the profession were also included in both groups’ work. The articulation of a specific function related to pharmacy management, however, was an addition to the work previously completed. In summary, however, the functions listed above confirmed the validity of the general functions outlined by the original working group.

The next step that the outcome analysis group undertook was to define the desired educational outcomes associated with each of these functions. The following broad outcomes for each function were developed by this group, with each desired educational outcome being directly linked to one of the nine critical functions developed above:

1. Graduates will respond to clients’ drug-related needs by optimizing drug therapy through the identification, solving and prevention of clients’ drug-related problems, thereby enhancing or contributing to the clients’ wellbeing.
2. Graduates will be able to contribute to assuring an effective health-care system by identifying, collaborating with and educating other care providers, and referring patients to them when appropriate.
3. Graduates will be able to teach clients, health-care providers, students and peers the knowledge, skills, attitudes and behaviors necessary to meet society’s drug-related needs in a cost-effective manner. Graduates will also be able to teach pharmacy students and peers the knowledge, skills and attitudes required to maintain compe-
Graduates will encourage and reinforce the development and adoption of patient, family and community policies and behaviors that reduce health risks and enhance health-related well-being.

Graduates will be able to acquire, develop, integrate and apply new knowledge of drugs, diseases and pharmaceutical practice to meet professional responsibilities to clients, to the profession and to society.

Graduates will be able to display an understanding of the knowledge and administrative skills which contribute to an environment conducive to meeting clients’ drug-related needs in a cost-effective manner.

Graduates will build support for public and institutional curricula which facilitate clients’ access to quality drug therapy.

Graduates will demonstrate an understanding of the process whereby research leads to scientific knowledge and will be able to apply research techniques to the development of his/her practice.

Graduates will be able to contribute to professional organizations and pharmacy education and be able to initiate and communicate innovations in pharmacy practice.

When comparing the broad intended educational outcomes developed by this group relative to those developed in the original education model, it is noted that again the priority is maintained on the provision of pharmaceutical care. The main differences are that the above group more clearly articulated the non-patient specific responsibilities, thereby placing greater emphasis on elements such as health promotion, contributions to public and health-care policy, pharmacy management, teaching, and contributions to the profession. To further articulate these outcomes, the group is developing the more specific level of desired educational outcomes, which are referred to as competency elements in the Australian documents(12).

It is clear to the Curriculum Committee that the greater emphasis on the areas mentioned above will require some changes in the proposed and approved pharmaceutical care-based curriculum. The priority given to the patient care-specific desired outcomes and to pharmaceutical care, however, reconfirm that the previously developed pharmaceutical care-based courses are appropriate and of sufficient depth and breadth. At present, the committee continues its work in comparing the previously developed pharmaceutical care-based curriculum with the intended educational outcomes.

An additional major task that the committee is addressing is the development of assessment systems which will measure the degree of ‘success’ of the new, pharmaceutical care-based curriculum. It is recognized that the significant increase in funding required by this program, the addition of one year of university to the education of a pharmacist in Ontario, and the energy being expended by the faculty on this new program all require that a rigorous, regular assessment system be integrated into the administration of the new program. Assistance with this effort is being sought from an expert on curriculum design and from resources such as the Program Evaluation Kit by Sage Publications(13).

The kit contains nine books aimed at guiding and assisting practitioners in planning and managing evaluations of new or revised programs. A second resource is Nichols’ book on institutional effectiveness(14).

CONCLUSIONS

We have presented our approach to curricular change for Faculties of Pharmacy. It is the intention of the authors to stimulate discussion and to provide those interested with a starting place for deliberation. It is also our intention that others will critique what is presented and move yet further toward a model curriculum to prepare students to both provide pharmaceutical care and to fulfill the professional and societal responsibilities which make the pharmacy profession worthy of the respect we desire from members of society.

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APPENDIX I. BRIEF OUTLINES FOR NEW OR SIGNIFICANTLY CHANGED COURSES

Introduction to the Profession of Pharmacy (new course—year I)
This course is designed to give students a broad perspective on the profession and the practice of pharmacy. The historical background of the profession is introduced and serves as a starting point for further exploration of developments and trends in the profession and practice of pharmacy. The evolution of the practice of pharmacy (from compounding and dispensing functions to a clinical and patient care focus) is examined. The philosophy of pharmaceutical care will be introduced and developed. An important component of this course is an introduction to a variety of teaching and learning methods with particular emphasis on problem-based learning.

Professional Practice (new courses - years I to IV)

Year I
This course is an introduction to several components of pharmacy practice, taught in a combination of large group lectures and small group workshops or tutorials. Introduction to Drug Information introduces the students to library and drug information storage and retrieval methods for researching and answering problems, abstracting and referencing. Students learn to develop a systematic approach for responding to drug information requests. Professional Ethics introduces students to principles of ethics as well as a systematic approach to ethical problem-solving. Communications focuses on having students understand and develop basic verbal and non-verbal communication skills. A pharmacy practice lab in the spring requires students to effectively apply legal principles learned in jurisprudence to the processing and filling of prescriptions in simulated community pharmacies.

Year II
This second year course continues to develop principles and skills as in Professional Practice I. The theoretical aspects of applied pharmaceutics and extemporaneous compounding form the basis of prescriptions that are used as cases in problem-based interactive sessions that coordinate with laboratories. The focus of both is the application of principles.

Year III
This third year course requires students to apply principles of jurisprudence, communication, group interaction, problem-solving and decision-making to a variety of situations generally encountered in ambulatory pharmacy practice. Simulated pharmacies provide the environment and a problem-based format is used where the prescription is a starting point. Pharmaceutical Care is provided to patients with a focus on positive patient interaction, where the prescription is a starting point. Pharmaceutical Care is provided to patients with a focus on positive patient interaction, where the prescription is a starting point.

Year IV
This is a continuation of Professional Practice III. It requires students to demonstrate a consolidation of knowledge from previous Professional Practice courses and draws on and complements material from Pharmaceutical Care I, II and III as well as other courses, in particular Health Systems and Pharmacy Management. Simulated pharmacies again provide the environment for this course. Pharmaceutical care is provided to patients, with a focus on ambulatory/community practice. Clear documentation of the provision of this care is required.

Pharmaceutical Care (new courses - years II to IV)

Years II and III
This course is an exploration of the pharmacist’s role in self-medication and focuses on the application of the pharmaceutical care process to self-care of mild and/or self-limiting conditions. The selection and use of non-prescription drugs forms the basis for the development of basic principles of self-care and self-medication. Students develop a systematic approach to self-care counsel-

ling and information gathering and enhance their communication skills. Role-playing, class discussions and workshops in this course address patients’ drug-related needs and sensitize students to the moral, ethical and legal responsibilities related to self-care.

Years III and IV
Through discussion of a series of case studies taught in a problem-based format, students acquire and or reinforce their skill at determining whether a patient’s signs or symptoms are related to drug therapy and, if so, how they are related to drug therapy and what alterations are required in the patient’s drug therapy to solve or prevent this problem. The case studies utilized reinforce relevant pathophysiological and pharmacological concepts required to make these decisions. The specific disease states discussed are common diseases that are not self-limiting. Students are expected to communicate both their decisions and the process followed in making these decisions in an understandable, appropriate written and verbal format.

Health Systems in Society (new courses - years II & IV)

Year II
This small group, interactive course places the pharmacist and pharmacy practice within its societal, institutional and professional environment. Topics include gaining a general understanding of the health-care system in Canada, the various definitions of health, how to judge the healthiness of citizens, individual action versus policy decisions, how and why careseeking occurs and the role of the pharmacists and other care providers in the health-care system.

Year IV
This course builds on material covered in the Health Systems in Society I and other courses to provide a theoretical understanding of some of the social issues that concern pharmacists as well as to provide the opportunity for students to begin to formulate and express their views on specific ethical, political and professional issues. Topics addressed include introductions to manpower issues, corporatization of pharmacy in Canada, the impact of biotechnology, care of the elderly, death and dying, alternative health-care, health policy, health economics and emerging trends in health-care.

Pharmacy Management (changed courses - Years III & IV)

Year III
This course provides the linkages between the principles of management theory and the realities of practice. Course material focuses on the organizational or institutional philosophy/practice towards material and service management which impact pharmacy practice. Focus is directed towards understanding the practice and philosophy of organizations external to pharmacy but which have a significant impact on the pharmacist’s practice.

Year IV
Course objectives identify the professional practice issues requiring a manager’s attention and how students, as future practitioners, can employ a management perspective to act as change agents for the profession. Repeatedly the students are exposed to the importance of the optimal use of the profession’s human resources. The concept of a good manager in the context of an ideal employer, an excellent place to work and a practice goal of pharmaceutical care are emphasized.

Pharmacy Practice Research (new course - year IV)
Students develop the research skills necessary to address questions commonly encountered in everyday pharmacy practice. The first series of interactive sessions allow the students to develop a step-by-step process for solving practice-related questions. The students then have the opportunity to apply this information to an assigned problem. They are responsible for developing a plan to
solve this problem which they will then formally present to other students and submit as a written proposal. Students learn a range of research techniques and are required to critique the proposals outlined by other students.

Statistics (altered course - year I)
This course introduces the basic concepts and applications of experimental design and statistical analysis in a problem-solving based format. The main course objective is to develop the students’ ability to read the professional literature critically. To achieve this, a full range of statistical techniques are reviewed, from the simple statistics for a single variable to more complex techniques for the analysis of many variables.

Pharmaceutics (altered course - year II)
In this problem-based course, the dosage form is considered as a means of delivering a drug to the appropriate site in the appropriate concentration, for the appropriate period of time. The science of dosage form development or formulation is presented within a framework that includes economic, biopharmaceutical, patient, ethical and quality issues.