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REVIEWS

Canadian Educational Approaches for the Advancement of Pharmacy Practice

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Canadian faculties (schools) of pharmacy are actively engaged in the advancement and restructuring of their programs in response to the shift in pharmacy to pharmacists having/assuming an advanced practitioner role. Unfortunately, there is a paucity of evidence outlining optimal strategies for accomplishing this task. This review explores several educational changes proposed in the literature to aid in the advancement of pharmacy education such as program admission requirements, critical-thinking assessment and teaching methods, improvement of course content delivery, value of interprofessional education, advancement of practical experiential education, and mentorship strategies. Collectively, implementation of these improvements to pharmacy education will be crucial in determining the direction the profession will take.

Keywords: pharmacy education, advanced practice, entry-to-practice PharmD

INTRODUCTION

The role of the pharmacist is moving away from that of dispensing and information gathering to that of a clinical decision-making, advanced practitioner;[1,2] thus, the need for an educational shift is imperative. However, concerns have arisen regarding the culture of pharmacy and the barriers pharmacists themselves are creating, such as their perception that they lack the knowledge to undertake new clinical roles and their unwillingness to accept increased professional liability.[3,4] In 2010, a Canadian paper by Rosenthal and colleagues suggested that pharmacist characteristics such as lack of confidence, reluctance to take on new responsibilities, and discomfort with ambiguous decisions all contribute to the slow, arduous process of changing pharmacy practice.[5] In a 2012 Canadian paper, participants identified the following barriers to building confidence and responsibility: the hierarchical structure of the health care system, poor perception among the public and other health care professionals of the pharmacist's role, lack of responsibility-building through pharmacy education, lack of ownership of clinical decisions, poor mentorship by senior pharmacists, and innate personality traits.[6]

The Association of Faculties of Pharmacy of Canada has recommended entry-to-practice doctor of pharmacy (PharmD) programs for all pharmacy schools in Canada by the year 2020.[7] Moreover, accreditation standards for the first professional degree in pharmacy have been revised to include standards for the entry-to-practice PharmD programs effective January 2013.[8] Those institutions that have not already moved to an entry-level program are actively committing resources to do so. For a student with an advanced clinical practice degree, an entry-to-practice degree would require an increase in baseline knowledge for the management of a broader scope of disease states, more training in management and communication skills, more clinical practice experiences, and development of cooperative abilities to work on interprofessional teams.[9-11]

The United States has already recognized the need for the advancement of pharmacy education. A "declaration of intent" by the American Council on Pharmaceutical Education in 1989 suggested that American pharmacy schools should shift to an entry-to-practice PharmD degree by the year 2000.[12]After much debate and drastic accreditation changes over the following decade, 2003 marked the first year all US pharmacy schools graduated only PharmD students from their respective programs.[13]

Restructuring the pharmacy curriculum for an entry-to-practice PharmD degree program provides a unique

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opportunity for significant change. There is little evidence regarding the optimal strategies to approach this task. The purpose of this review is to present and discuss educational changes that would promote the development of an entry-to-practice PharmD degree program that supports an advanced practitioner role. Admission requirements, critical-thinking methods, course content delivery, interprofessional education opportunities, practical experiential education, and mentorship strategies will be discussed.

ADMISSIONS

Research on learning styles of pharmacists suggest that a majority of students attracted to the profession of pharmacy are *assimilators*.[14] Assimilators prefer analytical work, information gathering, and a focus on ideas, concepts, and logical arguments, on which one can take time to form decisions. In contrast, people who are *convergers* prefer abstract conceptualization, active experimentation, and high-pressure situations where decision-making and leadership skills are imperative.[15] (Interestingly, medicine tends to attract converger-dominant personalities.[15]) With the shift in pharmacy practice from pharmacists having an information-gathering role to having a decision-making role, the admissions process should perhaps select those students possessing innate leadership and decision-making skills, ie, those with converger-dominant personalities, to address the lack of confidence and responsibility documented within the profession.[5,6]

The admissions process across Canadian pharmacy schools varies considerably and is not standardized. For example, the University of British Columbia and the University of Toronto now require the Pharmacy College Admissions Test (PCAT) as well as a Multiple Mini Interview (MMI) preadmission.[16,17] All other universities have various admissions requirements ranging from a personality test, traditional interview, written essay, letter of intent, or admission profile.[18-25] In addition, the University of Toronto and the University of Waterloo both require at least 2 years of prerequisite courses at the university level, whereas all other universities require at least 1 year of prerequisite courses.[16-25] In the United States, out of the 129 pharmacy colleges and schools, 100 require submission of PCAT scores as part of the admissions process, with some institutions specifying minimum scores between the 30th and 40th percentiles for admission consideration.[26] In terms of prerequisites, all US colleges and schools of pharmacy require at least 2 years (70-80 contact hours) of prerequisite course material, but the prerequisite content is not standardized nationally.[26]

Evidence from US pharmacy programs has suggested that the PCAT, MMI, and California Critical Thinking Skills Test (CCTST) are all good predictors of academic performance and success on licensing examinations such as the North American Pharmacist Licensure Examination (NAPLEX).[27-30] However, there is a lack of evidence for nontraditional examinations, such as those testing for learning, study habits, problem-solving strategies, and their predictive value on academic success.[30]

The PCAT is a standardized test designed to measure the abilities, aptitudes, and skills that pharmacy schools identify as essential for successful completion of their programs.[31] The test was developed in 1973 after a study conducted across American pharmacy schools confirmed that 82% were interested in a standardized entrance examination specific to pharmacy education. Since that time, the PCAT has been revised several times to incorporate pharmacy practice changes. The PCAT takes 4 hours to complete and contains 5 multiple-choice subsets including biology (anatomy, physiology, microbiology, cellular and molecular biology), chemistry (basic biochemistry, organic chemistry, and general chemistry), reading comprehension (comprehension, analysis, and evaluation), quantitative ability (basic algebra, functions, statistics, precalculus, and calculus), and verbal ability. There are also 2 essay-style writing sections.[32] Each of the multiple-choice sections are scored from 200 to 600 and given a percentile rank from 1-99. There is also a composite score, a weighted average of all 5 subsections, and a writing score ranging from 1.0-6.0. It is important to note that scoring for the PCAT was updated in July 2012. Writing scores prior to July 2012 were reported on a scale of 1.0-5.0 and percentile scores were subsequently updated to reflect the normative sample of first-time examiners from 2007-2011.[33] The University of British Columbia requires a minimum composite percentile score of 65% for admission consideration, whereas the University of Toronto has fluctuating minimum percentile scores from year to year in each of the tested subsets.[16,17] Unfortunately, there is a paucity of evidence regarding the use of the PCAT as a predictor of academic success for Canadian pharmacy students because only 2 Canadian schools incorporate it into their admissions process.

The MMI is modeled after the Objective Structured Clinical Examination (OSCE) used for licensing examinations.[34] The MMI format originated at McMaster University's Michael DeGroote Medical School.[35-37] Its structure resembles that of "speed dating," a circuit of approximately 7-12 stations where nonacademic attributes are tested over a 5- to 8-minute interview. Some of the attributes tested include communication skills, problem-solving, critical thinking, and ethical decision-making. Candidates rotate from station to station, read a scenario posted on the outside of the interview room, and are then

allotted a defined amount of time to participate in the interview. Once time is up, the interviewer in each room "rates" the response based on predetermined criteria. Three Canadian pharmacy schools (Toronto, British Columbia, and Dalhousie) have been using the MMI as a part of their admission process.[16,17,24] Cameron and colleagues at the University of Toronto published findings from a pilot test regarding reliability of interview scores from the MMI.[38] The researchers surveyed stakeholders (students, faculty members, admissions staff, and practitioners) to identify 8 nonacademic attributes of pharmacists that were seen as important for admission. The 8 attributes were commitment to care, critical thinking/problem-solving, ethical reasoning/integrity, interpersonal skills, motivation to be a pharmacist, oral communication skills, self-awareness, and being a team player. Once the attributes were identified, a 10-station MMI circuit was designed to evaluate them and tested on 30 incoming pharmacy students. The objectives of this study were to determine the feasibility of the MMI (resources and process), acceptability of the MMI (students and interviewers), validity of the attributes, and the validity/reliability of the scoring system. Overall, the MMI was well received by both candidates and interviewers and was feasible from a resources standpoint because of high interest from volunteer interviewers. The MMI scores were assessed for reliability with the resulting intraclass correlation coefficient of 0.77 (1 being perfect correlation) for the 10-station score. Also, correlations between prepharmacy grade point average and PCAT scores showed negligible results. Therefore, the authors concluded that the MMI is reliable for testing nonacademic characteristics of pharmacy students, is feasible from a resources standpoint, and is well received by both interviewers and students. The MMI therefore could be a practical way of identifying students with strong interpersonal qualities for admission to Canadian pharmacy programs.

The California Critical Thinking Skills Test (CCTST) is designed to assess core cognitive skills central to the process of critical thinking.[39] The original CCTST created in 1989 consisted of 34 multiple-choice items and reported 6 scores; an overall score for critical thinking, and a subset of 5 scores on analysis, evaluation, inference, deductive reasoning, and inductive reasoning. The current version of the CCTST has several different forms directed at different age groups, academic levels, and specialties. The premise is still the same with up to 7 domains (analysis, inference, evaluation, deduction, induction, interpretation, and explanation) being tested depending on the test version.[40] In an American study aiming to identify the prepharmacy predictors of success in pharmacy school, Allen and colleagues found that CCTST scores significantly predict PCAT scores as well as success in practice-based courses.[41] The authors suggest there is a relationship between critical-thinking skills and PCAT scores, and that merging critical-thinking aspects of the CCTST into the PCAT could add to the latter's predictive ability during the admissions process. A second American study from McCall and colleagues found that a composite of PCAT and CCTST scores are positively correlated with NAPLEX licensing examination scores, reinforcing the idea that a second method of evaluation would add to the predictive value of the PCAT.[30]

Although this evidence suggests that these evaluation strategies are valuable, implementation of new admissions testing requires a significant amount of work and resource allocation, especially for interview processes. Perhaps a stepwise admissions process could act as a screening tool to select those students most worthy of an interview. For example, a 2-year prerequisite for university level courses might attract more mature university students, who show greater capability for taking on a large course load. In addition, having minimum PCAT and CCTST scores for admission consideration could aid in the selection process. As a result, a smaller pool of candidates could be offered an interview structured as an MMI. These strategies require further investigation in terms of the type of students they would call out and how well the students' success rates in pharmacy program could be predicted.

TEACHING STRATEGIES

A large part of pharmacy care practice encompasses the application of theory to practice settings and critical thinking.[42] In addition, clinical reasoning, inference, and decision-making are important components of pharmacy practice.[43] The best strategies to assess clinical reasoning and critical thinking are debatable.[44,45]

Austin and colleagues hypothesized that self-assessment and reflection-in-action are perhaps the "missing links" in the development of higher learning and improvement of critical thinking among Canadian pharmacy students.[46] Ninety-four undergraduate fourth-year pharmacy students from the University of Toronto participated in a study where they were divided into 2 groups and completed a 24-item standardized test of critical thinking. Group 1 completed the test without interference, whereas group 2 completed the test with prompts to reflect and self-assess. Prompts included 2 important questions: "How confident are you that you have answered this question correctly?" and "Briefly explain how you decided on the correct answer." Group 2 scored significantly better ($p<0.05$) than group 1 after a prompt was given to reflect

and self-assess. These results suggest that reflection-in-action and self-assessment are important factors for the development of critical-thinking skills and a conscious effort should be made in building these concepts into coursework and assessment methods throughout the pharmacy curriculum.[46]

Clinical reasoning is comprised of a dual process of intuitive and analytical cognitive components.[47,48] The intuitive components consist of instincts and reflexes generated from first impressions, pattern recognition, and rapid responses to information. In contrast, the analytical components are problem-solving processes that consider alternatives and therapeutic options. This component depends on science, logic, inference, associations, and decision-making (in essence, critical thinking).[49] Kassirer suggests that in order to effectively teach clinical-reasoning skills, a framework or roadmap of the clinical-reasoning process should be introduced as the first step of the development of these skills.[49] Kassirer also suggests using real clinical material such as patient case examples, with increasing complexity corresponding to the learner's knowledge base and reasoning skill level. Case material should be organized in chronological sequence, corresponding to the framework developed for the clinical-reasoning process. Further, cognitive load theory demonstrates that adult learners acquire new knowledge and skills when applied to the context of real-life situations.[50] To capitalize on this, Vyas and colleagues studied the use of Human-Patient Simulation (HPS) as a clinical teaching method to help pharmacy students incorporate clinical reasoning and teamwork skills.[51] HPS training provides an opportunity for students to sequentially work through a real-life patient case in a high-stress, low-risk environment where facilitators provide immediate feedback on performance. The process promotes meta-cognitive awareness, self-reflection, and comfort with alternative solutions as more clinical data becomes available. In one such case, students were expected to make a diagnosis based on patient presentation, perform a physical assessment, review laboratory and microbiological data, make a therapeutic recommendation, write orders, manage adverse events (anaphylaxis), and provide a full monitoring plan, as well as oral antibiotic step-down therapy for discharge for a patient with endocarditis.

Taking all above factors into consideration, perhaps the best way to teach clinical reasoning is to provide students with a framework for approaching their patients and a clinical setting in which to exercise the framework so that they can immediately apply newly learned concepts to practice.

In addition to changing educational requirements within pharmacy, educators need to explore new teaching strategies for today's students, who grew up in a different technological era.[52] With constant access to computers and other new media, students use different resources and strategies to facilitate learning than the majority of their instructors.[52] Oderda and colleagues suggest 4 key considerations for pharmacy educators when designing coursework.[42] First, lectures may not provide an optimal learning environment for students with different expectations of course content delivery. Moreover, today's students view the teacher more as a facilitator of learning and less as a *provider* of information. Second, learners must see transparent relevance of assignments to pharmacy practice. Third, because social networking is a large part of their daily lives, students value collaborative group work as an important learning process. Finally, today's students appreciate efficient, constructive feedback using technology as an integrated part of the learning process in the classroom. Some pharmacy schools require laptops as a tool for learning,[23] which may be a good approach to facilitate new technological learning strategies. In addition, Caldwell has suggested that using "clicker" technology (or audience response systems) to poll large classes can increase student participation and attendance when "clicker quizzes" are worth at least 10% of final grades and the technology provides instant feedback for students and instructors.[53] However, using this type of technology in the classroom comes with caveats. Potential barriers include instructor training on the use of the technology, higher cost of audio-visual materials, technical support/difficulties, student affordability, and lost class-time. However, most of these barriers can be removed with adequate preparation and practice.

INTERPROFESSIONAL EDUCATION

Interprofessional education (IPE) has demonstrated that providing patient care in a team environment has a beneficial impact on students.[54] The World Health Organization defines interprofessional collaboration as "a patient-centered, team-based approach to health care delivery that synergistically maximizes the strengths and skills of each contributing health professional."[56] Medicine and pharmacy may be separate fields, but are ultimately interdependent professions. Medical students are more comfortable taking patient histories, while pharmacy students are more comfortable analyzing drug therapy, and therefore, a cooperative patient care approach is feasible.[55]

A practical example is the IMPACT project (Integrating Family Medicine and Pharmacy to Advance Primary Care Therapeutics),[57] in which 7 pharmacists were integrated into a family practice setting over a 12-month period in Ontario. In this setting, pharmacists' skills and

perspectives helped to establish a new professional role and resulted in an overall successful collaborative team approach to patient care.

Bidirectional application of interprofessional learning exists between medicine and pharmacy, working towards an interprofessional team approach rather than an independent or hierarchical structure. There are several models where practicing pharmacists are responsible for a teaching portion of the medical residents' education.[58,59] One survey reported that more than a quarter of family medicine residency training sites across Canada include direct teaching involvement of pharmacists in medical residents' education.[58] A systematic review of 36 US studies suggested that pharmacist participation in clinical activities resulted in reduced drug interactions, side effects, and prescribing errors, increased medication adherence, and increased appropriateness of drug use and drug knowledge, for both patients and other health care practitioners.[60] These and other studies suggest that the contribution of pharmacists' knowledge to inpatient or outpatient health care teams is valuable and results in improved patient outcomes.

Hind and colleagues suggest that early integration of interprofessional learning opportunities should be employed due to a high willingness to participate in IPE activities.[61] During the first years of a health sciences profession, it is theorized that within-group identification of social identity has not yet developed. Students see themselves as part of a much larger group (ie, first-year university students) rather than as pharmacy or medical students,[61] making IPE easier to initiate. Students are attracted to IPE to provide better patient care, enhance their future careers, and satisfy personal curiosity about other health care professions.[63] In an attempt to foster these curiosities, the University of Manitoba piloted a collaborative learning activity in February 2012 titled "Nightmare Night Care." Twenty nursing students, 14 medical students, and 3 pharmacy students occupied the Faculty of Nursing simulation laboratory on a 13-hour overnight shift in a mock hospital setting.[63] The purpose of the event was for health care students to understand the patient experience, practice interdisciplinary skills, and experience nightshift skills in a safe learning environment.

Interprofessional activities introduced at an early point in pharmacy education may help develop relationships with other health care professionals, define and advance professional roles, and optimize collaborative patient care roles once students graduate. In addition, involving pharmacists in new collaborative patient care roles will grant patients access to new health services, widening the public's perspective of the pharmacist's professional role.

INCREASED CLINICAL EXPERIENTIAL ROTATIONS

As discussed previously, critical-thinking and clinical-reasoning skills are best developed through active learning experiences.[50] Unfortunately, the majority of existing structured practical experiential programs (SPEP) across Canada are short in duration, expose students to the clinical role late in the program, and do not allow enough time to transfer knowledge into advanced practitioner skills.[65] Students often observe the pharmacist's role without actively participating themselves and are therefore not accountable for their decision-making in patient care activities.[66] In addition, short placements of only 2-4 weeks at each site may be insufficient for students to establish their role, feel comfortable taking on patient responsibilities, and actively engage in the learning experience. In 2010, the Association of Faculties of Pharmacy of Canada and the Association of Deans of Pharmacy of Canada published a position statement on the entry-to-practice PharmD programs stating that pharmacy schools must "increase the accessibility, quality, quantity, and variety of experiential learning opportunities to prepare pharmacy professionals, including students, to practice in expanded and innovative roles."[7] The Canadian Council for Accreditation of Pharmacy Programs (CCAPP) recommends that experiential time should be increased to a minimum of 40 weeks (1600 hours) total. The council also recommends that early and mid-program experiences must involve at least 8 weeks of student placement and can be supplemented with community-based volunteer experiences.[67] The Accreditation Council for Pharmacy Education outlines in the accreditation standards that US pharmacy colleges and schools require no less than 300 hours of introductory pharmacy practice experiences over the first 3 professional years, balanced between institutional and community pharmacy practice. In the final academic year (year 4), 1440 hours (36 weeks) of advanced pharmacy practice experiences are required.[68]

Expansion of experiential learning programs is not without issues. Increasing enrollment rates and movement to the entry-level PharmD program will result in the need for more experiential placements for students. For example, the University of Toronto Faculty of Pharmacy has doubled its enrollment from 473 students in 2000/2001 to 951 students in 2009/2010.[65] Faculties are reporting difficulties placing students for clinical rotations because of the host sites' limited participation and their overall unwillingness to take students.[69] This unwillingness stems from the fact that pharmacist preceptors are concerned with providing a quality experience

while still having time to perform duties.[70] Also, a survey conducted during the Moving Forward project as part of the Blueprint for Pharmacy suggested that pharmacists were reluctant to take students because of students' lack of confidence and independence.[71] Thus, curricular modifications need to be made that provide students with the tools to succeed in clinical placements.

Several strategies have been employed in an attempt to provide students with educational, valuable, and applicable rotation experiences. Several studies recommend earlier exposure to patient care settings.[65-67] Ackman and colleagues implemented an early hospital rotation for second-year Canadian pharmacy students, which aimed to introduce the pharmacist's clinical role and facilitate direct patient-care activities, such as medication history-taking and allergy assessment.[72] The 10-day experience was positive overall for both students and the preceptor, and the students' capabilities often exceeded the preceptors' expectations. This evidence suggests that earlier exposure is feasible and valuable to students' confidence-building. Martin and colleagues investigated another early experience involving first-year pharmacy students in the United States who were each paired with an independently living senior patient, and were required to complete 10 visits.[73] Prior to the visits, the students attended an 8-hour boot camp where basic assessment skills such as blood glucose testing, blood pressure reading, and older-adult sensitivity training were covered. The visits consisted of collecting health-related information and developing patient communication skills. The students were required to submit an electronic portfolio of reflections on their experiences and group-share activities. The students gained significant confidence in communication, medication interviewing, autonomy, and application of patient-care skills. The senior patients also enjoyed mentoring/interacting with the students and many experienced health-related improvements.

Another strategy suggests that experiential rotations should be structured similarly to the medical model, in which more senior pharmacy students or residents are responsible for teaching and mentoring junior students, and an attending pharmacist oversees the process.[65,71,74] With the increased demand for clinical placements, perhaps increasing the ratio of students from 1:1 to 3:1 or 4:1 and allowing preceptors to give senior pharmacy students more responsibility for teaching and partial responsibility for the patient care load is a viable solution. To support this concept, Linblad and colleagues created a clinical teaching unit model at a Canadian acute-care hospital on a medicine/stroke ward for 5 pharmacy students in their final year.[70,75] The model included a 9-week rotation where 3 students began their rotation on week 1, and the second group began their rotation on week 5, which allowed for 5 weeks of overlap between the 2 groups. Preceptors shared their patient care responsibilities with students, allowing them to take responsibility for history-taking, patient medication review, and creation, implementation, and follow-up of care plans, all of which preceptors co-signed. In addition, the group starting on week 1 mentored the group starting on week 5, and peer-reviewed proposed care plans prior to pharmacy preceptor review. Students critically reviewed each other's clinical activities such as history-taking, case presentations, and medication counselling. Both preceptors and students felt that students' confidence, independence, judgement, time-management skills, and responsibility increased with the clinical teaching unit model compared with the traditional model. In addition, during the clinical teaching unit project, the preceptors identified 768 drug-related issues as compared to 151 for the same period in the previous year. This is an example of how pharmacy student involvement in patient care activities directly results in improved patient care. Finally, Hall and colleagues suggest that a framework of expected patient care activities should be introduced to students at different stages of their training.[65] This would facilitate a sense of "graduated responsibility," which is seen in the medical model,[77] and would provide patient-care experiences appropriate to the level of the students' abilities.

Experiential rotation time is a valuable aspect of pharmacy students' education, allowing them to convert textbook knowledge to active-learning experiences with direct patient care. Unfortunately, clinical resources and availability of student placements may not be adequate to support such an ambitious expansion in professional roles. Providing support systems for pharmacist preceptors, increasing student to preceptor ratios, and moving toward a medical model where more senior students mentor one another in the clinical setting could provide potential solutions to these obstacles.

MENTORSHIP OF PHARMACY STUDENTS

Increasing the diversity of and time spent in experiential rotations will only develop students' independence, confidence, and responsibility if those experiences are of optimal quality. This fact has been recognized by both US and Canadian pharmacy education stakeholders.[67,78] Mentorship of pharmacy students is therefore of utmost importance. The ideal qualities of a mentor among medical professionals include personality traits such as enthusiasm, compassion, and selflessness; a willingness to act as a career guide for mentees; a commitment to participate in regular, frequent, and high-quality meetings; a willingness to help the student achieve personal/professional life balance; and a commitment to be a good role-model and set expectations for future mentors.[79,80] Pharmacists possess-

ing these qualities or those willing to develop these qualities are prime candidates to serve as mentors for pharmacy students.

Recent research has proposed strategies to develop, implement, and evaluate a formal pharmacist mentoring program. A Canadian pilot project paired 3 experienced pharmacists with 3 pharmacists with less than 18 months of clinical experience to determine if the program produced a productive mentoring relationship.[81] At the start of the program, mentors underwent a 3-hour coaching session, and mentees participated in an orientation session. Throughout the study, mentors and mentees met frequently and discussed the mentees' learning objectives and strategies to achieve them. Overall, confidence levels and overall job satisfaction increased for both mentors and mentees. Woloschuk and colleagues explored similar development and evaluation of a workplace preceptor training program in Canada.[82] Participants were responsible for self-study readings and had an interactive seminar session to develop lesson plans. Structured practical experience followed, during which participants were assigned a student or new staff member. Experienced preceptors were also available to coach participants. Qualitative interviews and course evaluations at the end of the program confirmed the usefulness of a preceptor-development program. It facilitated a positive practice and attitude change towards preceptorship and validated the usefulness of a preceptor coach. In an assessment of Canadian hospital pharmacist residency preceptors, participants identified, through focus groups, online surveys, interviews, pilot studies, and member checking, that communication skills, giving effective feedback, and clinical knowledge were the most important attributes for being an effective preceptor.[83] Participants also expressed interest in educational opportunities such as interactive workshops and mentorship programs to further develop their preceptor skills. Finally, Fuller and colleagues suggested that in order to maintain faculty retention, developing nurturing relationships with senior faculty members to promote protégé educators is vital, demonstrating that mentoring is not only useful to pharmacy students, but also to new pharmacy faculty members, who are expected to be the future educational leaders of the profession.[84]

CONCLUSION

There are many opportunities for pharmacy education programs to expand to meet changing societal needs and evolving roles and responsibilities for pharmacists. Standardizing the admissions process to attract pharmacy students who possess innate critical-thinking skills and leadership qualities is an approach worth considering. To accommodate students raised on new technologies, restructuring the depth, breadth, and method of delivery of course content may also need considering. Exposing students to interprofessional education through practical clinical experiences early on also seems essential for the development of effective communication and group collaboration skills, professional development of responsibility, and confidence for clinical decision-making. Finally, increasing the duration and scope of practical experiences as well as the quality of preceptorship will be important in shaping the future direction of practice.

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