Canadian Experiential Education Project for Pharmacy

Priority 4

Description and promotion of the value learners add to host organisations and their mandate

Prepared by
Katrina Mulherin, BSc Pharm, Pharm D
Jan Coates, BSc Pharm
Nadine Ijaz, PhD Candidate
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List of Abbreviations

AACP-American Association of Colleges of Pharmacy
AFPC- Association of Faculties of Pharmacy of Canada
ELPD – Entry Level Doctor of Pharmacy Degree
CanExEd- Canadian Experiential Education Project for Pharmacy
CAPSI – Canadian Association of Pharmacy Students and Interns
CPRB- Canadian Pharmacy Residency Board
CPhA-Canadian Pharmacists Association
CSHP-Canadian Society of Hospital Pharmacists
ExEd – Experiential Education
NAPRA-National Association of Pharmacy Regulatory Authorities
NPAC – Neighbourhood Pharmacy Association of Canada
OEE – Office of Experiential Education
PEP-C – Pharmacy Experiential Programs of Canada
SC-Steering Committee
Universities:
- MUN – Memorial University of Newfoundland School of Pharmacy
- Dal – Dalhousie University College of Pharmacy
- U de M – Université de Montréal Faculté de Pharmacie
- U of T – University of Toronto Leslie Dan Faculty of Pharmacy
- U of W – University of Waterloo School of Pharmacy
- U of M – University of Manitoba College of Pharmacy
- U of S – University of Saskatchewan College of Pharmacy and Nutrition
- U of A – University of Alberta Faculty of Pharmacy and Pharmaceutical Sciences
- UBC – University of British Columbia Faculty of Pharmaceutical Sciences

Executive Summary

Introduction: Priority 4 Report: ***Description and promotion of the value learners add to host organisations and their mandate*** is the 4th report in the CanExEd. It examines the current situation in Canada and evidence regarding the benefit of having learners present in clinical practices, makes best practice recommendations for measuring and maximising benefits and identifies prototypes for achieving best practice. Evidence of detrimental effects of learner presence is also briefly examined. Questions to be addressed in the course of this report include:

1. Describe the evidence (published and project-identified) indicating students provide value to organisations and those they serve.
2. Are there other potential benefits not described in the literature or by stakeholders?
3. What evidence is there to suggest that students are a source of risk or detract from the mandate of host organisations? How can these detractors be eliminated or minimized?
4. What quality outcome measures could be used to establish, track and quantify benefits of hosting students?
5. Describe a comprehensive plan for measuring quality outcome results of student contributions to organisations/organisational mandates.

Methods: Searches for relevant **peer-reviewed literature** from the last 10 years were conducted using established educational, science and health professions databases. In addition, academic interviewees provided citations (peer reviewed and grey) pertaining to the benefits and risks of having students on rotation. Relevant articles were retrieved, reviewed in detail, analysed using a structured data extraction guide and appraised for quality. **Semi-structured interviews** with key informants were conducted to describe the current situation with respect to student benefit on rotation and future concerns, hopes and possibilities on the topic. Interviews were recorded and transcribed. Transcripts were thematically analysed according to pre-determined subject areas to consolidate findings.

Results: Seven hundred and sixty-six (766) abstracts were initially identified. Of those, 64 total citations reviewed in detail. There were 53 articles pertaining to the benefits of having students in practice environments and there were 11 articles pertaining to the detriments or risk of having students present. Six important pieces of grey literature were identified. Peer-reviewed pharmacy education literature originated predominantly in the US and was generally of good to fair quality. Pharmacy settings were the focus of economic and patient benefit investigation however a few articles in other professions describing organizational benefit were generalizable. Institutional pharmacy was the setting for most of the studies (57%). The benefits examined include economic, patient (i.e.amount of antibiotics, morbidity, patient safety and readmissions) and organizational (i.e. patient satisfaction, reduced antibiotic expenditures) outcome measures. Value is measured in quantitative (e.g. time saved, interventions made) and qualitative (e.g. impressions on patients) . The literature indicates **community pharmacy** experiences benefit through extension of services (provision of pharmaceutical care components, patient and provider education), and economics (cost avoidance or revenue-generation) with patient impact more rarely described. Value in **institutional practice** was patient-related and specifically gained through the provision of various aspects of pharmaceutical care, patient satisfaction, completion of QA projects and extension of services such as antimicrobial stewardship. A particularly well-designed comparative study of nurses working in environments where preceptorships (albeit new staff rather than students) were embraced vs. environments where they were not used, indicated that organisational learning and organisational performance scores were higher in the units that used the preceptor model for training. These could be considered strong indicators of organisational benefit.
Sixteen interviews were conducted between July and January 2015. Stakeholders identified that students were perceived to save the preceptor time, extend services and generate profit. In the future< interviewees indicated it would be beneficial to collect national data on actual benefits accrued as a result of student presence but there are significant (but manageable) hurdles to achieving this nationally.

Discussion: There appears to be an appetite and potential for continual quality initiatives measuring benefits across time and jurisdictions of having students learning in patient care environments. Implementation of perpetual tracking will require technical resources and monitoring as well as up-front efforts to establish meaningful quality indicators. Recommendations in this report attempt to provide direction for continual QI measures of student impact through multiple tools. Results of these QI initiatives may then be used to promote the benefits of ExEd to stakeholders and funders. Until such time as Canadian results become known, promotional strategies will rely upon US-based research data. Prototypes for meeting these recommendations include staged establishment of KPI reporting by students and a national set of survey questions to measure intangible outcomes such as satisfaction levels, extension of pharmacy services and student impressions of benefit.

Conclusion: According to the literature and Canadian stakeholders in ExEd, there is definitive value to practice sites, patients and pharmacist preceptors to having students present on rotation. This is evident across practice sectors and jurisdictions. A national CQI strategy measuring benefit would provide Canadian evidence of organisational (economic, patient outcomes), professional (preceptor satisfaction and retention), patient and student benefit and inform stakeholders of changes over time.

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I. Introduction

A. Preamble

The Canadian Experiential Education (CanExEd) Project for Pharmacy contributors, context, scope, objectives, intended audience and application for all seven Priorities of the project are available in a separate document entitled, "CanExEd Foundational Information". Appendices for all the reports are contained within the document, "CanExEd Priority 1-7 Appendices".

B. Previous and Upcoming Reports

This is the fourth in a series of reports to be delivered between 2014 and March 2016. Each completed report is available at: http://afpc.info/content/canexed-reports.

C. Purpose of Priority Report #4

This report communicates the investigation and findings of the current state of ExEd in Canadian Pharmacy Faculties/Schools, best practices and recommendations to achieving best practice relating to CanExEd Priority #4:

Description and promotion of the value learners add to host organisations and their mandate

Context: Faculties of Pharmacy across the country are at various stages of transition from Baccalaureate of Science of Pharmacy (BSc Pharm) degree as the entry-to-practice degree to an entry level Doctor of Pharmacy (ELPD) degree. At time of writing, 4 schools had transitioned to the ELPD. The remaining 6 schools are expected shift to ELPD within the next 5 years. Implications of the transition are dramatic. Given that the knowledge and skills of students within the new curricula are expected to be augmented as compared to the existing Bachelors' curricula, It would stand to reason that benefits are poised to increase to a level approaching that in the US literature where the ELPD has been the entry to practice degree for the last 15 years.
Preceptors and organisations will be considering the value of learners to their practices, organisations, patients and pharmacists as decisions are made whether to host students on rotation and if so, the number of learners present in the environment. As ExEd Programs across Canada are requesting increasing numbers of rotations, having students must be seen as on the whole as providing benefit to a degree that surpasses the resources required to host them. This report seeks to identify these benefits and quantify them where possible.

The following content examines the evidence, both literature-based and stakeholder-identified, surrounding the benefits of having learners present in clinical practices, makes best practice recommendations for maximising benefits to sites and patients and puts forth key prototypes for achieving maximal benefit. In addition, recommendations for communicating these benefits to stakeholders and prototypes for promotion will be developed within **Priority #7 Report: Promotion of experiential education to stakeholders (organisations, preceptors, colleges)** In essence, the promotional content is established in this report for integration into promotional plan described in Priority #7 Report. Evidence of detrimental effects of learner presence will also be examined to achieve a fair and balanced representation. The mandate of this priority does not include examination of the benefits to preceptors offering rotations in non-direct patient care environments.

II. Description and promotion of the value learners add to host organisations and their mandate

A. Priority Description

To produce competent and confident pharmacists at entry-to-practice, faculty-sited education must be accompanied by learning opportunities in the field. The application of in-house learning is achieved through experiential rotations in various practice sectors both early and late in the learner's degree program. The benefits to the student and newly minted pharmacist are important but so too are the benefits accrued by the preceptors, practices and patients of host sites. The value of hosting students on rotations can be categorised as:

- Economic benefit

- Patient benefit
- Organisational / Professional Services extension
- Personal preceptor benefit

Economic and patient benefits and risks vary between health care professions due to their respective unique scope of practice and resource costs; therefore, consideration of these benefits should be limited to the pharmacy field. Considering benefit in other professions is appropriate in order to:
1. Establish reasonable design of economic investigations: The inputs and outputs used to examine similar benefits in other professions can set a standard for research that pharmacy investigations should mirror. Actual values assigned to inputs and outputs will vary and will not apply to pharmacy students
2. Describe impact on the organisation as a whole
3. The personal/psychological effect of hosting learners on preceptors, whether pharmacy students or other professional learners, is generalizable across fields. These impacts on the preceptor are explored across health care disciplines and results of that research are presented in greater detail within an upcoming **Priority #5 Report: Optimisation of preceptor recruitment and retention.**

The decision to include personal preceptor benefits in this subsequent report was made based on literature pertaining to the 5th priority which identified further preceptor benefits beyond those found within the 4th priority literature synthesis. To facilitate comprehensiveness of literature review, this category of benefit was relegated to the 5th Priority Report so that the evidence could be examined in its' entirety.

Evidence pertaining to the risks and liability of having pharmacy students on rotation must ensure a balanced representation of benefits and risks associated with the current scenario of having students on rotation, best practices and prototypes.

Economic benefit would be measured with tangible quantitative research whereas patient, organisational and personal benefits require a primarily qualitative approach in conjunction with quantitative measurements.
The promotion of these benefits will be accomplished in a subsequent report (#7), however the **content** for promotion will be included within the recommendations and prototypes section of this report.

B. Research Questions

In order to address this priority, the following questions were developed iteratively through the work of the project team and integrating feedback from the PEP-C group and SC.
1. Describe the evidence (published and project-identified) indicating students provide value to organisations and those they serve. Consider organisational type: community/clinic/institutions and Setting: urban/rural and Dimensions: health outcomes/economic/professional/psychological.
2. Are there other potential benefits not described in the literature or by stakeholders?
3. What evidence is there to suggest that students are a source of risk or detract from the mandate of host organisations? How can these detractors be eliminated or minimized?
4. What quality outcome measures could be used to establish, track and quantify benefits of hosting students?
5. Describe a comprehensive plan for measuring quality outcome results of student contributions to organisations/organisational mandates.

C. Methods

A detailed description of the methods used in the Project are contained in, "Canadian Experiential Education (Can ExEd) Project Primer". It is available at:
http://afpc.info/system/files/public/CanExEd%20Priorities%20Foundational%20Information.pdf

Semi-structured interviews
The Interview protocol was developed to explore topics related to Priority #4. The interview used semi-structured questions to guide discussion. Appendix B provides the complete guide. Interviews were iterative and emergent.

Peer-reviewed literature

All abstracts were reviewed for relevancy to Priority #4. Relevant articles were retrieved, reviewed in detail, analysed using a structured data extraction guide (Appendix C) and appraised using the QUESTS criteria (Table 1) as developed by the Best Evidence for Medical Education Collaboration(1). Quality was appraised according to the number of QUESTS criteria satisfied (Table 2).

Table 2: Quests Criteria

Letter	Criteria
Q	Quality of the evidence from a design standpoint
U	Utility or the degree a method can be transferred and adopted
E	Extent or amount of evidence
S	Strength of the evidence statistically
T	Target or question addressed and how it was measured
S	Setting of the evidence in both context and population

Table 3: Appraisal Guide

Grade	QUESTS Criteria Satisfied
Excellent	5-6
Fair/Good	4-3
Poor	0-2

D. Results

1. Process

Peer-reviewed literature
Seven hundred and sixty-six (766) abstracts were initially identified. Appendix E lists the 64 total citations reviewed in detail. There were 53 articles pertaining to the benefits of having students in practice environments and there were 11 articles pertaining to the detriments or risk of having students present.

Grey literature
Through consultations with members of the SC and PEP-C group, six important documents were identified. Appendix F lists these documents.

Semi-structured interviews
Sixteen interviews were conducted between July and January 2015. Interviews were predominantly one-on-one with two exceptions where the interviewer interviewed 2 participants simultaneously.

- 13/16 interviews were with Canadian Academics (Dean =1, Experiential Educators =11, assessment expert =1) within Pharmacy Faculties. All Faculties were included with the exception of two.
- 1/16 was with a US ExEd expert (Texas Tech)
- 1/16 was a member of NAPRA
- 1/16 was with a learner
- Although not a structured interview, a researcher-physician in primary care provided information

Interview duration ranged from 45 to 180 minutes. Long interviews were completed over 2-3 sessions. All interviews were conducted by the Project Manager and captured via audio and, when possible, video.
Interviewees were very forthcoming in their conversations regarding ExEd and were keen to participate. None expressed concern or questions regarding informed consent for recording.

Learner and preceptor feedback via survey and focus group
Will be conducted in late winter of 2015 and will refer to findings in this report and to the prototype product

Stakeholder feedback
A draft version of this report was discussed with two stakeholder groups, the PEP-C and CanExEd Steering Committee (SC).

2. Findings

Peer Reviewed Literature

Relevant articles were critically appraised for quality (Table 4), analysed for origin (Table 5) and practice setting (Table 6).

Table 4: Appraisal Grading	
Grade	Number of Citations
Excellent	15
Fair/Good	30
Poor	8
Total	53

Table 5: Country of Origin	
Country	Number of Citations
US	49
Canada	2
China	1
Germany	1
Total	53

Table 6: Practice Setting*			
Community Pharmacy	**Ambulatory Care**	**Hospital (Institution)**	**Other (list)**
15	10	30	3 Industry, Communication Centre

* Some studies included more than one practice site

Value of pharmacy student rotations was reflected in 45 of the 53 citations. Articles originating in other professions (6 nursing, 1 each physiotherapy and occupational therapy) were instructive for identifying particular costs/benefits considered in deciding on the value of having students. Note: Priority #5 will include results of broader searching of all health care professions for the personal benefits to preceptors as these multi-professional findings would be generalizable to pharmacist preceptors. The values examined in detail in this report relate to the economic benefits and patient and organisational outcome measures to organisations and patients through the contributions of advanced pharmacy practice experiences in the final year of the pharmacy program.

In general, **community pharmacy** experiences value as professional service extension(2-6) and economic benefit(7)-(8) while **Hospital and Ambulatory Care** describe value through quantitative (i.e. number of readmissions avoided, antibiotic cost impact) and qualitative categories (i.e. effect on patient(8-13), and preceptor(14-17)

Medication Therapy Management (MTM) is the student intervention identified as valuable in much of the **community pharmacy** published literature, and could be considered equivalent to pharmaceutical care (PC). Incorporating a systematic PC process in community pharmacies has been difficult to achieve(18) due to time commitments required of the pharmacist for dispensing and related obligations. Dugan(19) discusses these barriers, and the need for balance between patient access to medication and the need for pharmaceutical care to ensure optimal medication use. Activities of pharmaceutical care are necessary to both the pharmacy and the profession in order to promote a positive impression of pharmacy to the public, having patients recognize the importance of soliciting the help of health care professionals, and the impact of pharmacist recommendations regarding medications and patient outcomes(2,4,19,20).

Important literature based in community pharmacy includes the McDonough et al(5) retrospective review, including a thorough cost analysis of substituting a student for pharmacist time with a small positive net financial outcome. While the absolute dollars gained was negligible, it is important to note that the finding indicates the financial outlay of having a student is at least equalled by the income generated by the student performing MTM functions. Further benefit to patient was hypothesized (but not measured) with consideration of patient follow-up and home visits.

Woolley(7) evaluates (retrospectively) the potential cost avoidance at $908,000 (87 students, 36 weeks, and 5700 interventions) through student interventions documented in an intervention database. He concludes that student interventions (adverse drug event prevention, provider education, patient education having the greatest impact) had a positive contribution to potential cost avoidance in both in-patient and outpatient environments. The cost avoidance was derived from a comprehensive literature review and adjusted to the current year (2011) dollars based on consumer index for medical care. Divall reported on 3 years of interventions for students on advanced pharmacy practice experience rotations and found that 70% of interventions were accepted and that over 60% were considered to convey significant clinical impact. Long-term patient (and therefore cost) impact defined as decrease in morbidity and hospitalisations occurred for 1/6 of interventions and immediate cost impact defined as immediate decrease in drug or lab or hospital use occurred in about 1/10 of the interventions. Dollar amounts were not assigned to these outcomes.(8)

Benefits of student for pharmacist substitution have been described in an **ambulatory** care setting (19,21-24). Studies that looked specifically at patient benefits within the **community pharmacy and ambulatory Care** setting, found that student implementation of health promotion, health literacy and advocacy and community health education projects(2,19,25) such as therapeutically-specific interventions described as performing heart health risk analysis, pandemic information and immunization(6,26) resulted in significant benefits to patients. Benefits included increased understanding of cardiovascular risk, and an improved understanding of their medication. These recognized health benefits to the patient contribute to wellness initiatives, and contribute to the community pharmacy fulfilling their expected role of practicing pharmaceutical care. Stevenson combined student and faculty interventions over 3.5 years as well as all practice site interventions and arrived at a number 187 000 interventions documented by about 500 individuals. Student interventions accounted for 92-221 interventions per year and avoided between $2 700 to $7 533 per year per student.(27)MacKinnon, and Reddick corroborate Stevenson's results by reporting numbers and types of interventions and in some cases monetary value of student interventions(28,29).

I**nstitutional practice** has been the benefactor of published literature describing student impact. Literature describes the responsibilities related to Medication Reconciliation(30-32), and Antimicrobial Stewardship(33,34) as construing benefit to the organization through their successful outcomes (such as reduced antimicrobial costs, optimized antimicrobial therapy, reduced re-admission rates, etc.), and hypothesized positive impact on patient safety and outcomes. MTM (or pharmaceutical care) provided by students, including discharge counselling (11,12,35), identification of drug related problems (pre-intervention: 151 drug-related issues vs. post-intervention 768; a 508% increase) including medication errors with the inherent effective interventions (36) are well documented as being a financial benefit (37,38) as well as benefit to patient safety, patient satisfaction and thus the organization. (2,39-41) Additional contributors to safety include providing prescribers and caregivers education and participation in quality assurance projects.

Priority #5 of the CanExEd project examines best practices for preceptor recruitment and retention. It includes findings on the reasons preceptors agree to have students in their practice and in depth discussion of the impact of students across all areas of practice and all patient care professions (pharmacy, nursing, physician etc.). Please refer to that report for the more 'intrinsic/intangible' benefits.

The literature is certainly supportive of intangible benefits to preceptors and the associated unequivocal benefit to the organization. (10,42-44) A particularly well-designed comparative study of nurses working in environments where preceptorships (albeit new staff rather than students) were embraced vs. environments where they were not used, indicated that organisational learning (through better opportunities for staff development, accurate and efficient communication and processes for sharing new procedures throughout the department) and organisational performance (adaption secondary to using nursing resources appropriately, presence of effective nursing leaders, set of clear performance goals, achievable departmental mission) scores were higher in the units that used the preceptor model for training. (43) Whether these impacts to the organisation were due to preceptor presence, or that having preceptors was as a result of these attributes is difficult to ascertain but at the minimum, embracing preceptorship through establishment of learner goals, validating preceptor skills, and completing formal training and documenting completion of preceptorship periods may be considered intermediate indicators of organisational benefit.

Grey literature

HOSPITAL

Canadian hospitals and academic institutions have examined the benefit students present on rotation. Three published documents(45-47) indicate hospital directors believe students add value to their institutions. Directors indicated on survey that ExEd is provided in their institutions as a means to:

- recruit future employees
- train future pharmacists
- expand pharmacists' service
- fulfill educational mission of their site/region

In addition, 61% agreed that students were of benefit (in general) to their sites.

The University of British Columbia's (UBC) Agile project used a mixed method approach to describe pharmacists' perspectives on precepting. There were 233 surveys analysed and an unknown number of focus group and interviewees audio recordings transcribed and analysed in the QI initiative. Precepting benefits were grouped as personal, departmental and extrinsic. Personal benefits included increased knowledge of the preceptor, improvements in practice abilities and fulfillment of professional responsibilities. Departmental benefits included increased education opportunities for staff, increased recruitment impact and improved patient care. Extrinsic benefits were awards and recognition and remuneration or other incentives. (48)

The Agile project also (a second poster presentation available at: http://www.aacp.org/meetingsandevents/AM/2015/Documents/abstracts/ResearchEdu/ExperientialEdu/Opportunities_to_Enhance_Institutional_Experiential_Edu-MutuallyBeneficialActivities_Analysis.pdf) surveyed 124 front line pharmacy preceptors, coordinators, residents and recent graduates in BC to understand what specific student-performed activities would be subjectively viewed as mutually beneficial. Mutually beneficial activities (Table 7) were considered to be tasks that were:

1. Beneficial to student learning
2. Beneficial to patient care and site
3. Learners were prepared for
4. Preceptors were comfortable with

TABLE 7

Table 2: Reference list of Mutually Beneficial Activities

Tier 1 - *ALL* students are prepared to do on APPE rotation

Patient counselling and teaching:
- Medical device counselling (e.g. inhalers)
- Warfarin teaching

Staff education:
- Pharmacy technician in-service, nursing in-service, journal clubs*
- Responding to drug information requests

CSHP 2015 initiative:
- Ensuring appropriate discharge medications (e.g. ACEI/ARB) after cardiac events
- Identifying high-risk patients in need of influenza/pneumococcal vaccine(s)
- Identifying patients eligible for smoking cessation/nicotine replacement therapy
- Medication counselling (e.g. upon initiation/discharge)
- Obtaining a Best Possible Medical History (BPMH) for medication reconciliation

Pharmacotherapeutics:
- Identifying chronic meds that are no longer indicated/linked to a poor risk-benefit ratio
- Ensuring chronic conditions are well managed
- Preliminary recommendations for conversions between pain medications

Miscellaneous
- Allergy assessment and adverse drug reaction (ADR) reporting
- Post-discharge follow-up with patient/community pharmacist*
- Call and follow up on PharmaCare Special Authority request(s)*

Tier 2 - *SOME* students may be able to do with additional on-site training

Providing preliminary dosage recommendations to the pharmacist:
- Pharmacokinetic dosing and monitoring plans for vancomycin, phenytoin, etc.
- Initial & maintenance doses for insulin

Re-evaluating drug therapy:
- Reassessing empiric antibiotic therapy after culture and sensitivity results available
- Identifying patients eligible for IV to PO step-down therapy (antibiotics)
- Assessing need for ongoing proton pump inhibitor (PPI) therapy

Miscellaneous
- Site-specific mini-projects as determined by preceptor

Tier 3 - Preceptor's "Wish List" for students

Assessing need for therapy:
- Initiating or stopping venous thromboembolism prophylaxis
- 48/6 initiative: ensuring bowel and bladder, cognitive functioning, functional mobility, medication management, nutrition and hydration, and pain are managed properly

Providing preliminary dosage recommendations to the pharmacist:
- Warfarin dosing
- Starting dose and monitoring plans for patients with renal impairment

* In the survey, students responded that they were unprepared to do these activities. We believe this is mainly because they did not know what the activity entails. If some slight further instruction was provided to clarify/guide students on what is expected then these activities could be completed.

Excerpted from the AGILE poster presentation

Interestingly, most of the recommendations could be seen as gaps in the curriculum. (49) The generalizability to settings other than UBC is debateable but through replication of this procedure within other provinces and jurisdictions faculties may better understand the perceived gaps in student knowledge and skills.

COMMUNITY

The U of S examined benefits in a community environment of having 4 interns complete a 5-week rotation dedicated to providing billable professional services to patients. The benefits to the site included increasing awareness regarding billable services, assistance available to care for patients and revenue generation (mean of $2215.63/ student/ rotation)(50)

Semi-structured interviews
Types of Benefit Experienced
Interview respondents noted that pharmacists in different practice sectors likely hold distinct views on benefit and value of having students. For example, for many front line preceptors, economic value is not necessarily their primary motivator for working with students; they may, for instance, gain intrinsic enjoyment from the experience of mentoring students. Economic and patient value is believed to be more concerning for pharmacy owners and hospital administrators. It was generally perceived that financial benefits accrued from student placements were seen as holding greater value in community pharmacy settings as compared to hospitals. Hospitals, by contrast, were described as more concerned with improving patient services and creating enhanced flow in day-to-day practice through student integration.

Interviewees described various ways in which ExEd students might contribute added value to pharmacy settings, equally in terms of time saved, services extended, and money saved.

1. **Student as time saver:** Respondents provided numerous examples of students adding value to pharmacy by saving time for paid pharmacy staff, sometimes even up to 80-90% of their work time. For example: by talking directly with patients who would otherwise be speaking with pharmacists or by attending inter-professional hospital rounds in lieu of a pharmacist.
2. **Student as pharmacist extender**: Respondents provided multiple examples of students working in pharmacy settings to enhance and extend the existing services offered by the pharmacy. For instance: a. if three students worked back-to-back 8 hour shifts in a hospital setting, a 24-hour pharmacy service could be effectively staffed; b. students might assist (under direct supervision) with administration services (such as offering flu vaccines-depending on jurisdictional regulations) for which pharmacists may have difficulty meeting high demand; c. students might make a significant contribution by working i rural settings where there is a notable shortage of pharmacists or other health care providers; d. delegation of patient assessment (health history and issue determination), prescribing for uncomplicated patients and follow-up monitoring (for safety, efficacy and ability to use) which could then be verified by the preceptor.
3. **Student as profit generator:** Respondents emphasized the financial advantages many pharmacies potentially accrue by having students onsite. These profits may arise from time saved or extending pharmacy services.

Measuring Value/Benefit Added
Informants largely expressed enthusiasm for formal documentation and analysis of the value added by students at pharmacy sites. Barriers identified to successfully achieving the tracking and quantification of benefit included:

1. There will be instances of benefit being at least partially intangible which makes measurement challenging and may require multiple measurement tools
2. Identification of student-associated 'meaningful' outcome/impact/indicators would need to be established
3. Accounting for the 'lag time' during which students require the most direction. Measurement would have to determine the point in ExEd rotations when students become considerable assets to the practice site. This might vary across various placement types - e.g. hospitals vs. community pharmacies and also across students.
4. Differences in regulations (e.g. scope), credentialing (e.g. PharmD vs. BScPhm), as well as provincial definitions of billable activities may further compound the difficulty
5. Implementation nationally would require some start-up resources to ensure all jurisdictions have the ability to extract student-originating data, organize the reporting to each office of ExEd and coalesce it into a National picture. In addition, the issue of responsibility for tracking/reporting was raised; one suggestion was the Canadian Society of Hospital Pharmacists (CSHP) for hospital rotations since they are currently in the process of implementing the tracking of Key Pharmacy Indicators (KPIs) across Canada (Figure 1 below). No informant was aware of a community system that would collect similar indicators for that practice environment.

Figure 1: Excerpt from: Fernandes O, Gorman SK, Slavik RS, Semchuk WM, Shalansky S, Bussieres JF, et al. Development of clinical pharmacy key performance indicators for hospital pharmacists using a modified Delphi approach. Ann Pharmacother 2015 Jun; 49(6): 656-669.

Candidate cpKPI	Thematic cpKPI Critical Activity Area	Consensus Ratings[a] (n = 26)
1. Proportion of patients who receive formal documented discharge medication reconciliation and resolution of identified discrepancies by a pharmacist	Discharge medication reconciliation	25
2. Number (or proportion) of patients who receive formal documented admission medication reconciliation by a pharmacist (includes a pharmacist best-possible medication history or pharmacist best-possible medication history review as part of the medication reconciliation process as well as resolution of identified discrepancies)	Admission medication reconciliation and best-possible medication history	24
3. Number (or proportion) of pharmacists who actively participate in interprofessional patient care rounds to improve medication management	Interprofessional patient care rounds	24
4. Number (proportion) of patients for whom clinical pharmacists have completed (executed/implemented) a pharmaceutical care plan	Pharmaceutical care	24
5. Number of total drug therapy problems resolved by pharmacists	Pharmaceutical care	23
6. Number (or proportion) of patients receiving proactive comprehensive direct patient care by a pharmacist in collaboration with the health care team	Bundle of cpKPI critical activity areas	22
7. Number (or proportion) of hospital patients who receive medication counseling by a pharmacist at discharge	Patient education/ discharge counseling	21
8. Number (or proportion) of patients who have received in-person education from a pharmacist about their disease(s) and medication(s) during their hospital stay	Patient education/ discharge counseling	20

[a]Number of panelists who rated the consensus criterion 7 to 9 on Likert scale in final Delphi round.

Some informants suggested it might prove valuable to undertake 'needs assessments' at experiential education sites. This type of 'fact finding' might be achieved by surveying preceptors in advance of placements to establish clearly what kind of value they might be seeking from students and what degree of impact particular benefit(s) might have on their inclination to precept (more detail in Priority #5). However, given that few preceptors have currently expressed a need for such, it was not generally seen as a priority.

Several respondents agreed that it would be advantageous for more profession-wide indicators to be developed to describe impact of various work-related processes on patient outcomes both in relation to students in experiential education placements as well as for pharmacists overall.

According to a physician researcher in Family Medicine in Ontario, there is great variation between primary care practices and provinces as to what indicators are measured. There is currently no national standard for primary care and it may be difficult to implement a national standard as the current listing of potential indicators includes many that are disease-state specific and clinics may serve populations outside those studied in the potential indicators. This results in the potential for some irrelevant indicators. It may be that a menu combining basic definite indicators along with some selected indicators will be needed if a national approach is to be successful.

Medical schools and residency programs were also contacted to understand what indicators these organisations track. At time of writing, no responses had been garnered.

In January 2016 AACP commenced a research project entitled, "From Learner to Practitioner: A comprehensive exploration of the value and purpose of student intervention documentation process". http://www.evaluehealthcare.com/aacpstudy This work will be quite informative in terms of process and outcome of the research as there may be generalizability to Canada as well as instruction on developing similar processes in this country.

Addressing Potential Detriments to Student Presence

This report would not be complete without examining the obverse of benefit/value added associated with conducting student rotations. To that end, searches for literature describing risk or liability or harm within rotation sites identified 11 available articles. Appendix E contains a listing of these articles. In addition the 53 articles used in the above 'value and benefit' section were examined for any mention of risk or harm. Appraising quality of the findings was impossible as these

articles were either opinion pieces or the research focus was not on detriment. Grey literature contains some evidence of what the perceived and real risks are to hospitals and their pharmacy staff in hosting students on rotation. In addition, key stakeholder interviews broached this topic to understand the perceptions of academics. Respondents recognized contrary to adding value, a small percentage of students might burden the experiential education site and preceptor and that strategies to minimize the potential for a negative preceptor/organisation experience must be applied.

There is limited evidence describing detrimental effects of hosting students on rotation, however, where it is identified, it can be categorized as impacting:

1. PATIENT: Mersfelder's(51) 2012 review of student value to practice sites found no evidence to suggest that student activities resulted in greater risk to patients. The author specifically cites five of the 29 articles reviewed as including a review of interventions for potential adverse outcomes to patients and none of these found negative impact. Corroborating grey literature from Canadian hospitals did not identify risks to patients as a concern. With appropriate supervision commensurate with student abilities, **patient risk can be ruled out as a detriment.** Interviews with stakeholders highlighted that while it was possible that students with a weak therapeutics knowledge/skill base might make poor treatment decisions, these decisions would be rectified by appropriate preceptor intervention. Therapeutic knowledge gaps are remediable whereas other deficits in attitude are more difficult to address. As such, the real burden results from unprofessional behaviour and poor conduct (such as lateness, and lack of respect for patients and other staff).
2. PRECEPTOR WORKLOAD/STRESS: This concern is addressed more completely in Priority #5: Recruitment and Retention of Preceptors. Anecdotal accounts are supported by the literature (from pharmacy, nursing and medicine) of high-needs students impacting on preceptors workload(52-57) and stress levels(58,59), especially in situations where students may be deemed failing a rotation.
3. NEGATIVE STUDENT IMPRESSION OF THE ROTATION SITE OR PRACTICE SPECIALTY: This is especially concerning where sites may look at rotations as being a potential source of future employees. Preceptors in these environments may receive negative evaluations from students that can result in poor morale in the environment unless action is taken to address the issues described.
4. LABOUR MARKET: While not detrimental to the practice site or preceptor, there is some discussion in the Federal and Provincial governments(60,61) of the impact unpaid or discounted internships have on the demand and offering of paid positions within professional fields. With the exception of Waterloo's Pharmacy Program, Canadian programs mandate rotations be conducted in the absence of student remuneration. There must be careful consideration of whether the work students do while on rotation would be better considered work than education. While very unlikely that an argument would be made to the effect that these student experiences are not required to ensure the safe and effective practice of new pharmacists to practice, to justify rotations as unpaid educational experiences there must be a higher degree of guidance, assessment and feedback than what is provided to employees. Without a clear stress on the educational component rotations could be viewed as reducing the number of paid positions within the profession of pharmacy.

Stakeholder feedback

Two major outstanding items include:

1. Determine medicine's approach for establishing measurement criteria for benefits of students on rotation.

2. To portray benefit accurately, the degree of supervision required by a supervisor must be considered. The degree of supervision varies according to:

- educational level (i.e. early vs. later rotations)
- environments (i.e. outpatient clinics vs. ICU vs. community practice)
- time (i.e. first day vs. last week of rotation and first advanced rotation vs. 6th rotation)
- provincial/territorial regulatory authorities/jurisdictions (i.e. wording of supervision statements in regulations and by-laws)
- Provincial Regulatory Authority (PRA) nomenclature (i.e. student vs. intern moniker).

Each of these variables impact the degree of benefit a preceptor experiences. Preceptors require guidance to appropriately manage supervision and independence of students. Indeed, they often insist on having the discussion. The first 3 points above can be addressed within ExEd materials and education for preceptors and students. The last two points will require further advocacy. Examining all Canadian ExEd and PRA statements relating to student supervision with the possibility of coming to a common statement across Canada's ExEd Programs and PRAs would level the playing field and allow for a consistent approach in preceptor development/education as well as for national evaluation/research in the area. Appendix E contains a collection of statements from ExEd programs and PRA's regarding student supervision. To date, most PRAs have stratified pre-registrants into students and interns (or similar). Each classification of pre-registrant has different regulations governing their practice. The choice of designation impacts on the level of autonomy permitted. It may be advantageous for final year students on rotation to be classified as an intern rather than student. Interestingly, there seems to be a shift in Ontario to a model where the student and intern designations may be eliminated

in favour of all pre-registrants being seen as 'professionals in training'. All pre-registrants must be supervised by a licensed pharmacist for certain activities (such as prescribing, dispensing and injecting) and by a licensed professional (jurisdictionally dependent) for certain activities. Regulations and guidelines pertaining to supervision must apply to all pre-registrants and will therefore, be expressed at a level that may not provide explicit guidance so that the preceptor can use his/her judgement to decide how closely or remotely the student can safely be managed. While it is important for ExEd Programs to direct preceptors and students to the PRA documents describing supervision, it is necessary to provide continuing preceptor professional development (CPPD) to preceptors and orientation to students on this topic. An item on a survey to PEP-C asked the question, "Who determines the rules/regulations around the degree of supervision a student requires?" Of the 8 respondents, 4 said the PRA, 1 indicated the ExEd program and 2 described an amalgam of the PRAs regulation in conjunction with the ExEd program. There was one who indicated it was up to the supervising pharmacist's judgment.
The question, "In your province what are the requirements around the supervision of student pharmacists?" was also asked on the survey. Two of six respondents indicated that "Direct supervision at all times by a licensed pharmacist is required." The remaining respondents indicated "other" with statements ranging from it being up to the supervising pharmacists' judgement to very specific activities such as prescribing, dispensing, injecting being directly supervised. Alberta goes on to detail exactly what 'direct supervision' denotes.

3. Other feedback has been integrated into this report include:

- ensuring quality outcomes use *existing* reporting mechanisms where possible to minimise duplication of data collection and that useful information is collected
- Build in flexibility in quality indicators so that sites can include a few of their own that are unique to their practice. Develop a way for these self-identified indicators to be tracked jurisdictionally and reported ad hoc for a textured picture of student benefit.
- specify results pertaining to dollar and qualitative values
- inclusion of Mutually Beneficial Activities as stated by the Agile Project UBC)
- statements pertaining to risk should include a discussion of appropriate supervision and indicate that detractors to hosting students can be eliminated or mitigated if the recommendations from the CanExEd Project are actioned.
- Extracting information common to all reports and relegating it to the "Foundations Report Document"
- Resite the job descriptions prototype to Priority #5
- Promotional content should be geared to each audience: preceptor, manager and students

E. Discussion

1. Interpretation

Students on their clinical advanced pharmacy practice experience rotations provide benefit to preceptors, practice sites and patients. Literature (peer-reviewed and grey) as well as interviews do not attempt to describe the benefit of students on rotation in early practice experiences. This is an area for further inquiry especially as pharmacy programs change over to ELPD programs and students are expected to have some basic ability to perform aspects of patient care for uncomplicated patients with simple medication-related issues during these introductory experiences.
Outcomes have been economically quantified specially within community settings. Benefit to patients and extension of pharmacist service is well documented within the hospital and ambulatory care settings. The manager or director's perspective on student impact on the practice/organisation has been elucidated in 'Education: Information Paper on Collaborative Development, Delivery and Evaluation of Pharmacy Curricula (47)
As promotional materials are developed, this audience should be kept in mind.

There is a longer-term benefit to hosting students that the literature does not address in the improved preparation of new pharmacists to practice independently when they eventually finish their formal education. The literature and interviews focused almost entirely on the benefit while on rotation.

Measuring the benefit of having final-year students on clinical rotation in Canada has been accomplished through small academic research projects with defined timelines. There appears to be an appetite and the potential for continual quality initiatives measuring and comparing benefits across time and jurisdictions. Implementation of perpetual tracking will require information technology resources and monitoring as well as up-front efforts to establish meaningful quality indicators. The recent Canadian collaboration to establish clinical pharmacy key performance indicators (KPIs) (62) has looked at just this question for hospital pharmacists and there is initial work being done on a similar initiative for interprofessional indicators through the "Actionability of Primary Healthcare Performance Indicators Across Professions" under the auspices of Ottawa Hospital Research institute, Bruyere Continuing Care and the University of Ottawa

(personal communications with Sharon Johnston, July 2015). The use of these KPIs will be informative from a patient and practice site/institution benefit standpoint. To describe and quantify the personal benefits, other tools must be used such as surveys, interviews and focus groups. Please refer to Priority 5 Report for further detail on these benefits.

Finally, the potential detractors that may oppose the real positive effect of having students on rotation must be identified, fully understood and addressed. Detractors that could be mitigated via the development and deployment of national initiatives include:

- Preceptor workload and stress
- Negative student impressions resulting from poorly-chosen or developed rotation sites

2. Limitations

Because the vast proportion of literature describing benefits to student rotations originate in the US, economic benefits may not be extrapolated to the Canadian environment due to currency exchange rates but also due to the differences in pharmacist staffing and remuneration procedures. Non-economic findings may be more applicable to Canadian pharmacy and are consistent with the findings from the Canadian grey literature originating from hospital pharmacy. There research from Saskatchewan that corroborated the peer-reviewed literature within community pharmacy suggesting the dollar value of having students on final year rotations. There is limited information on the benefits of pharmacy students on rotation in primary care clinics.

This work was undertaken during a time of major change in Canadian Pharmacy academia when the entry to practice degree was shifting from a Bachelors degree to ELPD and, as such, the Canadian Grey Literature concerning the benefits and detriments of having students on rotation may not apply once the transition is complete.
The findings are applicable to only advanced pharmacy practice rotations as the literature and interviews do not encompass the benefit of having early or introductory practice experience students on rotation. It may be that if junior students in the new ELPD programs are prepared earlier to care for patients, similar types of benefits might accrue, but studies have yet to be done.

3. Recommendations and Priority 4 Prototype

Recommendations:

1) Measurement of meaningful student benefit to institutions in terms of patient outcomes should use established reporting mechanisms for KPIs for pharmacists in institutional settings across Canada.
2) Measurement of meaningful student impact in primary care (community and primary care clinics) in terms of patient outcomes should be based on future findings of collaborative work identifying KPIs for pharmacists in these environments. Until then, offices of experiential education may track indicators (surrogate or actual patient outcome) as determined relevant.
3) Priority #4 Working Group should encourage and support efforts to develop national indicators for quality patient care through discussions with working groups and organisations charged with their development.
4) National measurement of student benefit to preceptors and their practice should be undertaken through the development of a national set of survey questions administered annually to preceptors and students.
5) National measurement of student benefit to the organisation should be undertaken through
    a.) the development of a national set of survey questions administered annually to managers and directors
    b.) site-developed quality indicators on a more practice-specific level of meaning to that practice. This may require preceptor development and guidance to ensure relevant, collectible data.
6) Focus groups of preceptors and managers should be conducted on a jurisdictional level every 2-3 years to gain depth of knowledge regarding the benefits of having students on rotation.
7) Jurisdictions may wish to identify Mutually Beneficial Activities (MBA's) as a means to identify expectations of student performance by preceptors and their organisations. If identified, they should be used as quality indicators of whether these expectations are being met.
8) Measurement of student benefit in early/introductory pharmacy practice experience is achievable through surveys and KPI tracking. Existing programs with ELPD curricula should implement and share data for aggregation.
9) The benefits to having students on early/introductory and advanced pharmacy practice experiences should be used in recruitment and retention initiatives and promotional campaigns aimed individual stakeholder groups (preceptors, managers/directors and students). (See appendix F) Priority #7 will provide details on effective dissemination of this content.
10) To ensure maximal benefits are accrued, preceptor and student materials and curricula must provide clear instructions regarding appropriate level of preceptor/pharmacist supervision of the student. A national consensus on 'supervision of students' would provide clarity for students, preceptors and academics.

Prototypes

1. Develop model for establishing a longitudinal plan for measuring student benefit at ExEd Sites (See Appendix F for draft proposal)
2. Process to establish means to collect and report **student-generated** KPI data from institutions. Initially this will be done program-by-program but with coordination to determine the potential for combining data for National statistics.
3. Three to five questionnaire items for inclusion in every ExEd's annual survey to early/introductory and advanced pharmacy practice experience preceptors (With input from Program Evaluation Special Interest Group of AFPC)
4. Three to five questionnaire items for inclusion in every ExEd's annual survey to early/introductory and advanced pharmacy practice experience students
5. Three to five general questionnaire items for inclusion in every ExEd's annual survey to managers and directors.
6. Process/guideline for each ExEd program to identify MBA's
7. Content for recruitment and retention (Priority #5) initiatives and promotional (Priority #7) campaigns as identified in the literature, from surveys and focus groups (print, preceptor champions, multimedia products)
8. Develop National "Statement of supervision/autonomy for early/introductory and advanced pharmacy practice experience rotations" through the engagement of NAPRA and PRAs to come to consensus.
9. "Readiness to Practice" or "ability guide" for students (See Priority #1 for prototype)

4. Implementation Plan

Table 7: Implementation Plan

Date	Item
September, 2015	Establish P4 Working Group leadership and membership to develop prototypes. Will benefit from: ExEd Faculty Education Coordinator Hospital director/manager Community/Primary care pharmacy KPI leader
October, 2015	Hold first P4 WG meeting. Agenda: Establish member responsibility, order and deadlines (i.e. refine/review this plan) for the following items: 1. Process to establish means to collect and report student-generated KPI data from institutions. This may be program-by-program at first. 2. Three to five questionnaire items for inclusion in every ExEd's annual survey to early/introductory and advanced pharmacy practice experience preceptors 3. Three to five questionnaire items for inclusion in every ExEd's annual survey to early/introductory and advanced pharmacy practice experience students 4. Three to five general questionnaire items for inclusion in every ExEd's annual survey to managers and directors. 5. Process for each ExEd program to identify MBA's 6. Content for recruitment and retention (Priority #5) initiatives and promotional (Priority #7) campaigns as identified in the literature, from surveys and focus groups (print, preceptor champions, multimedia products) 7. Statement of supervision/autonomy for early/introductory and advanced pharmacy practice experience rotations Goals: Items 2,3,4,6 and 7 ready for January so that OEE can amend surveys and syllabi for April/May rotation start. And so that Priority 7 can integrate the content (due out in Feb/Mar) Item 1 and 5 complete by May.
November, 2015	Second P4 WG meeting Agenda: Check in with primary care Delphi group (Dr. Johnson) to see if close to establishing initial list of

	KPIs for primary care Review all ExEd current iterations of surveys to decide on wording/format of survey questions Develop reporting tool for central collation of data and responsibility for reporting for next 3-5 years. Determine what literature findings/existing survey results from ELPD programs could be most beneficial for promotional campaign to stakeholders. Develop brief for the P7 WG. Collect and review all statements of supervision from each ExEd program to determine if national statement is possible and advisable.
January, 2016	Third P4 WG meeting Agenda: Fine-tune survey items and disseminate to ExEd Coordinators for inclusion along with instructions and timeline for reporting results (perhaps fluid survey easiest?) Fine-tune content brief and supply to P7 WG Final statement of supervision of students authored and disseminated to ExEd Coordinators for inclusion in syllabi and preceptor development materials. Discuss approach for initial foray into collecting and reporting KPI data in various practice settings. Outline draft of work plan for testing
March, 2016	Fourth P4 WG meeting: Agenda: Report re: major players in tracking KPIs and what discussions have turned up re: existing option, building in student option for self-entry and ability to pull reports from the data on a national level. What do they need from the group? Commence work on identification of MBAs in various jurisdictions (led by individuals interested in using this methodology developed by M. Legal at UBC's Agile Project) Report to AFPC re: activities and status of implementation plan
May, 2016	Fifth P4 WG meeting Agenda: Identify pilot sites for implementing KPI tracking-likely institutions first Determine syllabus section content re: measuring KPIs on rotation for all levels of ExEd (if possible at this stage) to be used at pilot Faculty/Sites Set up education sessions for KPIs for students, preceptors and coordinators at pilot sites
June, 2016	Pilot KPI tracking for students
July, 2016	Sixth P4 WG meeting Agenda: Pilot program findings of the Spring Surveys and feedback for refinement Present template for engaging with MBA QI project that any OEE could use if desired
August, 2016	Seventh P4 WG meeting Agenda: Reminder to coordinators to report results of surveys. Collect preliminary results from the KPI pilot Establish QA process for this priority (See table 8 for suggested indicators of effectiveness)
Fall, 2016	Eighth P4 meeting Agenda: Determine plan for wider implementation of KPI initiative Implement QA plan Review student, preceptor and manager survey results re: benefit of having students on rotation Refine survey questions and redistribute Final report to AFPC re: activities and outcome of this WG

5. Quality Assurance Items

Table 8: QA for Priority 4

Indicator	Measurement Tool	Possible Items Applicable to this Priority	Focus
Rate of use of national set of survey questions measuring benefits students bring to the preceptor and site	Survey items to ExEd coordinators	1. Did you include the national survey questions measuring benefits students bring to the preceptor and site? 2. Which questions were included?	**OEE,**

		3. If not, why?	
Uptake of template for conduction regional studies of MBA	Survey items to ExEd coordinators	1. Did you use the template to establish MBAs within your jurisdiction? 2. If not, why?	**OEE (Perhaps in conjunction with Learning Site)**
Implementation rate of KPI tracking	Data from ExEd coordinators semi annually		**OEE Practice Education Sites**
Inclusion of statement of supervision of students in syllabi and preceptor development materials	Data from ExEd coordinators	1. Did you use the statement of supervision of students in your syllabi? 2. If not, why? 3. Did you include the statement of supervision of students in your preceptor education materials? 4. If not, why?	**OEE**

F. Conclusion

There is definitive value to practice sites, patients and pharmacist preceptors to having final year students present on rotation. This is evident across practice sectors, professions and jurisdictions. Economic, health outcome and psychological/professional benefits have all been described by stakeholders on interview and in the grey and peer reviewed literature as a result of hosting advanced pharmacy practice experiences. Detractors to hosting students consist almost entirely of preceptor teaching fatigue/workload/stress (rather than patient risk). The CanExEd Project for Pharmacy Priority 4 report provides multiple strategies that would result in Canadian evidence of benefits via continual measurement of outcomes to patients, preceptors and their organisations they practice within. Value of student presence to patient care should be more precisely established in the Canadian context with the advent of measuring evidence based, collaboratively developed, meaningful key performance indicators (KPI) for pharmacists (and therefore students) in all practice sectors. Pharmacy student contributions to KPIs should be used to quantify this benefit as one component (patient benefit) of CQI within ExEd. The second tool for describing value on a national level includes national measurement using preceptor, supervisor/manager and student surveys, interviews and focus groups in an effort to measure preceptor satisfaction and skill augmentation and extension (numbers of patients and breadth) of professional services.

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