

# Implementation of an electronic medical record simulation activity aligned with the Pharmacist Patient Care Process in an ambulatory care elective course

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## Abstract

This manuscript evaluates the introduction of an electronic medical record (EMR) simulation activity aligned with the steps of the Pharmacist Patient Care Process (PPCP) in an ambulatory care elective course. The exercise spanned multiple days and provided students with both formative and summative feedback using a rubric. A survey consisting of 16 items focused on attitudes towards and confidence in using EMR's and the PPCP was administered prior to and following completion of the activity.

Prior to the activity, 61% of participating students had never used an EMR. Survey responses demonstrated statistically significant changes on three of the questions that dealt with pharmacist skills and knowledge, benefits of an EMR in didactic coursework, and confidence in documenting clinical activities. Feedback on the activity was highly positive, with students expressing appreciation for the opportunity to develop both competence and confidence in using an EMR and the application of the PPCP.

**Keywords:** *Ambulatory Care, Elective, Electronic Medical Record, Pharmacists' Patient Care Process, Simulation*

## Introduction

For several decades, simulation has been incorporated into the training of health professionals as a means by which to provide opportunities for knowledge application and skills development (Bradley, 2006). Simulation exercises have the potential to provide a deeper learning experience for students, resulting in improved learning outcomes and performance on assessments (Cravens *et al.*, 2016). The Accreditation Council for Pharmacy Education (ACPE) recognises the role of simulation in developing critical thinking and problem-solving skills, and it has been described as a keystone of health profession education and patient safety by the Association of American Medical Colleges (Passiment *et al.*, 2011; ACPE 2015). Simulation exercises may involve a variety of components such as standardised patients, interactive mannequins, and simulated cases in electronic medical records (EMRs) (Bray *et al.*, 2011; Kane-Gill & Smithburger, 2011; Vyas *et al.*, 2013).

Simulation exercises involving these components are one method by which schools of pharmacy have the opportunity to expose students in the didactic curricula more robustly to the steps of the Pharmacists' Patient Care Process (PPCP), which was designed to describe the steps utilised by pharmacists to provide patient care services across all practice settings (Joint Commission of

Pharmacy Practitioners [JCCP], 2014). These steps include the following: Collect, Assess, Plan, Implement, and Follow-up: Monitor and Evaluate. The PPCP was approved by the JCCP in May 2014 and endorsed by the American Association of Colleges of Pharmacy (AACP) in July 2014 (Rothholz, 2014). Since that time, recommendations have been made for academic institutions to incorporate the PPCP systematically within curricula in both didactic and experiential education (Taylor *et al.*, 2015). While the practice and assessment of the steps of the PPCP are inherent to experiential education, simulation exercises provide students in the classroom environment the chance to also develop competence and confidence in patient care activities. These can include the use of an electronic medical records (EMRs) to collect patient-specific information, standardised patient interviews, assessment of pharmacotherapeutic regimens and development of a plan for a standardised patient, communication of that plan to the patient and other healthcare professionals, and various other simulation activities. While studies have reported on the efficacy of simulation in training healthcare professionals, few in pharmacy education have been designed to incorporate the PPCP (Kirwin *et al.*, 2013; Metzger *et al.*, 2015; Frenzel 2010; Vyas *et al.*, 2012; Milano *et al.*, 2014; Mountain *et al.*, 2015; Norose 2013; March *et al.*, 2013; March *et al.*, 2016).

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This manuscript discusses the creation and initial evaluation of an EMR-based simulation activity within an ambulatory care elective course at the Samford University McWhorter School of Pharmacy (MSOP). The simulation activity was progressive in nature and spanned several days of the course, allowing students to receive both formative and ultimately summative feedback. The intent of the activity was multifaceted: 1) to give students exposure to using an EMR in an outpatient setting for patient care activities; 2) to allow students to work through simulated complex patient cases built into the EMR in a setting that is more “real-life” than typical cases presented in didactic courses; and 3) to assess student performance in the steps of the PPCP.

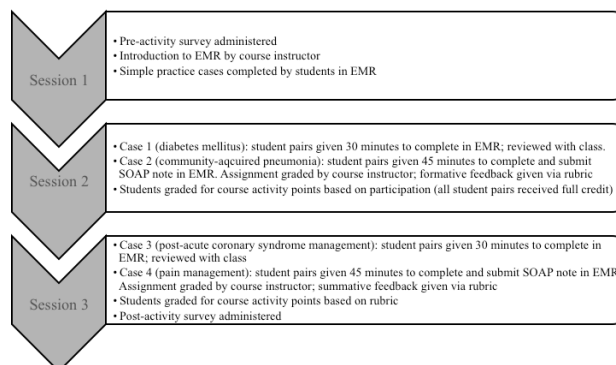
### Description of the Course and Activity

In the MSOP at Samford University, students in their third year have the opportunity to complete an elective in ambulatory care. This elective encompasses topics such as practice management, patient adherence, patient and provider communication, and an introduction to the EMR in the ambulatory care setting. Based on the ACPE Standards and the increased emphasis on the PPCP, the course coordinator identified a need to provide students with the opportunity to interface with the EMR in a hands-on manner that would also allow for the assessment of their ability to complete the steps of the PPCP by means of a complex patient case simulation. The course coordinator also recognised that the simulation would allow students to develop skills that will assist them in developing readiness for their ambulatory care Advanced Pharmacy Practice Experience (APPE) by making them more familiar with the steps of the PPCP: collecting and assessing patient information from the EMR, developing a plan to optimise pharmacotherapy and achieve goals of therapy, implement that plan through documentation within the medical record, and identifying need for monitoring and follow-up. Prior to the elective, at this point in their coursework at MSOP students have typically little to no exposure to working with an EMR in the didactic curriculum, unless used in the context of their workplace or Introductory Pharmacy Practice Experience (IPPE). Additionally, these students will have received exposure to the PPCP only in the form of didactic lectures- they have not formally used it within simulation activities or application exercises.

The EMR simulation occurred across three consecutive class sessions (Figure 1). Prior to the first day of the activity, multiple fictitious patient charts were input by the course instructors using the cloud-based electronic health record platform, Practice Fusion. Practice Fusion is a free electronic health record and is the largest cloud-based electronic health record system in the United States. It has the ability to be used in an actual practice setting and is currently used in over 30,000 active practices, while also allowing for educational licenses to be used in classroom and simulation settings (Practice

Fusion, 2017). The fictitious medical charts resembled patient charts and medical problems that are typically encountered in the primary care setting. In total, four separate patient cases were developed and involved four primary disease states, including type 2 diabetes mellitus, pain management, post-acute coronary syndrome management, and community-acquired pneumonia. However, each patient case required cross-content analysis and averaged four separate medical issues to be addressed. In order to ensure a reasonable level of difficulty for third-year pharmacy students, six fourth-year pharmacy students were involved in the development of the patient cases used in this simulation activity, contributing content and serving as a “focus group” for the activity and rubric. The fourth-year students completed the activity independently and were assessed by the course instructors, and then met with course instructors to review the cases, activity, and assessment forms. They provided feedback on difficulty of the case, time estimated to complete the activity, and the utility of the rubric in showing them the strengths and weaknesses of their performance. Several additional smaller patient cases were also created in separate charts for the students to practice using during the orientation to the activity.

**Figure 1: Outline of progressive simulation activity**



### Method

The students enrolled in the elective course (n=18) were surveyed before and after the activity to determine student attitudes towards and confidence in using an EMR and the PPCP. Students were also assessed by course instructors using a rubric that was designed to correspond to the steps of the PPCP. A description of the activity along with an examination of the strengths and weaknesses and opportunities for future development follows.

During the first class session, students were oriented to the practice fictitious EMR charts. The instructor explained the practical aspects of EMR and chart review (including medical record content and organisation of information) and allowed students to practice using the smaller sample charts. Students were also taught how to

present their findings to another medical professional using the SBAR (situation, background, assessment, recommendation) method during this first session to ensure that they had the necessary baseline knowledge to participate in the activity. The SBAR method was included in this activity to ensure that students could effectively communicate and collaborate verbally with other healthcare providers.

In the second class session students were divided into pairs. They were advised ahead of time that they would be completing an activity in which they would need to use their chart review skills to develop and document two SOAP (subjective, objective, assessment, plan) notes into the EMR based on their findings. Previous physician visits along with current subjective (chief complaint) and objective (vitals, lab work) data were provided to the students in the EMR for each case. The student-pairs were given 30 minutes to review the case and complete their first SOAP note, after which the case was reviewed as a class by going step by step through the PPCP. They were then given 45 minutes to review a second case and

complete their second SOAP note. Students were given low-stakes written formative feedback on their second SOAP note by course instructors using an activity-specific rubric (see Appendix) designed to align with the steps of the PPCP. While they received feedback via the rubric that provided a score on the assignment, for this portion of the activity they were graded on participation only so all students received full credit. Students were given two weeks in between session two and three to review the formative feedback and ask any questions, and interact further with the EMR outside of class time if desired. The third class session was identical to the second session, except that while the feedback on the final SOAP note utilised the same grading rubric it was summative in nature and the score obtained served as the actual activity grade for the students in the course. All cases were identical between pairs, but students were limited to discussing the case with their partner during class time when work was completed limiting the potential for compromising the case content between pairs.

**Table I: Student perceptions of the use of an electronic medical record and the Pharmacist Patient Care Process**

Statement*	1 or 2 (SD or D) (n [%])		3 (N) (n [%])		4 or 5 (A or SA) (n [%])		Median (IQR†)		p value
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
	Pharmacists are given the knowledge and resources to prevent, identify, resolve drug related drug problems, recommend cost effective therapy, and counsel patients on drug therapy problems.	2 (11)	0 (0)	0 (0)	1 (6)	16 (89)	17 (94)	4 (4 – 5)	
Using an electronic medical record provides opportunities to collaborate with other health professionals in managing medications.	0 (0)	0 (0)	1 (6)	1 (6)	17 (94)	17 (94)	5 (4 – 5)	5 (5 – 5)	0.43
An electronic medical record would be useful in documenting when a pharmacist provides patient care services, such as a medication review, cholesterol screenings, or diabetes mellitus management.	0 (0)	0 (0)	0 (0)	0 (0)	18 (100)	18 (100)	5 (4 – 5)	5 (5 – 5)	0.10
An electronic medical record is advantageous over a paper chart with regard to storage of patient data, ability to generate patient reports, and track patient outcomes.	0 (0)	0 (0)	0 (0)	0 (0)	18 (100)	18 (100)	5 (5 – 5)	5 (5 – 5)	0.56
It is important for pharmacists to gain access to patients' charts to document their role in the healthcare process.	0 (0)	0 (0)	0 (0)	0 (0)	18 (100)	18 (100)	5 (5 – 5)	5 (5 – 5)	0.083
An electronic medical record would allow pharmacists to expand the boundaries of their work beyond the traditional role of dispensing and counseling.	0 (0)	0 (0)	0 (0)	0 (0)	18 (100)	18 (100)	5 (5 – 5)	5 (5 – 5)	0.083
I feel that using an electronic medical record in daily coursework activities in the curriculum will enhance my comprehension and application of pharmacy knowledge.	0 (0)	0 (0)	0 (0)	0 (0)	18 (100)	18 (100)	5 (4.3 – 5)	5 (5 – 5)	0.18
The electronic medical record used in the elective is user-friendly.§	N/A	0 (0)	N/A	1 (6)	N/A	17 (94)	N/A	5 (4.25 – 5)	N/A
I would prefer using an electronic medical record versus a paper-based system.§	N/A	1 (6)	N/A	1 (6)	N/A	16 (88)	N/A	5 (5 – 5)	N/A
The information presented using the electronic medical record correlated with subjects discussed in the pharmacy curriculum.§	N/A	0 (0)	N/A	0 (0)	N/A	18 (100)	N/A	5 (5 – 5)	N/A
I feel that using an electronic medical record in didactic coursework will benefit students in preparing for the P4 professional year.	0 (0)	0 (0)	0 (0)	0 (0)	18 (100)	18 (100)	4.5 (4 – 5)	5 (5 – 5)	0.046‡
I have a solid understanding of the Joint Commission of Pharmacy Practitioners (JCPP) Patient Care Process.	2 (11)	0 (0)	2 (11)	0 (0)	14 (77)	18 (100)	4 (4 – 5)	4 (4 – 5)	0.070
I am confident in my ability to implement the JCPP Patient Care Process in practice.	2 (11)	0 (0)	2 (11)	1 (6)	14 (77)	17 (94)	4 (3 – 4.8)	4 (4 – 5)	0.075
I am confident in my ability to accurately document clinical activities into an electronic medical record.	5 (28)	0 (0)	8 (44)	0 (0)	5 (28)	18 (100)	3 (2.3 – 3.8)	4 (4 – 5)	<0.001‡
Having access to the electronic medical record outside of class after the first SOAP note gave me more confidence for the second SOAP note.§	N/A	0 (0)	N/A	2 (12)	N/A	16 (88)	N/A	5 (5 – 5)	N/A

\*SD: strongly disagree; D: disagree; N: neutral; A: agree; SA: strongly agree.

†IQR: Interquartile range.

‡Indicates the correlation is significant at the 0.05 level

§ Question excluded from the pre-survey due to not being applicable before the simulation was completed.

Identical surveys (Table I) were completed by the students (n=18) at the start of the first class session and at the end of the third class session. This 16-item survey was adapted from a previously published and validated survey, using all of the original survey questions along with three new questions added to assess comprehension of the PPCP as well as the perceived importance of an EMR for use in pharmacy practice (Frenzel 2010). While still administered in both surveys, four questions from the pre-survey results were not included in the statistical analysis because the questions were not applicable to the student until the activity was completed- these are marked as “N/A” under results in Table II. Through this survey, students were asked to identify their level of

agreement with the statements provided using a 5-point scale ranging from strongly disagree to strongly agree. The activity as a whole was designed to meet MSOP’s curriculum-wide ability-based outcomes and address specific domains within the Center for Advancement of Pharmacy Education (CAPE) Outcomes (Medina *et al.* 2013). A summary of how the activity and corresponding assessment met course objectives, ability-based outcomes, and CAPE Outcomes can be found in Table III, along with which classification of Bloom’s Taxonomy each component was associated with (Anderson *et al.*, 2001). The study received approval from the Institutional Review Board of Samford University.

**Table II: Statistically significant impact of Electronic Medical Record Simulation on survey responses**

Statement*	1 or 2 (SD or D) (n [%])		3 (N) (n [%])		4 or 5 (A or SA) (n [%])		Median (IQR†)		p value
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Pharmacists are given the knowledge and resources to prevent, identify, resolve drug related drug problems, recommend cost effective therapy, and counsel patients on drug therapy problems.	2 (11)	0 (0)	0 (0)	1 (6)	16 (89)	17 (94)	4 (4 – 5)	5 (4 – 5)	0.046‡
I feel that using an electronic medical record in didactic coursework will benefit students in preparing for the P4 professional year.	0 (0)	0 (0)	0 (0)	0 (0)	18 (100)	18 (100)	4.5 (4 – 5)	5 (5 – 5)	0.046‡
I am confident in my ability to accurately document clinical activities into an electronic medical record.	5 (28)	0 (0)	8 (44)	0 (0)	5 (28)	18 (100)	3 (2.3 – 3.8)	4 (4 – 5)	<0.001‡

\*SD: strongly disagree; D: disagree; N: neutral; A: agree; SA: strongly agree.

†IQR: Interquartile range.

‡Indicates the correlation is statistically significant at the 0.05 level

**Table III: Curricular map Relating Components of Activity to School-specific ABOs, CAPE Outcomes, and Bloom’s Taxonomy**

Component of Activity	MSOP Ability Based Outcome*	CAPE Outcome	Bloom’s Taxonomy Classification
Subjective patient information	Patient-centered care	2.1.1, 2.2.3	Knowledge
Objective patient information	Patient-centered care	2.1.1, 2.2.3	Knowledge
Assessment of patient	Evidence-based practice	2.1.2, 2.1.3, 2.1.4	Knowledge Comprehension Application
Treatment plan	Evidence-based practice Critical thinking	2.1.4, 3.1.3, 3.1.5	Knowledge Comprehension Application Synthesis
Presentation of information	Professionalism Communication	2.1.7, 3.6.9, 4.4.2	Knowledge Comprehension Application

ABO=Ability Based Outcome

CAPE=Center for the Advancement of Pharmacy Education

\* Definition of McWhorter School of Pharmacy (MSOP) Ability Based Outcomes (ABOs):

Communication=the candidate will model effective communication through use of verbal, written, visual, and kinesthetic media.

Critical thinking=the candidate will effectively evaluate information and critically think through issues in order to exercise appropriate judgment and provide appropriate solutions to drug-related problems.

Professionalism=the candidate will exhibit behaviors and values consistent with the trust given to the profession of pharmacy and actively and effectively engage as a healthcare team member.

Patient-centered care=the candidate will provide optimal, patient-centered pharmaceutical care by designing prevention, intervention, and educational strategies for common disease states to improve health and wellness for individuals and communities.

Evidence-based practice=the candidate will demonstrate competency in using drug information skills to promote evidence-based practice.

## Evaluation

### Survey results

Statistical analyses of results for the survey scores was conducted using SPSS (IBM Corp. Released 2010. IBM SPSS Statistics for Mac, Version 11.8.2 Armonk, NY: IBM Corp). An *alpha* value of 0.05 was considered statistically significant. A Wilcoxon Signed-Rank Test was used to determine statistical significance.

Response rates ( $n=18$ ) for both the pre- and post-activity surveys were 100%. Results from the pre-survey indicated that eleven students (61%) had never used an EMR before taking the elective. With most coursework at MSOP utilising physical patient charts instead of electronic, opportunities for EMR exposure generally only occur during a unique IPPE or employment outside of school. Many students claimed Practice Fusion was user-friendly (94%), which was very important for the students with little to no EMR exposure. Overall, three of sixteen questions resulted in statistically significant responses from the pre-activity survey to the post (Table II). For example, the statement, "I am confident in my ability to accurately document clinical activities into an electronic medical record" resulted in a statistically significant  $p$  value of  $<0.001$ . Similarly, after completing the simulation more students felt that pharmacists are given the knowledge and resources to prevent, identify, and resolve drug related problems, recommend cost effective therapy, and counsel patients on drug therapy problems ( $p=0.046$ ). Students varied among all five levels of agreement in the pre-survey questions; however, after completing the EMR simulation, student responses coalesced between "agree" and "strongly agree". In response to the statement, "I feel that using an electronic medical record in daily coursework activities in the curriculum will enhance my comprehension and application of pharmacy knowledge," 28% of students agreed and 72% of students strongly agreed, indicating a significant opportunity for future coursework across the curriculum. Similarly, 100% strongly agreed that "using an electronic medical record in didactic coursework will benefit students in preparing for the P4 professional year" ( $p=0.046$ ). Such a strong class opinion both illustrates a desire from students to gain exposure and indicates an area where the curriculum at MSOP and potentially other institutions can be strengthened. The majority of students also strongly agreed that having access to the EMR outside of class after the first SOAP note gave them more confidence for the second SOAP note (89%).

Regarding the PPCP, results showed a positive shift when comparing the pre- to post-surveys. In response to the statements, "I have a solid understanding of the JCPP Patient Care Process" and "I am confident in my ability to implement the JCPP Patient Care Process in practice," students consistently varied among all five options in the pre-survey. However, when asked both statements again after the EMR simulation, students either agreed or strongly agreed. See Table I for a full statistical comparison of each survey question.

### Course feedback

Representative student feedback was elicited through course evaluations and course reflections completed at the end of the semester, with all feedback being highly positive. While course evaluations were completed by students each semester, there was limited assessment of specific assignments on the evaluation form, meaning that the EMR exercise was not individually addressed in course evaluations. However, the required course reflection for the elective provided valuable feedback on the EMR exercise specifically. A representative summary of student comments on the activity can be found in Table IV. No negative feedback was received on the EMR activity in either the course evaluations or required course reflections with one suggestion indicating additional course time on interpreting and applying practice guidelines to individual patients and patient cases would be beneficial.

**Table IV: Representative Student Feedback**

Section Header: Reflect on your overall experience in the elective course, highlighting significant learning achievements.
I felt like the activities we did were really valuable in helping us be more comfortable with our rotations. Looking at the EMR in particular was incredibly helpful because it showed us what sections information will generally be found in. Getting comfortable with these aspects will be so valuable to us because we'll feel slightly more acquainted with these aspects during our rotations.
Additionally, the EMR activities and SOAP note activities both contributed to my overall understanding of them both and their impact for my future career. Before the course began, I had no idea on how to construct a SOAP note or navigate an EMR... Knowing all of this will give me a foundation I can carry after graduation and when pursuing my career.
I genuinely appreciated the exposure to Practice Fusion. It gave me a more realistic view of what patient cases look like. I really enjoyed doing the SOAP notes...It helped me differentiate the separate parts effectively and approach a patient case thoroughly.
I also found practicing with the electronic medical record and SOAP note writing to be imperative for my learning. I got so much more hands-on experience than most of my other classmates who did not enrol in this elective. I feel better prepared for fourth year rotations because of this specific practice in class. The practice patients were fun and provided us with a meaningful learning experience.
The SOAP note exercise was incredibly beneficial.... I believe we were given adequate time to where I felt pressed for time to make the plan quickly but had time to properly think through the problem. I believe this exercise is an accurate representation of what 4 <sup>th</sup> year rotations will be like. As a result, I feel much more prepared and comfortable with preparing a SOAP note for a preceptor next year.
SOAP notes and EMRs are something we will be using/doing nearly every day in many of our rotations...This class really gave me an unbelievable level of knowledge, practice, and feedback in them. It also put us in a pair so we weren't trying to figure it all out alone. It was also done in an environment where I feel more questions and better questions can be asked and answered.
I also appreciated the opportunity to familiarise myself with the electronic medical record and to practice writing SOAP notes. I do not feel that we get enough hands-on training with these topics during our regular curriculum, so I found these sessions to be extremely beneficial.

The most frequent student comments centred on an appreciation of additional exposure to the EMR and SOAP note writing, increased confidence in APPE readiness, and overall relevance of the exercise. Relevance of course assignments and activities is an important feature to fully engage today's population of students, according to a white paper from the AACP that discusses critical-thinking and problem solving skills of the new generation of learners (Oderda *et al.*, 2010). Students appreciated the opportunity to practice skills that they saw as relevant to their upcoming APPE's, commenting that they felt more prepared to participate in patient care and communicate patient information to their preceptor and other medical professionals - an important step in the PPCP.

### Discussion

In the study by Frenzel using an EMR simulation for disease state management activities in a laboratory sequence in a school of pharmacy, students demonstrated gains in perceived knowledge and a deeper appreciation for the role of technology in patient care activities (Frenzel, 2010). The majority of students (94%) agreed that simulated disease state management activities were perceived as beneficial to prepare them for their fourth year clinical rotations. Similarly, students in this study saw the benefit of simulated patient care activities and expressed a desire for expanded opportunities to use them throughout the curriculum. Overall, based on the results from the surveys, students appeared to comprehend the steps of the PPCP more readily as the simulation exercise was repeated. As with Frenzel's study, a similar trend in improvement was seen in student performance in the PPCP-aligned activity grading rubric. Use of an EMR simulation exercise in the didactic setting is one example of how students can directly apply and improve knowledge and skills associated with the PPCP.

Curricular benefits of the activity included the opportunity to assess both student knowledge of and capacity to apply the steps of the PPCP to a patient case and to develop/document a care plan via SOAP note format. As with other studies that have utilised health record simulation activities, much value was also found in giving the students exposure to an outpatient EMR in a manner that builds both their skills and their confidence prior to them entering clinical rotations in their fourth year of pharmacy school (Frenzel 2010; Vyas *et al.*, 2012; Kirwin *et al.*, 2013; Metzger *et al.*, 2015). To provide more exposure to the PPCP and how it relates to essential coursework, this simulation exercise could be adapted throughout the pharmacotherapy curriculum. This would allow an enduring practical experience with the PPCP accompanied with standardised feedback throughout each course.

Challenges to implementing this exercise were primarily centred around initial time investment in the building of patient cases and corresponding answer keys and grading rubrics to be used for evaluation. The time investment in

preparation for active learning exercises is a common challenge described in academic literature (Gleason *et al.*, 2011; Stewart *et al.*, 2011). Yet while building the cases took significant preparation, the content is now readily available for future iterations of the activity and should require minimal updates annually. Fourth-year academic APPE students assisted in the development and testing of the cases and answer keys to both reduce instructor workload and to provide input regarding the level of complexity of the cases to ensure that the case was education level-appropriate and could be completed in the class time given.

### Limitations and Future Opportunities

Limitations include the small sample size of the elective (n=18) and the potential that students who self-select into an elective for a specific area of practice may be predisposed to increased engagement and performance with the content. Unlike the surveys that were individually completed, students completed the simulation exercise in pairs, allowing them to partner together on the activity and in completion of the steps of the PPCP independent from an instructor. While the use of pairs provided opportunities for peer teaching and made students more comfortable with an exercise in which there was guarded uncertainty associated with minimal previous EMR experience, it does prevent assessment of skills of an individual student. Future exercises may benefit from having an additional final round of simulation built in where students complete the activity independently and undergo evaluation. However, this process would be limited by available course time and class size. Individual assessments would provide additional workload and may not be feasible in a large class setting. For class sizes where individual assessment is not possible, benefit may also be seen from regular changing of student pairs.

Another limitation of this activity are the missing components of "live" patient interaction and inter-professional communication. For this course at MSOP, future iterations of the activity aim to involve the use of standardised patients to provide an even greater level of depth and realism to the exercise. The course instructors also plan to involve both nursing students and medical residents to provide opportunities for students to practice care collaboration and inter-professional communication using the SBAR method. However, it may be difficult to scale this version of the activity outside of the elective to the larger class due to space and time constraints. Similar challenges may be experienced at other institutions, depending on the existing framework for inter-professional education activities.

### Conclusion

By implementing a simulation exercise using an EMR in an ambulatory care elective course, students were given

the opportunity to further develop skills and confidence in the use of the PPCP and the EMR, as evidenced by survey scores and course feedback. Course instructors were able to evaluate student comprehension and application of the PPCP in a complex patient case built within an EMR. The activity could be replicated in elective and required courses covering a variety of curricular topics as the core skills assessed are not exclusive to ambulatory care, but overall utility may be limited based on class size. Student feedback reflected positively on the relevance of the exercise and their improved confidence in their ability to be successful on APPEs. Students would likely benefit from repeated exposure to similar activities prior to beginning their APPE activities with additional focus placed on the systematic approach of the PPCP and how it aligns with patient care activities. Simulation exercises provide a unique opportunity for further integration of technology and the PPCP within the didactic curriculums in schools of pharmacy.

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**Appendix: Assignment Grading Rubric**

Component	1= Remediation Required 2= Needs Significant Development 3= Meets Expectations 4= Above Average 5= Developing Excellence
<b>Subjective Patient Information (Collect)</b>	
Patient Identification: Age, Sex, Race	
Chief Complaint	
History of Present Illness	
Past Medical History	
Family History and Social History	
Medication Changes	
Adherence	1 2 3 4 5
Review of Systems	
<b>Objective Patient Information (Collect)</b>	
Allergies/Adverse Drug Reactions	
Current Medications	
Vitals: height, weight, BMI, heart rate, blood pressure, respiratory rate	
Surgical History	
Laboratory Parameters	1 2 3 4 5
Physical Exam	
<b>Assessment of Patient (Assess)</b>	
Treatment Goals	
Prioritized Problem List	
Monitoring Parameters	
Pertinent Medication History	
Medication-Appropriate Therapy, Adverse Drug Reactions, Drug Interactions, Precautions, Contraindications	1 2 3 4 5
<b>Treatment Plan (Plan, Implement, Follow Up)</b>	
Pharmacologic Treatment (Evidence-Based)	
Non-Pharmacologic Treatment	
Counseling/Education Provided	
Monitoring Needed	1 2 3 4 5
Follow-Up Established	
<b>Presentation of Information</b>	
Communication of Clinical Information	
Accuracy of Information	
Clarity of Information	
Completeness of Information	1 2 3 4 5
Grammar/Spelling	
<b>Total Score</b> (out of 5 points)	