INSTRUCTIONAL DESIGN AND ASSESSMENT

Establishment and Implementation of a Required Medication Therapy Management Advanced Pharmacy Practice Experience

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Objective. To develop a community pharmacy-based medication therapy management (MTM) advanced pharmacy practice experience (APPE) that provides students with skills and knowledge to deliver entry-level pharmacy MTM services.

Design. The University of Colorado Skaggs School of Pharmacy & Pharmaceutical Sciences (SSPPS) partnered with three community pharmacy chains to establish this three-week, required MTM APPE. Students completed the American Pharmacists Association MTM Certificate Course prior to entering the APPE. Students were expected to spend 90% or more of their time at this experience working on MTM interventions, using store MTM platforms.

Assessment. All 151 students successfully completed this MTM APPE, and each received a passing evaluation from their preceptor. Preceptor evaluations of students averaged above four (entry-level practice) on a five-point Likert scale. The majority of students reported engagement in MTM services for more than 80% of the time on site. Students' self-reporting of their ability to perform MTM interventions improved after participation in the APPE.

Conclusion. The SSPPS successfully implemented a required MTM APPE, preparing students for entry-level delivery of MTM services.

Keywords: Students, pharmacy, medication therapy management, community pharmacy practice, advanced pharmacy practice experience

INTRODUCTION

Community pharmacy practice continues to evolve with a transition from a product-focused, largely medication dispensing role, to a more clinical "medication specialist" role. Pharmacists in this setting are recognized as an asset to the overall health care team and perform medication therapy management (MTM) and clinical interventions, many of which are increasingly reimbursable by third-party payers. Medication therapy management (MTM) services were officially established in 2003, when Medicare Part D plans were required to establish MTM programs for particular beneficiaries.¹

The provision of medication therapy management services is widely accepted within the pharmacy profession as an essential, evolving role for the pharmacist in the United States. Medication therapy management services,

also referred to as comprehensive medication management (CMM), were recognized by the American College of Clinical Pharmacy (ACCP) in their 2015 white paper as an essential part within the practice of pharmacy, particularly with evolving interprofessional team-based care models.² In this paper, we advocate for a defined collaborative process of care, where the pharmacist is granted authority and responsibility within a greater overall team-based practice. We also emphasize the importance of pharmacists gaining experience and training to enable them to impact patients' medication-related outcomes.²

The Center for Medicare and Medicaid Services (CMS) has also increasingly recognized health care quality metrics, many of which apply to pharmacy practice, including medication safety, medication adherence, and comprehensive medication reviews, as important components when assigning ratings to Medicare Part D and Medicare Advantage plans. The CMS uses a star rating system, where higher performing plans achieve more stars. Plans with a higher star rating receive multiple benefits, including year-round plan enrollment, rebates that can be used to provide patients with higher-quality benefits, and eventually higher

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reimbursement rates.³ This has created, and will continue to create, incentives for community pharmacies and third-party payers to dedicate time and resources to improving the quality of care provided.

High-level MTM initiatives have been implemented by pharmacists in the community setting, and have demonstrated successful outcomes.^{4,5} In collaboration with pharmacists, pharmacy students have also demonstrated the ability to provide effective MTM services in the community pharmacy.⁶⁻⁹ More broadly, pharmacy students provide clinical medication interventions that improve care and decrease cost in a variety of pharmacy settings during the advanced pharmacy practice experiences (APPEs).¹⁰⁻¹²

In response to a growing body of evidence demonstrating effective medication interventions performed by pharmacists and pharmacy students, along with the implementation of MTM reimbursement, community pharmacy practice has evolved to include MTM services as a routine part of a pharmacist's job description. Two available MTM platforms, OutcomesMTM (Cardinal Health, Des Moines, IA) and Mirixa (Mirixa Corporation, Reston, VA), interface with third-party health care claims data to identify patients in the community pharmacy who are eligible to receive pharmacist-provided reimbursable MTM. The number of community pharmacists actively participating in providing MTM services using these platforms has increased dramatically over the past several years. The Accreditation Council for Pharmacy Education (ACPE) has also recognized this continuously evolving role of the profession in community pharmacy.¹³ In the newest guidance document for pharmacy schools produced by ACPE, titled the "Guidance for Standards 2016," entry-level competencies needed for community pharmacy practice are clearly spelled out and include the ability "to define and appropriately document comprehensive MTM services," "use multiple MTM platforms as required by third-party payers," and "to identify and resolve medication therapy problems, manage drug interactions, and resolve gaps in care."¹³

Recognizing the evolving impact of MTM services in community pharmacy practice, and the curricular goals and objectives delineated by ACPE, the University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences (SSPPS) identified the provision of MTM services in community pharmacy as a gap in the curriculum and prioritized this within the curricular renewal process. The objective was to develop a required MTM rotation that would provide the student with the necessary skills to perform entry-level MTM practice upon graduation from the program. The structure of the university's APPEs was changed during the curriculum renewal, with

a new six-week IPPE added into the third year (P3) of the program, and the community pharmacy APPEs being reduced from two to one. This new three-week MTM APPE was also established and approved both by the school's curriculum committee and by a full faculty vote. This article describes the development and implementation of a focused MTM APPE within the SSPPS curriculum.

DESIGN

To establish the foundation needed for a focused APPE dedicated to MTM services, the SSPPS worked closely with the American Pharmacists Association (APhA) to integrate the APhA MTM certificate program into curricular content, requiring the one-day (approximately eight hours of live classroom training with 10 hours of pre-course work required) training for all students at the end of the third year of the PharmD curriculum. This helped to establish a context for MTM services for the students, and stimulated discussions regarding what future opportunities may exist for pharmacists under the expanding definition of MTM. While students were introduced to the various clinical services pharmacists provide within the curriculum, the specific process of providing medication therapy management was not included. The curriculum and experiential education committees felt that the APhA program would serve to introduce MTM service delivery from a philosophic level, which could be followed by store-specific training that focused more on the logistics of providing the services and platforms that were used.

While MTM services are provided in a variety of pharmacy practice settings, the majority are in community practice, and use the two MTM platforms previously described. To best prepare students for pharmacy practice, the curriculum committee decided that the MTM APPE would take place in community pharmacy settings. The assistant director of Experiential Education and the chair of the Experiential Education Committee, both of whom had multiple years of experience practicing in community pharmacy and developing clinical services, met with the three primary pharmacy chain stores in the Denver Metro area (Albertsons-Safeway, King Soopers [Kroger Foods], and Walgreens) as well as with the buying group RxPlus, which represents the majority of independent pharmacies in Colorado. These discussions highlighted the importance of identifying stores or practice environments that would support students' goals of providing focused MTM services for approximately 90% of the time across three weeks. Successful partnerships were established with each of the chain pharmacies to implement this MTM APPE at their pharmacies. Because of the significant variation in the amount of MTM services provided at each of the independent pharmacies, the

committee decided to wait and explore this partnership in the future, once the MTM programs at the pharmacy level had reached wider acceptance. As part of this partnership, the SSPPS agreed to sponsor APhA “train-the-trainer” training in MTM for identified pharmacists from each of these companies. In return, the companies agreed to provide the APhA certificate training for third-year students on a yearly basis.

Through discussions between faculty members with expertise in this area, members of the curriculum committee, and representatives from these three chain pharmacies, the curriculum committee decided that a three-week time period would be optimal for a focused MTM experience. The intent was for students to be immersed in MTM services, in order to build their skills and expertise in this area and prepare them for practice; all other pharmacy roles, including dispensing, were to be minor within this experience. Three weeks was considered an optimal timeframe to achieve this goal, while not causing students to feel that the work was too repetitive and redundant. Students ranked their preferences for which chain they would like to be matched to, as well as what time block they would prefer for the MTM rotation within the optimization process in E*Value. The remaining three weeks of the normal APPE cycle would be open time for students. The expectation was that during the three-week experience, students should spend 90% or more of their time directly engaged in delivering MTM services in order to build their skills in delivering services, and specifically create familiarity with the two software programs used by the majority of retail community pharmacies: Mirixa and OutcomesMTM. Students were matched to either block A or block B within one of seven rotation times, with all students being required to attend site training on day 1 of the rotation. On this first day of training, students would be introduced to the two software programs and oriented to that specific chain store’s MTM operations and procedures. These sessions generally lasted about four to five hours.

The community pharmacy outreach coordinator for the Office of Experiential Programs reinforced the immersive model of spending ~90% of the time on site working on MTM interventions by visiting all of the pharmacies involved with the MTM rotation during the first year it was implemented, helping to answer questions from preceptors or students, and redirecting students not actively engaged in MTM away from other pharmacy activities back to the MTM interventions, which were the intentional focus of this rotation. The coordinator continued to routinely reach out to these sites and gently reinforce the message that students should be engaged in MTM services almost exclusively. The SSPPS also organized a conference call for all participating pharmacists at one of the chain

pharmacies to explain the intention of the rotation and the importance of students spending almost all of their time working on MTM interventions.

The implementation of the three-week APPE in MTM in the fourth year looked slightly different across the three community pharmacy chains. The first class of 151 students was matched to one of the three community chains during the year, resulting in approximately three to four students participating in MTM services per chain per three-week block. The SSPPS did not dictate the care delivery model, but allowed the individual pharmacy chain to decide the most appropriate model. Kroger and Walgreens placed students directly into the pharmacies with individual preceptors to provide both in-depth face-to-face comprehensive medication reviews (CMRs) as well as the shorter targeted intervention programs (TIPs), which could be completed without requiring the patient to physically come to the store. At these pharmacies, the students first provided MTM to eligible patients at the site. If they completed all eligible MTM opportunities at the individual pharmacy level, they would then seek MTM opportunities remotely for other pharmacies in the Colorado region. Students were evaluated by the individual preceptors at their primary pharmacy site. Albertsons-Safeway pharmacy opted for a slightly different model. All students were stationed at the central corporate location and worked with the specialized MTM pharmacist, with a preceptor to student ratio of 2:1. This differed from the other two chains because the majority of the work completed by students was done at the corporate office level rather than the store level. Students at this site completed work for all eligible MTM opportunities in the region, primarily over the phone with eligible patients. The students also identified patients eligible for CMR and contacted them over the phone to establish face-to-face appointments at the patient’s primary pharmacy. The students then worked with the patient’s pharmacist at the primary pharmacy location to deliver the CMR service. The students had opportunities to travel to the pharmacy sites to deliver the face-to-face CMRs. All students at the Safeway site were evaluated by the specialized MTM pharmacist at the central corporate location.

To pass the rotation, students had to achieve a rating of at least “entry-level performance with limitations” in each assessment category. Students were also required to complete and submit through the electronic portfolio system E*Value, (MedHub, Minneapolis, MN) five post-case write-ups on de-identified patients they had worked with during the MTM APPE. These write-ups were reviewed by the Office of Experiential Programs for completeness, and were also submitted by the students to APhA to complete the requirements for that certificate program. Patient

Table 1. Preceptor Assessment of Student Performance Based on Validated Preceptor Final Evaluation Tool (n=151)

Assessed Ability-based Outcome (ABO) Components	Mean Score
ABO 1: Collect appropriate patient data to make an assessment	
Identify, collect, and organize patient-specific information needed by the pharmacist in order to prevent, detect, and/or resolve medication-related problems	4.4
ABO 2: Conduct a patient-centered assessment	
For each problem, assess current therapy	4.5
Identify and prioritize patient-specific medication-related problems	4.4
Assess disease severity, chronic disease control, and therapeutic goals	4.4
ABO 3: Design, implement, evaluate and adjust a patient-centered pharmacy care plan	
Consider patient-specific characteristics, including health literacy, cultural diversity, clinical data, and behavioral psychosocial issues, when determining appropriate medication and non-medication therapies	4.3
Develop a monitoring plan	4.1
Critically evaluate and recommend treatment options using sound scientific principles and evidence	4.4
Consult other health care providers as appropriate to resolve medication-related problems	4.4
Optimize appropriate medication and non-medication therapy	4.3
Conduct patient education including verification of patient understanding of treatment plan	4.3
Implement interventions to improve adherence	4.3
ABO 5: Participate in population-centered care	
Use medication therapy management platforms (eg, Outcomes, Mirixa) to improve population health	4.4
ABO 7: Participate in the management of a successful patient-centered practice	
Describe a plan for the establishment, marketing, or compensation for medication therapy management and patient care services	4.3 ^a
ABO 8: Retrieve, evaluate, and utilize basic science, professional, and lay information in a critical and scientific manner that enhances the practice of pharmacy	
Within the MTM process, identify and select appropriate medication information resources to provide patient care	4.4
Utilize information from medication therapy management platforms in a manner that optimizes patient care and health outcomes	4.3
ABO 9: Manage medication use systems to optimize patient and population outcomes	
Predict, identify, evaluate, and report adverse drug reactions and medication errors and recommend actions to minimize medication misadventure	4.3 ^a
Integrate third-party formulary information within the medication therapy management process to optimize medication therapy	4.3 ^a
ABO 11: Exhibit the highest standards of professional and ethical behavior in pharmacy practice (eg, honesty, integrity, tolerance, confidentiality, care and compassion, respect for others, responsibility)	
Make and defend rational, ethical decisions within the context of professional and personal values	4.3
Demonstrate caring, ethical, and professional behavior when interacting with peers, professionals, patients, and/or caregivers	4.5
Respect and protect private, proprietary, and/or sensitive information	4.4
Develop and maintain professional relationships with peers, professionals, patients, and/or caregivers	4.5

(Continued)

Table 1. (Continued)

Assessed Ability-based Outcome (ABO) Components	Mean Score
ABO 12: Maintain professional competency and professional stewardship	
Recognize emerging issues, products, and services (eg, use of CMS Star Ratings) to improve pharmacy practice and/or public health	4.3 ^a
Self-identify opportunities for growth in one's own performance	4.3 ^a
Demonstrate self-motivation to improve performance	4.4
Incorporate provided feedback into work	4.4
ABO 14: Communicate effectively using multiple strategies to improve health outcomes	
Provide accurate and succinct verbal information that is appropriate for the target audience (eg, peers, professionals, patients, and/or caregivers)	4.5
Provide accurate and succinct written information that is appropriate for the target audience (eg, peers, professionals, patients, and/or caregivers)	4.5
Select effective communication strategies that optimize interactions between peers, professionals, patients, and/or caregivers	4.5
Display verbal and non-verbal mannerism that promote empathetic, respectful, and compassionate communication	4.5
Demonstrates sensitivity to humanistic factors (diversity, culture, age, race, socioeconomic status, health literacy, stigmatized disease, and end of life)	4.4

^aThe number of respondents for this item was slightly lower than the total n because preceptor evaluations that stated "n/a" for that field were referred. These numbers were, respectively, n=103, n=140, n=137, n=136, and n=143

Responses based upon a 5-point scale: 1=not ready for advancement/failure to demonstrate skill, 2=beginning performance (significant improvement needed), 3=entry-level performance with limitations (improvement needed), 4=entry-level performance, 5=beyond entry-level performance

cases that did not have the correct documentation and medication information were rejected back to the students for further work and resubmission.

EVALUATION AND ASSESSMENT

This project was determined to be "quality improvement" and thereby exempt by the Colorado Multiple Institution Review Board. The graduating class of 2016 was the first class to complete this MTM APPE. Table 1 outlines the preceptors' final evaluations of 151 students, based upon a rubric tool that assessed students on 10 of the 14 ability-based outcomes (ABOs) established by the SSPPS. This rubric tool has since been validated by the director of assessment at the SSPPS and is currently pending publication. Score averages across the class are presented, based upon a five-point Likert scale. All 151 students successfully completed a rotation with one of the three participating chain pharmacies, and all 151 students obtained a "P" or grade of "passing" for the experience. In addition, preceptors were asked to assign a letter grade percentage as part of the validation process for the evaluation tool. The average grade for the class was a 94.2%, with 138 students (91%) receiving an A grade. No students were assigned a grade lower than a B. Figure 1 represents students' self-reporting of the amount of time they spent during the APPE performing MTM interventions.

To complement the student assessment by preceptor, the course directors employed additional assessment strategies to ensure the course achieved its targeted

learning outcomes, provided quality experiences to students, and identified opportunities for improvement with subsequent course offerings. Qualitative and quantitative assessment data were collected via the Qualtrics online survey platform (Qualtrics, Provo, UT), allowing students the opportunity to provide confidential feedback regarding the MTM and other required coursework within the experiential education program. Quantitative items were reported using a Likert scale and focused on students' perceived value of the course and the APhA certificate programs on their knowledge, skills, and abilities to perform MTM. An open-ended response item asked students to "Please provide any comments regarding how the MTM rotation could be improved for students." This item was included specifically to gather qualitative data to improve further iterations of the course. Responses to this question underwent a thematic content analysis to identify major themes within student feedback.

Of the 151 students enrolled in the course, 128 responded to the elective survey (85% response rate). Quantitative data illustrated in Table 2 indicated students could identify improvement in their ability to perform MTM interventions. Students also reported improved knowledge and skills, albeit to a lesser degree compared to the improvement seen in ability to perform MTM.

Forty of the responding students provided roughly 135 lines of narrative text in response to the open response question. This qualitative feedback was reviewed by two

Figure 1. P4 students' self-reported time spent performing MTM interventions during the MTM rotation.

faculty members and organized into four major themes based upon the content, some of which included a clustering of subthemes within the larger theme. These data are presented in Table 3.

DISCUSSION

This article describes a focused advanced pharmacy practice experience designed specifically to give students opportunities to provide MTM in community pharmacy settings. To our knowledge, this is the first APPE that requires an entire class of students to participate in the provision of MTM services in community settings. Because MTM services continue to grow as a prominent role for the pharmacist, particularly in community retail settings, faculty members felt that providing immersive training for students during their APPE year was appropriate and necessary.

Upon establishing this APPE, the faculty and curriculum committee decided that the SSPPS would use the APhA Delivering Medication Therapy Management Services certificate program to establish a core understanding of MTM for the students. This program provides a history of how MTM services were established, and describes how these services could be expanded beyond what is currently being reimbursed. The curriculum committee felt that this program would provide context to the

students about the role these services play within the pharmacy profession, both currently and in the future. It was up to the individual chain pharmacies to then establish an orientation for students that focused on the logistics of how MTM services were provided in each setting. Considering Table 1, students' performance at these sites exceeded the expectations of the SSPPS, averaging well above the goal of "entry-level performance," or a four on the five-point scale. The assessment tool used to evaluate students listed the relevant ability-based outcomes (ABOs) that students should be demonstrating, along with subcategories that helped preceptors understand which parts of the students' performance would map to an individual ABO. Of note, every subcategory of the school's ABOs used to evaluate the MTM experience reflected an average above four, indicating that within a three-week timeframe, students were able to meet the expectations of the school and of preceptors while providing MTM services. Of high relevance are the subcategories below ABO 5 ("Use medication therapy management platforms [eg, Outcomes, Mirixa] to improve population health") on which students scored an average of 4.4 out of 5, and below ABO 7 ("Describe a plan for the establishment, marketing, or compensation for medication therapy management and patient care services") on which students scored an average of 4.3. These were key performance

Table 2. Fourth Year Pharmacy Students' Self-reported Ability to Perform Medication Therapy Management (MTM) Interventions Before and After Completion of an MTM Advanced Pharmacy Practice Experience

Timeframe	Very Weak n (%)	Weak n (%)	Neutral n (%)	Strong n (%)	Very Strong n (%)
Before MTM rotation (n=128)	9 (7.0)	31 (24.2)	51 (39.8)	32 (25)	5 (3.9)
After MTM rotation (n=128)	0 (0.0)	3 (2.3)	20 (15.6)	79 (61.7)	26 (20.3)

Table 3. Fourth Year Pharmacy Students' Qualitative Feedback Regarding an Advanced Pharmacy Practice Experience in Medication Therapy Management, Categorized by Common Themes

Theme Statement (F:N) ^a
Supporting sub-theme
Examples of evidence supporting theme or sub-theme
Theme 1: Many inefficiencies exist in the MTM process and the relating rotation experience (27:18)
Students do not perceive the call-center model as effective means to conduct MTM (6:4)
Many phone numbers are incorrect.
I found most patients did not like being called about their medication and would find a way to get off the phone quickly.
Students perceive MTM experience having insufficient work volume to justify stand-alone experience (4:4)
Not enough work to make this rotation practical.
The failure rates for MTM are too high for students to be successful.
Theme 2: MTM should be sequenced elsewhere in the curriculum (20:15)
MTM should be placed earlier in the curriculum (6:6)
This rotation seems more appropriate for a P2-P3 student.
The platforms completely guide you through how to navigate problems and explain guidelines, etc, behind TIPs and CMRs. I think this is something a younger classman could perform despite not having completed the entire pharmacotherapy curriculum.
MTM should be an elective experience (4:4)
I wish I could have had another rotation more suited to my interests during my P4 year.
I think this rotation should be optional, not required.
I feel I didn't learn as much as I had in all of my other rotations.
Theme 3: My MTM experience was positive or was valuable to me (11:11)
I really enjoy providing MRTM services to patients and find great pleasure in doing the task.
So glad this was provided. I got a job because of this skill!
I believe the face-to-face CMRs were very beneficial for both (patients and pharmacy students).
Theme 4: My MTM experience was not positive or not valuable to me (16:13)
There is too much emphasis on the money aspect and hardly any on the actual patient care.
I felt like a telemarketer.
I've had a lot of experience with MTM previously so I don't feel like this rotation was as beneficial for me as it was for some of my other classmates.
Students should not be used as free-labor (3:3)
I didn't appreciate how the parent company sees this as an additional source of free labor.
What incentive is there for [the pharmacy] to hire pharmacists to perform MTM duties if all of them are performed by interns?

Abbreviations: CMR= comprehensive medication review, MTM= medication therapy management, TIP= targeted intervention program

^aFrequency to number ratio: the ratio of the frequency of which the theme (F) or subtheme (f) is identified within the available pool of text, to the number of individual respondents supporting the theme (N) or subtheme (n)

areas that the MTM APPE was designed to address. While the category below ABO 7 was rated high, approximately 32% of preceptors selected "not applicable" when evaluating students, suggesting that not every student had the opportunity to describe such a plan on site.

Based upon the data in Figure 1, the expectation that students would spend $\geq 90\%$ of their time engaged in MTM services appears to be lofty on the side of the SSPPS. Just over 50% of students reported engagement with MTM services 80%-100% of the time, while approximately 80% reported engagement with MTM services during over 60% of their time on site. Students may have viewed complementary activities, such as preparing education for patients who were scheduled to be seen for an MTM intervention, as not directly part of the MTM process, or that other duties were taken on or required of students that decreased their

time available to provide MTM services. Based on the high performance assessments and student-reported learning, both of which suggest the rotation accomplished the goals for which it was established, perhaps 90% engagement is not realistic or necessary.

Student feedback regarding this rotation suggests that the course accomplished the overarching goal of preparing students to perform entry-level MTM practice in a community setting. Students' self-assessment of their ability to perform MTM interventions improved dramatically, where the majority started with a "neutral" assessment (40%) moving to the majority of the students rating their abilities as "strong" (62%). Out of the entire class that responded, 82% rated their MTM intervention skills either "strong" or "very strong" after completion of the MTM rotation. This aligned well with preceptor evaluations of

students from Table 1. However, further research with more objective measurements beyond self-reported feedback are needed to establish that this goal of student preparation was achieved.

The community sites used for the MTM rotations did not receive students for a more traditional community APPE concurrently. At present, the number of community APPE sites available to students is quite robust, with many also meeting the rural Colorado requirement placed on students, so it was decided that these specific stores would be used for the MTM experience and would not match for a traditional community APPE. Because of the requirement for students to be immersed in MTM services for the strong majority of the rotation (~90%), the curriculum committee felt that preceptors would benefit from only seeing students involved in the MTM program so that there was no confusion over where the students should be spending their time.

The qualitative feedback regarding the MTM rotation provides further insight into students' perceptions of the overall experience. Many students felt that the experience should be offered in a different way to the class; either earlier, where students could complete the tasks as an introductory pharmacy practice experience (IPPE), or as an elective, where students could opt in or out of completing the MTM rotation. Several of these students felt that the interventions that were being performed did not require the complete in-depth pharmacotherapy knowledge possessed in the fourth year, and that the experience could have been completed in earlier years of the curriculum. This is in stark contrast to APhA's policy of only providing the MTM certificate course to students who are within one year of their fourth-year rotations, where the intention is that students need virtually all of their didactic and skills training prior to engaging in the delivery of MTM services. There is likely a disconnect between the interventions that APhA and other pharmacy organizations see pharmacists and students being able to perform and the actual interventions that are currently happening in the community retail setting. Students at the SSPPS are very clinically trained, and are often given patient case scenarios where they provide targeted education and management. The level of interactions students participated in through this rotation did not appear to be of the depth that they would have preferred, either in time or in content. More MTM models are needed in order to justify the time and increased reimbursement these more in-depth clinical interventions would require when performed by a pharmacist. In regards to offering the MTM experience as an elective, the SSPPS views MTM services as a rapidly evolving role within community practice, and considering that the majority of graduates from the SSPPS (>60%) enter community pharmacy practice settings after graduation, the

faculty feel it is important to include this experience among the core skills taught to all graduates of the program.

Other qualitative feedback provided highlighted the difficulty of performing MTM interventions over the phone, as well as students' perceptions that they were generating profits for companies and were virtually "free labor" during the experience. Because there is strong evidence that telephone MTM delivery is effective in reducing patients' costs and improving patient outcomes,¹⁴⁻¹⁷ this feedback suggests that perhaps the delivery is not ideal for students not familiar with a call center-based practice, and/or is a learned skill rather than an inherent one. Also, retail pharmacy chain companies are responsible for pharmacist labor time, so profits will be inexorably linked to interventions within this setting. Finally, 11 students provided qualitative feedback that they perceived this experience as being highly valuable, with one student actually declaring that they obtained a job as a result of this targeted MTM APPE.

In regards to reproducing this model at a different institution, the largest challenge would be identifying a three-week interval of time during the APPE year for each student to complete the training. This was done at the SSPPS under a larger curriculum renewal where other changes were already taking place, so that made the process easier to implement. The faculty members requested that the community chain partners teach the APhA MTM training program each year to the students so there was no faculty time committed to offering that program, although the SSPPS did sponsor pharmacists with each company to become MTM "train-the-trainers" at the APhA annual meeting. The program itself cost \$90 per student, which was built into the student fee structure, and did provide the additional benefit of each student receiving a certificate of completion from the program. In conversations with the community partners, the burdens created by placing teams of students in these sites for three weeks in terms of evaluation and oversight were more than balanced by the successful MTM work completed by these students.

There are limitations to this project. This MTM APPE was only offered at one institution, which limits the ability to generalize the results seen. The data presented are heavily reliant on student perceptions, and there are no statistical analyses or data available regarding students' performance before and after the experience. Data collection is underway to clarify what interventions students are making, and to determine the cost savings associated with these interventions.

CONCLUSION

The University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences successfully implemented a required MTM community APPE for all

students in the fourth year of the curriculum. Based upon preceptor evaluations and student reporting, this experience successfully prepared students to engage in MTM interventions upon graduation. With the role of MTM services continuing to grow as an essential part of the pharmacy profession, it is important to train pharmacy students in this area. This APPE represents one model for accomplishing that training.

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