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Student pharmacists' role in enhancing ambulatory care pharmacy practice

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Abstract

With a primary care physician shortage, utilization of pharmacists in the ambulatory care setting has proven to have positive economic and clinical outcomes for the practice and for patients. To extend the reach of the pharmacists, students may assist with patient care activities, such as medication reconciliation, point-of-care testing, and counseling. Evidence has shown that students benefit in building confidence, as well as improved perceptions of interprofessional care, while positive patient outcomes are maintained. There are many methods for schools to integrate these experiences early into their curriculum, as well as for students to explore opportunities on their own.

Keywords

Students, Pharmacy; Pharmacists; Ambulatory Care; Education, Pharmacy; Problem-Based Learning; Interprofessional Relations; United States

Introduction

A growing and aging population is contributing to an insufficient supply of physicians to meet the primary care provider demand.^{1,2} A report from the Association of American Medical Colleges found that by 2033, there will be a primary care shortage of between 21,400 and 55,200 physicians. This sixth-annual report highlighted that population health goals can be achieved through collaboration with non-physician clinicians.² The increase in the number of advanced practice registered nurses and physician assistants has helped address some of the gaps in care by making more chronic and acute visits available for patients; however, pharmacists with an in-depth knowledge of pharmacotherapy can also play an important role in improving medication use to optimize chronic disease state management, thus further increasing access to care.²⁻⁴

The provision of pharmacy services in the ambulatory setting results in improved clinical and economic outcomes.^{5,6} For the purpose of this article, ambulatory care addresses the delivery of care to patients who are able to ambulate, whether they are in a clinic, transitioning from a hospital to home, or in their home receiving services, through means such as telehealth.⁷ Pharmacy services are often provided under collaborative practice agreements (CPAs), which allow pharmacists to initiate, modify, and discontinue therapy based on an agreement between a provider and a pharmacist.⁸⁻¹⁰

The combination of pharmacist value recognized in the ambulatory setting, along with a changing health care environment, has resulted in the need for more ambulatory

care pharmacists.⁶ To account for this demand, post-graduate year 2 (PGY-2) specialty residency offerings in ambulatory care have grown by 85% since 2015, and as of 2019, there were 4,342 board certified ambulatory care pharmacists.^{11,12} While the need for and impact of pharmacists on the health care team have been established, the staffing ratio of physician to pharmacist has not been well defined. Estimates vary from 0.20 pharmacist full-time equivalent (FTE) to 1.0 pharmacist FTE matched to a wide range and complexity of physician panels.¹³

Budget constraints often restrict optimal staffing ratios, thus the utilization of student pharmacists in the ambulatory care setting may offset these needs. The purposeful integration of students into the ambulatory setting may also positively impact clinical care and student education, as has been suggested with medical students.¹⁴

Evidence to support the role of student pharmacists

In the ambulatory setting, there are many technical tasks, such as patient scheduling, obtaining vitals, calling pharmacies to obtain up-to-date medication lists, and investigating patient prescription benefits that take away time from more complex aspects of disease-state management, such as implementing medication adjustments, ordering laboratory tests, and documenting clinical services provided.¹⁵ To better utilize clinical pharmacists' time, the University of Wisconsin used primary care pharmacy technicians to fulfill technical tasks, which enabled pharmacists to focus on clinical tasks.¹⁵ However, a limitation of this model is the need to hire more staff (e.g., pharmacy technicians) to fulfill this role. An alternative solution would be to utilize student pharmacists to perform technical and low-level clinical tasks, which would also have a minimal budget impact. Table 1 provides examples of such tasks, which align with the American Association of Colleges of Pharmacy entrustable professional activities (essential activities and tasks that new pharmacy graduates should be able to perform without direct supervision upon entering practice).¹⁶

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Table 1. Select examples of non-clinical, low-level, and high-level tasks that student pharmacists may perform in an ambulatory setting

Non-Clinical	Low-Level	High-Level
<ul style="list-style-type: none"> - Room patients - Schedule patients - Research patient assistance programs - Obtain medications lists from pharmacies 	<ul style="list-style-type: none"> - Obtain vitals - Perform point-of-care testing - Conduct medication reconciliations - Administer immunizations - Screen patients for pharmacy consults - Counsel patients on medications or medical devices - Assess a patient's health literacy utilizing a validated screening tool 	<ul style="list-style-type: none"> - Assist a patient with behavior change through motivational interviewing - Interpret laboratory data and recommend therapeutic changes or additional monitoring - Interpret patient provided health information to develop an evidence-based therapeutic plan

Several studies have demonstrated the positive contribution of student pharmacists collecting medication histories, completing medication reconciliation, conducting patient interviews, performing point-of-care testing, and providing immunizations.¹⁷⁻²³ In an interprofessional setting, the use of fourth-year student pharmacists to obtain medication histories has been employed in a variety of clinics (e.g., internal medicine, cardiology, and pediatrics).¹⁷ In this model, students spent an average of 10 minutes (range 2-30 minutes) collecting medication histories before reporting their findings back to the attending physician.¹⁷ Based on the time spent to obtain a full medication history, this model suggested that medical providers saved time by collaborating with student pharmacists, and students benefited by working in an interprofessional, real-world setting.¹⁷ Dalal *et al.* demonstrated that student pharmacists independently performing subjective interviews and obtaining fingerstick international normalized ratios before making therapeutic recommendations under pharmacist oversight provided comparable clinical care to pharmacist-only visits in an outpatient anticoagulation setting.¹⁸ Furthermore, there was no difference between third-year and fourth-year precepted students.¹⁸ This study suggests that the utilization of student pharmacists to reach more patients does not compromise patient care.

Complementary findings regarding students' abilities to practice in an ambulatory setting have been illustrated when students perform medication reconciliation.^{19,20} In a depression clinic, students identified at least one medication list discrepancy in more than 50% of patients and an insufficient antidepressant trial in approximately 32% of patients through a pilot telephonic medication reconciliation and antidepressant treatment history program.¹⁹ Considering each call completed by the students required, on average, 18 minutes, students were able to optimize the pharmacists' time.¹⁹ A retrospective review of this service found there were no differences among student educational level (e.g., all four professional years) for identifying medication discrepancies, suggesting that incorporation of students into ambulatory care practices can occur regardless of the professional year.²⁰

Provision of immunizations is another task that student pharmacists can assist with, as many would have been trained at their institution.²¹⁻²³ Training can be costly, due to the supplies needed to ensure hands-on experience; however, Woelfel and colleagues compensated for this cost by utilizing immunization-trained student pharmacists to provide vaccinations to Medicare beneficiaries in mobile clinics.²¹ Between 2015 and 2016, the net income generated by student pharmacists administering 1,777 vaccinations was USD 19,937, with the greatest return on

investment from the influenza vaccine, followed by Tdap and pneumococcal vaccine.²¹ This program enabled students to practice their skills and gain experience with immunization coverage and billing while generating revenue for the school.²¹ Regarding humanistic outcomes, Hannings *et al.* showed that 98% of the individuals who received a vaccine through a student-led immunization clinic were satisfied. Furthermore, this clinic was able to capture approximately 68 individuals who would not have been vaccinated otherwise.²² The availability of pharmacists and student pharmacists to provide immunizations has increased vaccine awareness and access, especially among low-income patients, thus resulting in a positive public health impact.^{23,24}

Strategies for incorporating student pharmacists in ambulatory settings

To ensure that student pharmacists have the appropriate skills to practice in an ambulatory care setting, experiences should begin early and be sustained throughout their education.

One way for student pharmacists to build skills prior to rotations is through purposeful and innovative didactic education. Sando *et al.* demonstrated that use of a game-like educational tool to teach medication history skills increased students' confidence levels and skills.²⁵ However, ambulatory care is more than just the clinical skill set, as it also entails practice management skills. For student pharmacists to obtain more from their experiential opportunities, education embedded into the pharmacy curriculum regarding the business model of ambulatory care is important.²⁶ Students should be able to complete a market analysis, perform a needs assessment, accurately describe the service to be provided, and define how the service will be operated and sustained.²⁷ Colleges and schools of pharmacy should promote classes from both the clinical and the business standpoints so that students stay abreast of the changing health care landscape and are prepared to perform the next generation of pharmacist roles.²⁸ To build upon the didactic content, students can work on a business plan for implementation of a new service or evaluation of an existing one as part of their fourth-year experiential ambulatory care rotations.

Since the onset of the coronavirus disease 2019 (COVID-19) pandemic, some institutions have found unique ways to engage students in ambulatory care practice by providing patient care via telehealth visits, answering drug information inquiries, and providing educational opportunities for staff.^{29,30} The incorporation of student pharmacists into telehealth ensures their experiential training continues during the pandemic, while introducing



them to a new approach to care that could remain post-pandemic. Evidence is limited regarding patient outcomes when students are involved in telehealth; however, a previous study suggested that students who were involved in telehealth medication therapy management (MTM) programs were more confident in the provision of comprehensive medication reviews compared to students who provided MTM in the community and hospital settings.³¹ As telehealth continues to expand, the utilization of students and their impact on patient outcomes will be an area to explore.

Population health initiatives can also be completed via telephone and introduced into experiential education or offered for volunteer students. Kaiser Permanente Colorado incorporated population health management activities for rotation students that entailed students reviewing patient records and identifying interventions that could be made by the student or a clinical pharmacist.³² Of the 1,406 actionable interventions documented by approximately 46 students, 52% pertained to patient education (e.g., student contacts the patient via telephone or letter for sole purpose of education), 23% to verification (e.g., calling a pharmacy to verify a patient refill history), and 10.5% to medication therapy adjustment (e.g., any dose or medication change within the same medication class).³² The chart reviews, and subsequent completed interventions, when applicable, conducted by pharmacy students accounted for approximately 765 hours of clinical pharmacist time that would have been required over the four-year study period.³² These innovative ways for engaging students allow student pharmacists to be exposed to ambulatory care practice, while offsetting pharmacist time.²⁹⁻³²

Unique opportunities for students in ambulatory care

Student pharmacists interested in ambulatory care should take it upon themselves to seek out experiences to engage in real-world experience. Some opportunities may be facilitated through their school or college, but some may require the student to apply on their own.

Within the commonwealth of Virginia, there are many opportunities for students to gain early, hands-on, exposure to ambulatory care. For example, in partnership with VCU School of Pharmacy, free clinics in Richmond that provide primary care and chronic disease management for the uninsured population offer ambulatory care electives for third-year student pharmacists, along with numerous volunteer hours.^{4,33} Throughout the elective or volunteer hours, student pharmacists work as part of an interprofessional team, conducting patient interviews, addressing medication-related concerns, counseling patients on lifestyle changes and, if needed, providing smoking cessation services under the supervision of the attending clinical pharmacist or physician. In this practice model, student pharmacists not only gain experience with direct patient care and enhance their critical thinking and cultural competence and problem-solving skills, but the clinics benefit from increasing the number of patients that they care for by utilizing student pharmacists as pharmacist extenders.⁴

Not all students will have the opportunity to partake in a formal internship or have an ambulatory care practice-based elective offered. Therefore, students could engage in domestic or international medical outreach events that focus on chronic disease state management (e.g., diabetes and hypertension), or preventive medicine (e.g., cardiovascular disease prevention).^{34,35} On these outreach trips, students engage in direct patient care through physical assessments, medication and disease state counseling, and interprofessional collaboration regarding medication choices or therapeutic interchanges.^{34,35} While these opportunities do not offer longitudinal ambulatory care experiences, they enable student pharmacists to have a glimpse of what ambulatory care practice entails.

At the national level, externships are available with the Indian Health Service (IHS) and the Junior Commissioned Officer Student Training and Extern Program during the summer months.^{36,37} With a large emphasis on ambulatory care at many IHS facilities, students are immersed in ambulatory care practices with pharmacists to manage diabetes, anticoagulation, asthma, smoking cessation, HIV, and other chronic diseases.³⁷ Beyond participating in patient visits, student pharmacists conduct research projects, create educational handouts for patients, and complete projects that advance clinical services. These opportunities are also available during IHS ambulatory care rotations for schools that have agreements with IHS facilities.³⁷ Further opportunities for internships can be found with local ambulatory clinics or federally qualified health centers, as well as Veterans Affairs medical centers via the VA Learning Opportunities Residency.

On an international level, there are opportunities for students to experience pharmacy in other countries through the student exchange program of the International Pharmaceutical Students' Federation.³⁸ Additionally, the VCU School of Pharmacy offers an interprofessional international outreach opportunity, which enables students from any professional year to travel to South American countries and work with other health professions for an intensive two-week direct patient care experience.³³ Furthermore, some schools of pharmacy may offer international fourth-year rotations. These experiences increase student pharmacists' cultural awareness, self-awareness, and knowledge of public health, while providing an environment for them to gain confidence in providing clinical care and making recommendations.³⁹⁻⁴¹ For students interested in a career with a public health emphasis, engaging in domestic and international outreach events is a way to gain a deeper appreciation for disparities in health.

Barriers to incorporating student pharmacists in ambulatory settings

Despite the many benefits to incorporating student pharmacists into the ambulatory setting, it does not come without barriers. The biggest barrier identified in studies is time.^{20,42,43} This can include the time spent training students or planning events for students, such as medical missions or diabetes self-management courses.^{42,43} A suggestion to minimize this burden includes planning far enough in advance to overcome any legal barriers or site restrictions for student-led initiatives (e.g., immunization



clinic).⁴² Involving more individuals in the planning is recommended, especially if engaging in an interprofessional activity.⁴³ Lastly, ensuring there is enough time to train students, especially depending on the level of tasks the student will be performing, is a necessary consideration.²⁰ Preceptor time may need to be invested up front to ensure students are properly trained; however, as described throughout, when the experiences are well-planned, there is a potential for a large impact on student growth, patient care, revenue generation, and time-savings later on.^{17-23,32,42,43}

Conclusion

With numerous opportunities for engagement early on in their careers, student pharmacists can actively contribute

to the advancement of ambulatory care practice by functioning as pharmacist extenders. With the opportunity to utilize their clinical and business skills, student pharmacists may enhance patient care services, leading to improvements in quality of care and patient access.

CONFLICT OF INTEREST

None to declare.

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