

## RESEARCH ARTICLES

# Impact of Interprofessional Activities on Health Professions Students' Knowledge of Community Pharmacists' Role and Services

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**Objectives.** To determine the impact of health professions students' participation in interprofessional activities on their knowledge of the roles of community pharmacists and community pharmacist-provided services.

**Methods.** Students at the Medical University of South Carolina were surveyed via a self-administered online survey tool to determine their participation in interprofessional activities as well as their knowledge of the role of community pharmacists and community pharmacist-provided services.

**Results.** Over 600 students completed the survey instrument. Nonpharmacy students who attended the university-sponsored Interprofessional Day were more knowledgeable of pharmacist-provided services. Previous interaction with a pharmacist increased nonpharmacy students' awareness of the services that pharmacists provide.

**Conclusion.** Participation in interprofessional activities increased health professions students' awareness of the role of pharmacists. Continued education among healthcare professions about the role of and services provided by pharmacists is needed to ensure that pharmacists have the greatest possible impact on patient care.

**Keywords:** community pharmacy, health professions, interprofessional education

## INTRODUCTION

With increased methods of reimbursement for pharmacy services and the passage of new laws such as the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, the roles of community pharmacists have changed and continue to evolve, including the expanded role they play on healthcare teams.<sup>1</sup> In South Carolina, community pharmacies offer a variety of services, including medication therapy management (MTM), immunizations, health and wellness screenings, and disease state management, which are common services offered by community pharmacists across the United States.<sup>2,3</sup> When performing these patient care services, it is necessary for pharmacists to collaborate with other healthcare professionals and work as part of a team to provide optimal patient care. Improved patient outcomes through collaborative care have been demonstrated through the Asheville Project, Project ImPACT, and DiabetesCARE.<sup>4-7</sup> Participation of health professions students in interprofessional education is important to better understand the

roles and contributions of other members of the healthcare team.

The 2003 Institute of Medicine report, *Health Professions Education: A Bridge to Quality*, stated the goal that "All health professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches and informatics."<sup>8</sup> To achieve this vision, many healthcare universities, including the Medical University of South Carolina (MUSC), developed interdisciplinary centers and groups.<sup>9-12</sup> MUSC, a comprehensive academic medical center, created the Creating Collaborative Care (C3) initiative, which focuses on interprofessional education in response to the complex healthcare system in the United States.<sup>13</sup> The initiative established 4 goals: students will (1) acquire teamwork competencies; (2) acquire knowledge, including the values and beliefs, of health professions different from their own discipline that will enable them to define interprofessional healthcare delivery or research, (3) apply their teamwork competencies in a collaborative interprofessional healthcare delivery or research learning setting, and (4) demonstrate their teamwork competencies in collaborative interprofessional healthcare delivery or translational research contexts.<sup>13</sup> To accomplish these goals, C3 developed a number of interprofessional events and activities, including required

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interprofessional courses, lectures, interprofessional competitions, and its largest event, Interprofessional Day. Participation in interdisciplinary teams is an important part of patient care. With community pharmacists' roles rapidly changing and continually evolving, it is uncertain whether students of other health professions are aware of the role of the community pharmacist and community pharmacist-provided services. Patients' and other health professionals' knowledge of the role of the community pharmacist and community pharmacist-provided services have been examined,<sup>14-17</sup> but students' knowledge of and perspectives on these areas have not. The primary objective of this study was to examine the impact of participation in Interprofessional Day on first- and second-year health professions students' knowledge of the roles of the community pharmacist and community pharmacist-provided services. The secondary objectives were to examine whether students' having prior exposure to a pharmacist in a non-dispensing capacity or being currently enrolled in the college of pharmacy impacted their knowledge of the roles of community pharmacists and community pharmacist-provided services.

## **METHODS**

### **Overview of Interprofessional Day**

Interprofessional Day was held in the fall semester of each year and involved first- and second-year students from all 6 colleges at MUSC: dental medicine, graduate studies, medicine, nursing, health professions, and the South Carolina College of Pharmacy (MUSC campus). The college of graduate studies' programs offer master of science degrees and doctor of philosophy degrees in studies such as biomedical science, molecular and cell biology, and neuroscience. The college of health professions enrolls students in many degree programs including physical and occupational therapy, physician assistant, health administration, and health sciences. Interprofessional Day was scheduled for a half-day and included a speaker and interprofessional group breakout sessions facilitated by faculty members specially trained on effective team facilitation.

On Interprofessional Day, first-year students were divided into groups of approximately 30 students, each with representation from all 5 participating colleges, that met in various locations across campus. The students were asked to explore each profession's role on a healthcare team and available postgraduate opportunities within their respective profession. Each group of 30 students was split into smaller groups of approximately 10 students, with each smaller group still having representation from each college. Each group was responsible for engaging in discussion within their interprofessional teams and com-

pleting a list of questions pertaining to each profession. Information collected included admission requirements and prerequisites for each program, the length of each program, courses taken during particular semesters, advanced training opportunities in each profession after graduation, and stereotypes about each profession. Following this activity, the larger group of 30 students met to discuss the findings of each smaller group. Each small group presented something they learned about each of the healthcare professions represented. The purpose of this presentation was to encourage students to recognize the importance of collaboration among healthcare disciplines.

Second-year students followed a similar model for Interprofessional Day. However, rather than answering questions pertaining to each profession, the students worked as small groups to analyze a case study related to a major health event (ie, pandemic) or sentinel event within a health system. Each small group participant demonstrated how their particular profession would contribute to the healthcare team in their case study.<sup>13</sup> Each team member discussed the role their profession could play in the care of the patient presented. The purpose of the exercise was to demonstrate the importance of involving all professions to optimize the care of the patient. Third-year and higher students also could elect to assist a faculty member and serve as a facilitator for first-year students on Interprofessional Day.

### **Survey Development and Administration**

Study investigators searched the primary literature for information regarding community pharmacists and clinical services offered in the community setting across the United States, including South Carolina, to include in a survey instrument. In spring 2009, a 20-question survey instrument was distributed to all students enrolled at MUSC (Appendix 1). Closed-ended questions were used to collect information about the student's college affiliation, degree program, current semester, and participation in Interprofessional Day, and to assess the participant's knowledge of services that each healthcare professional provides and that professional's involvement in other practices, including prescribing, administering, and dispensing medications. Open-ended questions collected information relating to the student's involvement in interprofessional activities, such as student organizations or case competitions, and past interactions with a pharmacist through practice experiences or shadowing experiences also was obtained. In the last section, study participants were asked to select whether a pharmacist, physician, dentist, or several other healthcare providers participated in the interprofessional activities noted by the student. Multiple answer choices were allowed for this final section of questions.

A final question asked which healthcare provider would be the student's first choice for a referral for a comprehensive medication review. This project was approved as exempt by the institutional review board at MUSC. The survey instrument and description of the research project were reviewed by each participating college's administration. Following review, the administration of the College of Dental Medicine, College of Medicine, College of Health Professions, and the South Carolina College of Pharmacy (MUSC campus) gave approval to distribute the survey instrument to all of their students. The College of Nursing provided a list of student e-mail addresses for those students who were willing to receive an e-mail requesting participation in the survey. Students in the MUSC College of Graduate Studies were not included in the survey because graduates enter professions that provide limited or no direct patient care. Prior to distribution, 10 students (2 from each participating college) pilot tested the survey instrument for readability, ease of completion, and clarity of the questions. As a result of this feedback, a condensed definition of comprehensive medication review was added, examples of disease management services and point-of-care testing services were included, and several questions were reworded for clarity.

Students in the 5 participating colleges were sent an e-mail from an MUSC e-mail account describing the survey and providing a link to the survey instrument on SurveyMonkey, Palo Alto, California ([www.surveymonkey.com](http://www.surveymonkey.com)) an Internet-based survey tool. (The full version of the survey tool is available from the author upon request.) As an incentive to participate, when students clicked on the survey link in the invitation e-mail, their e-mail address was automatically transmitted to a database that entered them in a drawing to win 1 of 4 \$50 gift cards. Upon completion of the survey instrument, students' results were downloaded to a database and identifying information, including their e-mail address, was removed to maintain confidentiality during data analysis. Reminder e-mails were sent to nonresponders after 5 days and 15 days, with data collection ending 1 month after the initial invitation was sent. The completed survey instruments were analyzed using SPSS for Windows version 14.0 (IBM Corporation, Armonk, New York) and Microsoft Excel for Macintosh, version 12.1.7. Descriptive statistics and chi-square tests were used to analyze the survey data. Alpha was set at 0.05.

## RESULTS

Six hundred forty-seven of 1931 students completed the survey instrument, for a response rate of 33.5%. The majority of respondents represented the colleges of medicine, health professions, and pharmacy (Table 1). Most

Table 1. Health Professions Students Responding to a Survey Regarding the Impact of Interprofessional Activities

College Affiliation	Survey Respondents, No. (%)
College of Dental Medicine (n = 226)	55 (24.3)
College of Health Professions (n = 742)	217 (29.2)
College of Medicine (n = 589)	181 (30.7)
College of Nursing (n = 56)	29 (51.8)
College of Pharmacy (n = 316)	165 (52.2)
Overall (N = 1929)	647 (33.5)

of the respondents had attended MUSC Interprofessional Day but had not participated in interprofessional activities outside of the event. The majority of respondents did not have a family member or friend who was a pharmacist, and had not previously worked with a pharmacist in a non-dispensing capacity (Table 2).

Of the many services that pharmacists provide, non-pharmacy students who had attended Interprofessional Day were most aware that pharmacists immunize patients, provide education on disease state management, dispense medications, and counsel patients on their medications (Table 3). Nonpharmacy students who had worked with a pharmacist in a non-dispensing setting were more knowledgeable than other respondents that pharmacists can prescribe medications ( $p = 0.047$ ), practice under a standing order/protocol ( $p = 0.001$ ), and provide point-of-care tests ( $p = 0.012$ ). More nonpharmacy students who had worked with a pharmacist chose a pharmacist as the first choice for a referral for a comprehensive medication review ( $p = 0.024$ ). There was no difference in knowledge about pharmacist-provided services between nonpharmacy students who had a family member or friend who was a pharmacist and those who did not. Pharmacy students were more knowledgeable than nonpharmacy students about what services pharmacists can provide (Table 4).

Table 2. Health Professions Students' Interprofessional Activities and Interaction With Pharmacists, N = 647

Variable	No. (%)
Attended Interprofessional Day	607 (93.8)
Participation in other interprofessional activities, not including Interprofessional Day <sup>a</sup> (N = 646)	188 (29.1)
Family member or friend is a pharmacist <sup>a</sup> (N = 646)	249 (38.5)
Previous pharmacist interaction <sup>b</sup> (N = 644)	277 (43.0)

<sup>a</sup> Not all students responded to this item (n = 646).

<sup>b</sup> Not all students responded to this item (n = 644).

Table 3. Nonpharmacy Health Professions Students' Perceptions of Pharmacists Based on Attendance at Interprofessional Day

<b>A pharmacist has the ability to:</b>	<b>Students Who Attended Interprofessional Day, No. (%)</b>	<b>Students Who Did Not Attend Interprofessional Day, No. (%)</b>	<b>P</b>
Prescribe medications	92 (20.5)	5 (14.7)	0.51
Immunize patients	212 (47.3)	7 (20.5)	0.003
Provide education on disease state management	386 (86.1)	23 (67.6)	0.004
Use diagnosis codes for billing services	169 (37.7)	15 (44.1)	0.46
Practice under a standing order/protocol	245 (54.6)	16 (47.0)	0.39
Administer medications	297 (66.2)	17 (50.0)	0.05
Apply for an individual DEA number	288 (64.3)	23 (67.6)	0.69
Provide point-of-care tests	185 (41.1)	9 (26.5)	0.09
Dispense medications	427 (95.3)	27 (79.4)	<0.0001
Counsel patients on their medications	437 (97.5)	28 (82.3)	<0.0001
Serve as the primary referral for a comprehensive medication review	344 (76.8)	23 (67.6)	0.23

## DISCUSSION

Community pharmacies continue to expand the clinical services they provide, including disease state management and administration of point-of care tests and immunizations. Given this expansion, other healthcare providers must be aware of what services community pharmacists offer and the impact pharmacists can provide on the overall care of patients. Pharmacists serve as facilitators, advocates, and immunizers for vaccinations.<sup>18,19</sup> All 50 states have passed legislation allowing pharmacists to vaccinate. Even with increased patient accessibility to vaccinations throughout the United States, other healthcare providers may not be aware that pharmacists provide this service. The majority of nonpharmacy students surveyed were not aware that pharmacists provide these immunizations; however, students who attended MUSC

Interprofessional Day were more knowledgeable than other nonpharmacy students that pharmacists are able to provide this service (Table 3). Without this knowledge, pharmacists may not be used effectively to help advance patient care. Provision of vaccinations is one area where increased education of other healthcare providers about the services pharmacists provide is necessary to ensure that patients have received all recommended vaccinations.

The majority of pharmacy students surveyed were aware of the clinical services a pharmacist can provide (Table 4). This demonstrates that pharmacy students are being exposed to a variety of practice settings, including community pharmacy, and experiences during their pharmacy school curriculum. When comparing pharmacy students to nonpharmacy students, there was not a knowledge difference related to a pharmacist's ability to

Table 4. Comparison of Pharmacy and Nonpharmacy Health Professions Students' Perceptions Regarding Pharmacists' Abilities

<b>A pharmacist has the ability to:</b>	<b>Pharmacy Students (n = 165), No. (%)</b>	<b>Nonpharmacy Students (n = 482), No. (%)</b>	<b>P</b>
Prescribe medications	9 (5)	97 (20)	< 0.0001
Immunize patients	161 (97)	219 (45)	< 0.0001
Provide education on disease state management	161 (97)	409 (84)	< 0.0001
Use diagnosis codes for billing services	118 (71)	184 (38)	< 0.0001
Practice under a standing order/protocol	118 (71)	261 (53)	< 0.0001
Administer medications	111 (67)	314 (64)	0.58
Apply for an individual DEA number	58 (35)	311 (64)	< 0.0001
Receive post-graduate training	163 (98)	396 (81)	< 0.0001
Provide point-of-care tests	146 (88)	194 (40)	< 0.0001
Dispense medications	158 (95)	454 (93)	0.35
Counsel patients on their medications	160 (97)	465 (96)	0.60
Serve as the primary referral for a comprehensive medication review	161 (97)	367 (75)	< 0.0001

administer medications, dispense medications, and counsel patients on their medications, which are activities most associated with a pharmacist and not directly related to clinical services (Table 4). This would be expected, as these activities are defined in the pharmacy practice act and traditionally considered to be duties of a pharmacist.

Nonpharmacy students who attended Interprofessional Day demonstrated greater knowledge that pharmacists can immunize patients, provide disease state management education, dispense medications, and counsel patients on their medications than nonpharmacy students who did not attend Interprofessional Day (Table 3). This difference in knowledge demonstrates the importance of interprofessional initiatives as a means of educating future healthcare professions about the capabilities and responsibilities of all healthcare professions, including those of a pharmacist. There was no difference in knowledge regarding pharmacist-provided services between nonpharmacy students who had a family member or friend who is a pharmacist and those who did not. This demonstrates that while a relationship may be present between people, a more detailed understanding of the profession is not always shared. However, nonpharmacy students who previously worked with a pharmacist on a shadowing or rotation experience were more likely to choose a pharmacist as a first referral for a comprehensive medication review. This suggests that interaction with providers from other health professions is beneficial in providing health professions students with a greater understanding of the role and specific areas of expertise of other professions. Additionally, nonpharmacy students who indicated a previous interaction with a pharmacist in a non-dispensing setting were more knowledgeable that pharmacists are able to prescribe medications, practice under a standing order/protocol, and provide point-of-care tests. These results were expected because pharmacists in the non-dispensing setting can provide these additional services and there these students would have gained exposure to such practices.

This study had some limitations. Although the survey instrument was pilot tested, it was not validated prior to use in this project. Survey questions assessed students' knowledge regarding the specific services that a pharmacist was able to provide. It did not assess students' opinions of whether pharmacists were qualified to provide these services.

Only 1 or 2 examples of the service were included in each question (ie, point-of-care services and disease state management) and therefore the question was not inclusive of every potential service the pharmacist is able to provide. Also, community pharmacists were not specified as the ones providing these activities, and this may have impacted students' responses.

Rather than giving approval to survey every student in the college, the College of Nursing provided a list of e-mail addresses of students willing to receive an invitation to participate in the survey. Because a smaller percentage of students from the College of Nursing were invited to participate in the survey, the results may not have been a true representation of nursing students' knowledge of pharmacist services.

In compiling and analyzing the data, students were not stratified based on their level of academic achievement/rank (eg, responses of undergraduate nursing students were compared to those of final-year medical students who already had completed 4 years of premedicine undergraduate curriculum.) These differences in respondents' academic rank may limit how the data can be analyzed/interpreted/applied.

The achieved response rate of 33.5% was less than optimal and may be an additional limitation of the study because a majority of students were not represented. However, there was a fair response from each college, which ensured representation of all professional students (Table 1).

While online survey instruments can reach a great number of people more efficiently, limitations include a potential decrease in response rate due to undeliverable e-mail resulting from incorrect e-mail addresses and e-mail filters that do not recognize the file as legitimate. Due to self-selection bias, respondents' views tend to be skewed toward positive responses. Simultaneously, there tends to be a lack of responses from those who know less about the issue and are less interested in the survey topic, potentially resulting in fewer negative responses on the survey.

With the additional services being offered in community pharmacy settings by community pharmacists, the pharmacist's role in optimizing patient care may not always be recognized by other healthcare providers or students. In this study, participation in interprofessional activities demonstrated MUSC students' increased awareness of the role of a pharmacist. Education and exposure of pharmacist services among other healthcare professions at MUSC needs to continue to occur. These study results emphasize the importance of interprofessional learning experiences. Future studies should be conducted to further evaluate their impact on the knowledge and potential use of pharmacist-provided services.

## **CONCLUSION**

This study demonstrated that interprofessional activities, such as the Interprofessional Day offered at MUSC, allow students to gain a greater knowledge of the services other healthcare professionals provide and how

each provider contributes to a healthcare team. Other healthcare professions should consider providing students with experiences outside of their profession to increase their exposure to other healthcare providers. This information can be used to incorporate more interprofessional education into a curriculum, and encourage innovative ways of using community pharmacists to their maximum benefit.

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