

## Impact of Collaborative Inpatient Pairing Between Pharmacy Students and Family Medicine Residents on Perceptions of Interprofessional Care

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### Abstract

**Introduction:** Interprofessional education (IPE) and collaborative practice increasingly inform accreditation standards for pharmacy and medical education, grounded in evidence of benefits to patients and learners. Optimizing models that meaningfully provide this type of practice remains a challenge. This study examines the impact of inpatient collaboration between pharmacy students and family medicine residents on perceptions of interprofessional care.

**Methods:** Pharmacy students and family medicine residents were invited to participate in an IPE experience during their medicine rotation, in which student-resident pairs worked collaboratively on patient care for a block rotation. We used a Student Perceptions of Physician-Pharmacist Interprofessional Clinical Education Instrument (SPICE-2) survey instrument and included an opportunity for open comments by participants. We performed statistical analysis using paired *t* tests.

**Results:** We observed statistically significant changes ( $P < .05$ ) in four of the 10 survey items for pharmacy students and two out of 10 in family medicine residents. Narrative comments provided by both students and residents were positive regarding the IPE experience.

**Conclusion:** This pilot provides preliminary evidence to support an IPE care model that integrates pharmacy students by pairing them with family medicine residents on an inpatient adult family medicine teaching service. Implementation of a paired-IPE model changed both professions' perception of their roles within the team and appreciation of training requirements. Larger studies could be done to further evaluate the outcomes of this and similar models.

## Introduction

Patient care continues to trend toward increased collaboration between pharmacists and physicians, with multiple studies demonstrating benefits from physician-pharmacist management of a variety of disease states.<sup>1-3</sup> The Accreditation Council for Pharmacy Education (ACPE) and the Accreditation Council for Continuing Medical Education (ACCME) both require interprofessional education (IPE) and collaboration, with the ACPE affirming that "interprofessional interaction is paramount to successful treatment of patients."<sup>4,5</sup> Additionally, the Accreditation Council for Graduate Medical Education (ACGME) in Family Medicine (FM) lists

interprofessional teamwork as a core measure.<sup>6</sup> The challenge, however, lies in creating training experiences where such collaboration is meaningful.<sup>7</sup>

While some literature has evaluated the use of integrating resident pharmacists into an FM residency site, less is known about integrating pharmacy students.<sup>8</sup> In 2016, Kostoff et al placed pharmacy students into an FM residency clinic to examine interprofessional collaboration and satisfaction between pharmacy students (n=52) and medical residents (n=22).<sup>9</sup> In the study, perceptions were assessed using the Scale of Attitudes Toward Physician-Pharmacist Collaboration (SATP2C). The researchers noted that pharmacy integration resulted in high levels of collaboration and perceived benefit by medical residents. In a similar approach, Nwaesi et al paired student pharmacists (n=18) and student physicians (n=18) in the inpatient setting with intent to evaluate study participants' perceptions of the program.<sup>10</sup> Student pharmacists and student physicians were involved in both prerounds as well as teaching rounds. Participants were given a pre- and post- Student Perceptions of Physician-Pharmacist Interprofessional Clinical Education Instrument (SPICE-2) survey in order to assess perceptions. Nwaesi et al reported positive changes to interprofessional collaboration and clinical education, despite high baseline IPE exposure.

The objective of our study was to describe and assess the impact of a structured IPE involving pharmacy students and FM residents on an inpatient adult FM teaching service. To our knowledge, this represents the first such investigation aimed at assessing perceptions of interprofessional care.

## Methods

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This prospective study occurred during one academic year at a community hospital and the methods of this pilot received Institutional Review Board exemption by the University of Wyoming as an educational improvement project. Investigators included a faculty pharmacist and faculty physician, both with IPE exposure. Objectives and expectations were communicated verbally and in writing and participation was voluntary.

On the first day, two fourth-year pharmacy students were individually paired with either a postgraduate year-one (PGY-1) or PGY-2 FM resident on a 3 or 4-week adult medicine rotation. Pharmacy students were present at the site 5 days per week, and practiced under the guidance of a pharmacist preceptor. At the beginning of each day, pharmacy students would perform a brief check-in with their resident, after which each independently developed a care plan to be reconciled while rounding with the remainder of the health care team. The interprofessional team was composed of the attending physician, pharmacist preceptor, FM residents, pharmacy students, and one or two registered nurses dedicated to optimizing transitions of care. Other activities included a weekly didactic presentation by the attending physician and a weekly presentation given by the pharmacy students.

To assess baseline perceptions of benefit, participants anonymously completed the SPICE-2 instrument, which contains survey questions based on interprofessional teamwork, roles/responsibilities for collaborative practice, and patient outcomes from professional practice.<sup>11,12</sup> While many instruments exist, SPICE-2 has been validated in a diverse population of medical and pharmacy students. SPICE-2 uses a 5-point Likert scale, where 1 is "strongly disagree" and 5 is "strongly agree." Participants completed the SPICE-2 again at the end of the rotation. Responses were collected by the attending pharmacist. We used GraphPad Prism to perform statistical analysis using paired *t* tests, with significance level set at *P*=.05. We also gathered optional narrative comments about the experience from participants.

## Results

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Nine pharmacy students and nine FM residents completed the SPICE-2 presurvey. Over a single academic year, a total of 18 participants were invited and all 18 participants consented to participate. The pre- and postsurveys were completed by 100% of participants.

Pharmacy students showed a significant increase ( $P<.05$ ) postexperience in understanding of their role within the team, their role being clearly defined, understanding of the training requirements of both professionals, and the reduction in health care costs when patient care involves a team consisting of different professions (Table 1). FM residents similarly showed significant increases ( $P<.05$ ) in their understanding of the training requirements and the reduction in health care costs (Table 1). Narrative comments provided a constructive element of the experience (Table 2).

## Discussion

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In this study, pharmacy students were paired with FM residents on an inpatient adult FM teaching service. Baseline perceptions from pharmacy students showed some understanding that interprofessional collaboration enhances education and patient-centered care, consistent with other studies on perceptions of IPE.<sup>9,10,13</sup> Despite high baseline perceptions from FM residents, significant increases were shared by both groups regarding understanding one another's education and training, as well as the financial benefits of interdisciplinary teams. Understanding of team roles significantly increased in the pharmacy students, consistent with findings from Nwaesei and colleagues in their study involving pairing pharmacy and medical students,<sup>10</sup> as well as others.<sup>8,9</sup> This was not seen within the FM residents, which is consistent with other evidence that physicians continue to underestimate the scope of possible pharmacy involvement on teams.<sup>14</sup> However, higher IPE exposure in the FM residents may contribute to a lesser degree of change. Given that our narrative comments suggest paired-IPE had a positive impact on this dynamic, future studies could be powered to assess for small changes in these perceptions as well as to further optimize this educational model.

While comments were generally positive, we want to highlight the impact of variation in expectation-setting identified by one pharmacy student. This student experienced different levels of engagement between residents, and attributed this to a lack of clear guidance provided to that resident by a pharmacy or FM attending. This causality cannot be established and this element of the intervention was not being directly studied, but the experience suggests an opportunity for modeling by supervisors. The interprofessional communication involved in expectation setting itself may be responsible for some of the increased understanding and appreciation of the other professional's role and responsibilities that characterized this pharmacy student's other interactions.

Our study is limited by small sample size, single community-hospital setting, and lack of comparison group. The FM residents generally held positive perceptions of interactions with pharmacy, possibly influenced by senior residents who have historically worked with pharmacy trainees. This may skew the results to lack a demonstration of a large difference when evaluating the pre- and postsurveys and account for high initial attitudes. While participation was voluntary, FM residents and pharmacy students may have been influenced to participate for fear of retribution if they did not participate, as demonstrated by the 100% participation rate. Finally, the study is at risk of selection bias due to only including pharmacy students and FM residents in a small program with 21 total residents.

## Conclusions

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This study provides preliminary evidence to support an integrated role for pharmacy students through pairing

with medical residents in an inpatient setting. The paired-IPE experience changed both professions' understanding of training requirements and financial benefits of interdisciplinary management. Positive narrative responses suggest additional benefits may be demonstrable with larger groups or through optimization of the model. Sustained collaboration over time may better educate future physicians and more fundamentally empower pharmacists, leading to improvements in educational experiences, collaborative practice, and patient care.

## Tables and Figures

**Table 1: Physician-Pharmacist Interprofessional Clinical Education (SPICE-2) Survey**

Items	Survey Scores					<i>P</i> Value
	Medical Residents Average (n=9)		<i>P</i> Value	Pharmacy Students Average (n=9)		
	Pre	Post		Pre	Post	
1. Working with another discipline of students enhances my education.	5.0	5.0	n/a	4.78	5.0	.1690
2. My role within the interdisciplinary team is clearly defined.	4.56	4.78	.3466	3.75	4.88	.0071
3. Patient satisfaction is improved when patients are treated by a team of professionals from different disciplines.	4.67	4.67	n/a	4.78	4.89	.3466
4. Participating in educational experiences with another discipline of students enhances my future ability to work on an interdisciplinary team.	5.0	5.0	n/a	3.22	4.56	.3466
5. I have an understanding of the courses taken by, and training requirements of, both pharmacy and medical residents.	3.33	4.33	.0085	3.22	4.56	.0017
6. Health care costs are reduced when patients are treated by a team of professionals from different disciplines.	4.22	4.89	.0497	4.33	4.78	.0353
7. All health professions students should be educated to establish collaborative relationships with members from other disciplines.	4.78	4.78	n/a	4.89	4.89	n/a
8. I understand the roles of other professionals within the interdisciplinary team.	4.22	4.33	.3466	3.78	4.67	.0092
9. Patient centeredness increases when care is delivered by a team of professionals from different disciplines.	4.44	4.78	.1950	4.67	4.89	.1690
10. During their education, medical and pharmacy students should be involved in teamwork in order to understand their respective roles.	4.89	5.0	.3466	4.67	4.89	.1690

Abbreviation: SPICE-2, Student Perceptions of Physician-Pharmacist Interprofessional Clinical Education Instrument.

**Table 2: Narrative Comments From Participants**

Pharmacy Students	Family Medicine Residents
<p>"I felt that it helped me feel more comfortable making recommendations during rounds."</p> <p>"I think this has been a great experience and has helped me learn much more about what physicians do and how important pharmacy's input is."</p> <p>"I truly enjoyed the rotation and recommended it to future pharmacy students based on the resident pairing. The best part about the pairing is that I had the opportunity to prepare recommendations prior to rounds."</p> <p>"I really appreciated the opportunity to pair up and get questions from the resident, research, and prepare recommendations before going to rounds. We gained knowledge together and made really impactful recommendations for our patients. I took it upon myself to talk to her about the pairing experience and how I would communicate with her. In the end, I gained a lot of confidence from working with residents who were also learning and training. Setting expectations upfront entices more interaction and communication."</p> <p>"I truly enjoyed the rotation and recommended it to P3 students based on the resident pairing. The best part about the pairing is that I had the opportunity to prepare recommendations prior to rounds. My favorite part of the entire rotation is the learning environment during rounds. On my first day, I was asked a question that my resident and I both did not know. In my mind, that was a huge relief and allowed for a much more comfortable learning experience for the rest of the rotation. Throughout my rotation, I was assigned with three different residents. When I was first assigned with Resident #1, the expectations were set by the pharmacy attending during rounds. Resident #1 and I worked together incredibly well and she asked me questions or to look up topics for extra learning almost every morning. We gained knowledge together and made really impactful recommendations for our patients. Resident #2 had been rounding with us while Resident #1 was on service also, so I was able to communicate with Resident #2 easily and effectively also. Resident #2 relied on me often to make recommendations on drug therapy due to the immense amount of patients Resident #2 was caring for. When Resident #3 started, I took it upon myself to talk to her about the pairing experience and how I would communicate with her. I continued to reach out to her every morning, as I had with the previous residents, but did not receive much feedback. While Resident #3 was on service, I often found myself surprised by the negative reactions to the recommendations/extra-learning opportunities I would present during rounds. If Resident #3 would have had the expectations set by someone other than myself, perhaps a pharmacy or family medicine attending, then I hope that would have enticed more interaction and communication. With that being said, I still truly enjoyed working with residents that are also learning. Working in a clinical setting like that, especially as early in my P4 year as it was, I gained a lot of confidence from working with residents who were also learning and training."</p> <p>"I quickly felt comfortable due to the pairing and felt like my recommendations were taken seriously. I think there was a lot of learning that happened both ways and showed me how important a pharmacist's role is on the healthcare team. Honestly, I think the pairing in my IM rotation set me up to be successful during residency in regards to working with medical residents. As a result, and during my critical care rotation in residency, I established pharmacy rounding with the IM residents in our ICU and established a great relationship between not only residents but attendings too."</p> <p>"I believe having a specific resident that you work with opens communication, and they are much more likely to reach out for help."</p> <p>"It helped incorporate us into decision making with the residents."</p>	<p>"Loved rounding early, talking about questions we each had, splitting up to round/research, and coming back together at rounds to discuss. It added a lot to the conversation."</p> <p>"I honestly cannot imagine not working with a pharmacist in my career. It adds so much value, adds an additional level of patient safety, and improves patient care."</p> <p>"I really loved my experience with the pharmacy students. I liked having a student assigned to my patients and it was nice getting their insights on new guidelines for medication management. I think asking them a few questions before rounds and getting to include them in the patient presentations was the most helpful for me and a good way to establish a relationship with the students. I definitely would love to work in a setting with pharmacists on the team when I'm done with residency."</p> <p>"I want to start off by saying I LOVE having pharmacy at our rounds."</p> <p><b>Likes:</b>            "I appreciate when we can be paired up one to one with a pharm student, so when there's two at a time that is ideal. For most of the students we've had, it feels like they take ownership of the patients and the list."</p> <p>"I love when they also go through the patient's home med list and bring up possible interactions, dose errors, or missing meds - why isn't this patient on a beta blocker?, etc."</p> <p><b>Areas of Improvement:</b>            "I think it would be helpful to take a little more formal time (like only 5-10 minutes) at the beginning of each rotation with the residents and pharm students to touch base on what expectations are, and what kind of questions might come up. And if the residents switch in the middle of the students rotation we should do it again."</p> <p>"After talking with my pharmacy student, I think we were able to choose better antibiotics and I felt more prepared for rounds. Additionally, I think it saved all of us time, but also allowed the patient to get the appropriate antibiotics faster. I think this is also helpful because then the plan can be implemented earlier in the day and I can let the patient and the nursing team know how we plan to move forward. I think after working with the pharmacy students I've been more and more comfortable talking to the pharmacists and the pharmacy team whenever I have a question. They often bring up some facts that I don't remember. For example, selecting the appropriate COVID-19 vaccine so that a patient could be discharged safely to their LTC/SNF."</p>

Abbreviations: IM, internal medicine; ICU, intensive care unit; LTC, long-term care; SNF, skilled nursing facility.



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