

Original Research

Resident physicians' perceptions of ambulatory care pharmacy

Ashley H. MEREDITH , Darin RAMSEY , Andrew SCHMELZ , Rachel BERGLUND .

Received (first version): 28-Mar-2019

Accepted: 11-Aug-2019

Published online: 24-Aug-2019

Abstract

Background: Physicians' acceptance of clinical pharmacy services is dependent on exposure to those services, with use increasing as resident physicians progress through their training. Resident physicians train within environments that have a multidisciplinary teaching and clinical care approach, working closely with other healthcare professionals. Ambulatory care pharmacists are increasingly working with resident physicians in clinic settings as part of the multidisciplinary team, and identification of resident physicians' perceptions may influence future collaboration.

Objective: The objective of this research is to evaluate the perception of ambulatory care clinical pharmacy services from the perspective of resident physicians.

Methods: A statewide network of ambulatory care pharmacists was identified and received an electronic questionnaire. Pharmacists working within clinics that serve as training sites for resident physicians then completed and distributed questionnaires to the resident physicians within their clinical site. Items related to demographics and perception of involvement and interactions with clinical pharmacists.

Results: Forty-five resident physicians responded from four unique clinical sites (response rate = 42%). They agreed or strongly agreed that pharmacists help patients obtain their therapeutic goals (97.8%), are able to educate patients effectively (95.6%), provide high quality care (97.8%), and do a good job helping co-manage patients (91.1%). Previous exposure to pharmacists was limited primarily to the drugstore (48.9%) and hospital (51.1%) settings. Resident physicians in the third year of training and those reporting a friend was a pharmacist, were more likely to have a positive perception of the pharmacist's role as a resident educator ($p=0.048$ and $p=0.044$, respectively).

Conclusions: Resident physicians with a longer duration of exposure and personal friendship with a pharmacist are more likely to express positive perceptions. Areas for further enhancements in this interprofessional relationship related to perceptions about pharmacist autonomy and patient relationships were identified.

Keywords

Pharmacists; Physicians; Interprofessional Relations; Attitude of Health Personnel; Patient Care Team; Professional Role; Ambulatory Care; Surveys and Questionnaires; Indiana

INTRODUCTION

Ambulatory care clinical pharmacy practice has shown significant recent growth with increased numbers of pharmacists managing multiple disease states under collaborative drug therapy management protocols.¹ In addition to preventative care, pharmacists may provide chronic disease management for a variety of conditions including the management of diabetes, hypertension, and dyslipidemia. Under Collaborative Practice Agreements (CPA) or Collaborative Drug Therapy Management (CDTM) protocols, prescribers can delegate aspects of patient care such as initiating, modifying, and discontinuing drug therapy.^{2,3} Pharmacists may also order and interpret any necessary laboratory tests as it pertains to the disease state(s) being monitored. Physicians' acceptance of clinical pharmacy services is highly dependent on the level of

exposure to those services and expectations of pharmacists are associated with the number of years post-graduation from medical school, with those physicians who graduated within the past ten years having higher expectations of pharmacists.⁴⁻⁶ Expectations include assisting in the design of drug therapy treatment plans, monitoring response to drug therapy, and patient education regarding safe and appropriate use of medications. Additionally, physicians that are young, group practice-oriented, and write higher numbers of prescriptions are more likely to utilize, and have a positive view toward, clinical pharmacy services.⁶

A collaborative working relationship (CWR) is built in stages. In order for pharmacists to establish CPAs or CDTM protocols, the first step is to build strong working relationships with physicians. The Physician-Pharmacist Collaborative Instrument (PPCI) measures provider exchange characteristics through a framework consisting of five stages: Stage 0 - Professional Awareness, Stage 1 - Professional Recognition, Stage 2 - Exploration and Trial, Stage 3 - Professional Relationship Expansion, Stage 4 - Commitment to the Collaborative Working Relationship.⁷ As the relationship progresses through the various stages, the establishment of mutual trust and respect is established, ultimately strengthening the professional relationship to improve patient outcomes.⁷ While progressing to Stage 4 may take time to achieve, pharmacy residents may be more receptive to this collaboration as they become familiar with the pharmacist's professional

Ashley H. MEREDITH. PharmD. Department of Pharmacy Practice, College of Pharmacy, Purdue University. Indianapolis, IN (United States). ahmeredith@purdue.edu

Darin RAMSEY. PharmD. Department of Pharmacy Practice, College of Pharmacy & Health Sciences, Butler University. Indianapolis, IN (United States). dramsey@butler.edu

Andrew SCHMELZ. PharmD. Department of Pharmacy Practice, College of Pharmacy & Health Sciences, Butler University. Indianapolis, IN (United States). andrew.schmelz@eskenazihealth.edu

Rachel BERGLUND. PharmD. Pharmacy Department, St. Vincent Fishers Hospital. Fishers, IN (United States). rachel.berglund@ascension.org

abilities and have confidence in the benefits of the collaboration.

The Collaboration Among Pharmacists and Physicians To Improve Outcomes Now (CAPTION) trial evaluated a physician-pharmacist collaborative model for blood pressure management and found that pharmacists with direct patient care improve control of chronic conditions and should be members of the care team for patients with hypertension.⁸ The inclusion of pharmacists on the care team likely translates to the management of other chronic conditions, especially those related to cardiovascular disease.⁸

Throughout clinical training, resident physicians are placed within environments that have a multidisciplinary teaching component requiring working closely with other healthcare professionals. As part of this multidisciplinary teaching approach, ambulatory care pharmacists often work with resident physicians in clinic settings. Approximately 25-50% of family practice residency programs report the presence of clinical pharmacists within their program, although limited data is available describing details of this practice setting.^{9,10} First-year resident physicians in family medicine programs that offer clinical pharmacy services have a more favorable attitude towards clinical pharmacist's participation on the health care team compared to those residency programs that lack these services. In addition, these residents prefer to practice as part of a multidisciplinary team that includes a pharmacist and see the value in hiring a clinical pharmacist within a private practice setting.⁵ Resident physicians value the clinical pharmacist educator and thought their experiences with the pharmacist improved their quality of patient care, drug knowledge, and confidence.^{11,12} Lastly, the clinical pharmacist educator was found to positively impact resident physicians' abilities to work as part of an interdisciplinary team.^{12,13}

Additional data show that use of clinical pharmacy services increases as resident physicians progress through their training programs. This is consistent with the CWR framework and existing literature on pharmacist-physician collaboration: development of mutual trust, sustaining the relationship, and understanding of one another's role.^{8,14} Based on reporting of pharmacist-physician encounters, first- and second-year resident physicians do not fully utilize clinical pharmacy services, perhaps due to the lack of education and communication regarding the available services offered.^{11,15} Third-year resident physicians may utilize clinical pharmacy services more frequently due to increased patient contact, development of a professional relationship with the clinical pharmacist, and/or a better understanding of the importance for therapeutic information.¹¹

Currently, there has not been any literature identified that has assessed the role of ambulatory care pharmacists from the viewpoint of resident physicians. Due to the increasing presence of ambulatory care pharmacists as part of resident physician clinical training programs and sites, it is necessary to understand resident physicians' awareness and perceptions of the capabilities of ambulatory care pharmacists.^{9,10} These physicians-in-training can impact future collaboration, patient care, and expansion of

ambulatory care pharmacy. The purpose of this study is to evaluate the perception of ambulatory care clinical pharmacy services from the perspective of resident physicians in Indiana.

METHODS

In order to identify appropriate participants for this observational cohort study, a two-step recruitment strategy was utilized. The first step involved identifying pharmacists within clinics that serve as a training site for resident physicians throughout Indiana. The second step involved seeking pharmacist volunteers to distribute questionnaires to the resident physicians within their clinical site. Pharmacists were identified through convenience sampling based on a comprehensive list provided by the office of experiential education from colleges of pharmacy in Indiana, namely Purdue and Butler Universities. Though there is now a third pharmacy program within Indiana, at the time this research was conducted this program had not yet established their experiential training sites. Inclusion criteria for pharmacist participation required self-identification as a clinical practice site that provides longitudinal training for resident physicians, clinical site located within Indiana, and willingness to participate. Inclusion criteria for the resident physicians included currently participating in longitudinal ambulatory care clinical training at a site that includes an ambulatory care pharmacist as part of the healthcare team, clinical practice site located within Indiana, and completing an Internal Medicine, Family Medicine or Transitional Year medical residency. All participants were required to be greater than 18 years old and able to read English. Pharmacists and resident physicians not meeting the inclusion criteria were excluded from participation. This research was deemed exempt by the Indiana University Institutional Review Board (IRB).

Two unique questionnaires were developed, one to be completed by ambulatory care clinical pharmacists and one to be completed by resident physicians. The pharmacist questionnaire sought to describe the characteristics of their clinic settings and other aspects of their job. The resident physician questionnaire sought to assess perceptions and attitudes regarding working with ambulatory care pharmacists within clinics. Prior to item creation, researchers developed five main themes for which to assess resident physician perceptions and attitudes: quality of patient care provided by the pharmacist, level of autonomy provided by the pharmacist, role of the pharmacist as patient educator, role of the pharmacist as resident educator, and the pharmacists' integration within the clinical care team. These themes were identified based on researchers' past experiences with resident physicians and felt to encompass the unique roles an ambulatory care clinical pharmacist may be asked to undertake. Five point Likert scale items ranging from strongly agree to strongly disagree were developed by researchers for inclusion in the questionnaires, and had not been previously validated.

Pharmacist Survey

A statewide web-based questionnaire was developed for ambulatory care clinical pharmacists. An email was sent to

Table 1. Pharmacist Questionnaire Items and Responses (n=15)		
Item	Response n(%)	
How many pharmacists provide ambulatory care clinical pharmacy services on a regular basis at your individual clinic site? (mean SD)	2.93; SD 1.91	
What services do you personally provide in your ambulatory care clinic? Please select all that apply.		
Disease state education	14 (93.3)	
Drug therapy management	14 (93.3)	
Medication therapy management services	9 (60)	
Transitions of care	6 (40)	
Wellness visits/disease screening	4 (26.7)	
Formulary approval	4 (26.7)	
Immunizations	1 (6.7)	
Other	2 (13.3)	
What disease states do you provide drug therapy management for based on approved protocol or collaborative practice agreement? Please select all that apply.		
Smoking cessation	10 (66.7)	
Anticoagulation	8 (53.3)	
Hypertension	8 (53.3)	
Diabetes	7 (46.7)	
Hyperlipidemia	7 (46.7)	
Weight loss	4 (26.7)	
COPD	3 (20)	
Asthma	2 (13.3)	
Heart failure	2 (13.3)	
Metabolic syndrome	2 (13.3)	
Osteoporosis	2 (13.3)	
Hypothyroidism	1 (6.7)	
GERD	1 (6.7)	
Other(s)	1 (6.7)	
GI (nausea/vomiting/constipation/diarrhea)	--	
HIV	--	
Mental health disorders	--	
Migraine	--	
Pain	--	
Renal impairment/chronic kidney disease	--	
Seizure	--	
What best describes the location of the clinic in which you work with resident physicians?*		
Urban	11 (78.6)	
Suburban	3 (21.4)	
Rural	--	
How many half-days per week do you personally provide the clinical pharmacy services identified in question 1, at your practice site? (mean SD)	5.07; SD 2.58	
How many FTE (full-time equivalent) hours do you personally provide clinical pharmacy services at your clinic site?*		
0.1-0.25	1 (7.1)	
0.26-0.50	7 (50)	
0.51-0.75	3 (21.4)	
0.76-1	2 (14.3)	
1.1-2	1 (7.1)	
How long have you been providing clinical pharmacy services at your practice site with resident physicians?		
< 6 months	3 (20)	
6-12 months	2 (13.3)	
1-2 years	2 (13.3)	
2-3 years	2 (13.3)	
3-4 years	3 (20)	
4-5 years	1 (6.7)	
5-6 years	1 (6.7)	
> 6 years	1 (6.7)	
*n=14; **n=7		

the identified pharmacists asking if their clinic served as a training site for resident physicians and included a link to an electronic questionnaire soliciting additional clinical practice information if they responded affirmatively. Only data indicating that they were part of an ambulatory care clinic that served as a training site for resident physicians were analyzed for the purposes of this study. Descriptive demographic information focused on the number of clinical pharmacists within the clinic who worked directly with resident physicians in a longitudinal manner, the number of

full-time equivalent hours (FTE) the pharmacist(s) worked in the clinic, the number of half-days per week dedicated to providing clinical services, the types of services and activities that were offered within the longitudinal resident physician-training clinic and how long they had specifically provided services in their clinic. Finally, questions were asked about the types of involvement that the resident physicians had directly and indirectly with the clinical pharmacist and how often that interaction occurred.

Table 1 (cont.). Pharmacist Questionnaire Items and Responses (n =15)		
Item		Response n(%)
How long have clinical pharmacy services been provided by any pharmacist at your clinic site with resident physicians?*	< 6 months	1 (7.1)
	6-12 months	--
	1-2 years	1 (7.1)
	3-4 years	2 (14.3)
	4-5 years	2 (14.3)
	5-6 years	1 (7.1)
	> 6 years	7 (50)
How many resident physicians work at your practice site?	0-5	2 (13.3)
	6-10	3 (20)
	11-15	1 (6.7)
	16-20	2 (13.3)
	21-25	--
	26-30	3 (20)
	31-35	1 (6.7)
	36-40	--
> 40	3 (20)	
What specialty are the resident physicians at your practice site? (Select all that apply)	Family practice	9 (60)
	Internal medicine	5 (33.3)
	Transitional	2 (13.3)
	Other	3 (20)
What is your primary method of communication with the resident physicians at your practice site?*	Face-to-face	8 (57.1)
	Patient chart (paper or electronic)	3 (21.4)
	Electronic communication via EMR	2 (14.3)
	Other	1 (7.1)
	E-mail	--
Do you provide formal resident physician education at your site?	Yes	7 (46.7)
	No	8 (53.3)
How often do you provide formal resident physician education at your practice site?*	Quarterly	3 (42.9)
	Monthly	2 (28.6)
	Weekly	1 (14.3)
	More than once per week	1 (14.3)
	2-3 times per month	--
	Annually	--
In what form do you provide formal resident physician education at your practice site?*	Structured clinical rotation	2 (28.6)
	Formal presentation	2 (28.6)
	Clinical shadowing experience	1 (14.3)
	Preparation of written materials for distribution	--
	Other	2 (28.6)
How often do resident physicians shadow your clinical encounters?	Never	6 (40)
	Weekly	3 (20)
	Quarterly	2 (13.3%)
	Annually	2 (13.3%)
	Monthly	1 (6.7)
	Once throughout residency	1 (6.7)

*n=14; **n=7

Resident Physician Survey

Pharmacists identified as practicing in a longitudinal resident physician clinic were asked to forward an electronic questionnaire link to each resident physician within their clinic. Due to a low initial resident physician response rate, this data was discarded and a hard copy questionnaire was mailed to each participating pharmacist for the resident physicians within their clinics. All questionnaires were anonymous and, once complete, were placed in an envelope that was not located within the pharmacist's office or direct workspace to maintain confidentiality and anonymity. The questionnaire focused on the perceptions of the resident physician and inquired

about the types of services the ambulatory care pharmacist provided within their longitudinal clinic. Additional demographic information included the type of residency they were completing, current year of residency, and prior exposure to pharmacists and/or pharmacy students. Questionnaires were distributed April 1, 2015 through April 30, 2015. A reminder was electronically sent to participating pharmacists to encourage the resident physicians at their clinic to complete the questionnaire.

Data Analysis

Data were analyzed using SPSS 22 (IBM) software. A range of statistical tests were completed including basic

Resident Physician Characteristic		Response n (%)
Clinic Location	Urban	36 (80)
	Suburban	8 (17.8)
	Response omitted	1 (2.2)
Type of Medical Residency	Internal Medicine	32 (71.1)
	Family Practice	12 (26.7)
	Response Omitted	1 (2.2)
Year of Residency	First	17 (37.8)
	Second	15 (33.3)
	Third	12 (26.7)
	Response omitted	1 (2.2)
Primary Method of Communication with Pharmacist	Face-to-Face	32 (71.1)
	Electronic via EMR	10 (22.2)
	E-mail	1 (2.2)
	Patient Chart	1 (2.2)
	Response omitted	1 (2.2)
Frequency of Patient Referral to Pharmacist Service(s)	Less than once per clinic session, at least once per month	22 (48.9)
	Less than once per month	18 (40)
	Never	4 (8.9)
	Response omitted	1 (2.2)
	At least once per clinic session	--
Frequency of Medication-Related Discussion with Pharmacist	Less than one time each clinic session, at least once per month	22 (48.9)
	Less than once per month	12 (26.7)
	One time each clinic session	5 (11.1)
	Several times each clinic session	2 (4.4)
	Never	2 (4.4)
	Response omitted	2 (4.4)
Participated in Discussion(s) of the PharmD Curriculum and/or Various Career Options for Pharmacists	No	34 (75.6)
	Yes	11 (24.4)
Number of Lectures Taught by a Pharmacist During Medical School Education	An entire course	13 (28.9)
	A few lectures	11 (24.4)
	Several lectures	10 (22.2)
	I did not have a pharmacist teach me in medical school	7 (15.6)
	I do not remember, but a pharmacist did teach me	4 (8.9)
	One lecture	--
Frequency of Collaboration with Pharmacy Students on Projects During Medical School	Not at all	37 (82.2)
	Once during medical school	8 (17.8)
	Each semester	--
	Once per year	--
Exposure to Pharmacists Before Longitudinal Clinic*	Hospital pharmacy	23 (51.1)
	Team member on inpatient ward as student/intern	23 (51.1)
	Drugstore pharmacy	22 (48.9)
	Ambulatory clinic as student/intern	6 (13.3)
	No prior exposure	6 (13.3)
	Faculty member during medical school was a pharmacist	1 (2.2)

*Total n=44; resident physicians able to select all applicable responses

descriptive statistics for summarizing demographic information and frequencies, one-way ANOVA for analyzing the summed category responses and independent samples t-test to assess specific demographic items, such as year of residency and summed category responses, such as role as resident educator. Prior to project initiation, researchers determined that means of Likert scale responses would be reported.¹⁶ The significance level (alpha) was pre-determined to be 0.05.

RESULTS

A total of 72 pharmacists received an invitation to participate. These pharmacists represented 51 unique clinical sites, although it is unknown how many serve as resident physician longitudinal training sites. Fifteen clinical pharmacists responded to the questionnaire (response rate=20.8%). As the clinic location was not a required response in order to maintain anonymity, it is unclear how many unique clinic sites these responses represented. Of the 15 pharmacists that completed the questionnaire, four agreed to facilitate distribution of the resident physician

questionnaire. Responding clinical pharmacists within these medical residency program sites provided a wide range of services with more than 90% reporting involvement in disease state education and collaborative drug therapy management via approved protocol or scope of practice (Table 1). There was a mean (SD) of approximately three clinical pharmacists providing services within each site (2.93; SD 1.91), with each individual pharmacist providing services over a mean of 5 half-days each week (5.07; SD 2.58). The majority of pharmacists within resident physician training clinics had been providing services for fewer than four years. Less than half reported being formally involved in resident physician education (n=7; 46.7%), with this education taking the form of shadowing experiences, structured clinical rotations, and presentations.

It is unknown how many resident physicians received the initial electronic questionnaire. A total of 107 resident physicians from four unique clinical sites received printed questionnaires. Forty-five resident physicians responded (response rate =42%). Most resident physicians were from Internal Medicine programs (71%) in urban areas (80%) with similar representation from all 3 years of their programs (1st: 38%; 2nd: 33%; 3rd: 27%). Almost half of the resident physicians referred patients for clinical pharmacy appointments at least once per month, and the primary method of communication with the pharmacist was face-to-face (71.1%) rather than through less direct methods such as email (2.2%) or via the EMR (22.2%) (Table 2).

Resident physicians reported that prior to working with a pharmacist in their clinical practice sites, most had been exposed to pharmacists in the drugstore (48.9%) and hospital (51.1%) settings, with only 13.3% indicating they had worked with a pharmacist practicing in an ambulatory clinic as a student or intern. There was a wide spectrum of exposure to pharmacists in the resident physician medical school curriculum, with pharmacists' responsibilities ranging from no didactic teaching (15.6%) to teaching an entire course (28.9%). Few resident physicians (24.4%) had ever discussed the PharmD curriculum and/or various career field options for pharmacists.

Most resident physicians agreed or strongly agreed that pharmacists help patients obtain their therapeutic goals (97.8%), are able to educate patients effectively (95.6%), provide high quality care (97.8%), and do a good job helping co-manage patients (91.1%). Despite this, they reported that clinical pharmacists are given too much independence in clinical encounters (28.9%) and some worry that referring patients to a clinical pharmacist hurts their relationship with their patients (8.8%). Most resident physicians reported working collaboratively with the clinical pharmacist at their longitudinal clinic site (82.2%); however many (26.6%) reported not spending enough time with the clinical pharmacist to gain an understanding of their capabilities. Most are confident in the clinical pharmacist's abilities to manage patients (97.8%), and more than half (53.3%) think the pharmacist is qualified to provide additional services than those currently being offered at their clinic sites such as management of chronic pain, heart failure, and weight loss (Table 3).

Resident physicians felt that the clinical pharmacist is a strong resident educator (73.3%) and most agreed that they would like the clinical pharmacist to be more formally involved in their clinical education (84.4%). They believed pharmacists provide education in a way that is different from physicians (86.7%) and that they use specific educational techniques to improve resident physician understanding of pharmacotherapy (84.4%).

Only four of the demographic items evaluated were associated with significant differences in responses. Resident physicians in the third year of their training and those that reported having a friend that was a pharmacist, were more likely to have a positive perception of the pharmacist's role as a resident educator (p=0.048 and p=0.044, respectively). Those resident physicians who referred patients more frequently for clinical pharmacy appointments or reported prior exposure to pharmacists practicing in inpatient settings were more likely to respond favorably to the clinical pharmacist having autonomy with patient care (p=0.016 and p=0.033, respectively). Also, resident physicians responding with high levels of agreement to statements about the integration of pharmacists within the clinic team were more likely to report that one of their friends was a pharmacist (p=0.038).

Both pharmacists and resident physicians were asked the same questions to describe the types of pharmacy services offered and disease states managed within the clinics (Table 4). There were differences in pharmacist identified activities and resident physician identified pharmacist activities, with resident physicians over-identifying the types of services the clinical pharmacist provides, as compared to the pharmacist self-report.

DISCUSSION

Medical resident perceptions of pharmacists have not been well established in scientific literature. Based on the findings from this study, resident physicians perceive pharmacists that work within their longitudinal ambulatory clinic as providing effective patient education and a high quality of care to the patients that are referred for clinical pharmacy services. The majority of respondents indicated that they strongly agreed or agreed that the pharmacists in their clinics had the appropriate clinical training to provide the level of care for the services offered and were confident in the abilities of the pharmacist with whom they have a relationship, similar to reports of non-resident physicians.^{14,17} Additionally, the majority of resident physicians in this study either strongly agreed or agreed that care provided by the pharmacist is different than the services offered by the physicians. Pharmacists are able to conduct focused visits for one or two disease states that incorporate not only pharmacotherapy, but also non-pharmacological elements pertaining to the patient's lifestyle such as dietary and physical activity. This varies from an appointment conducted by a physician that may need to focus on a wide array of disease states not allowing for adequate time to fully incorporate pharmacologic and non-pharmacologic treatment options.

Table 3. Resident physician questionnaire perception items and responses. n (%)

Item (Category)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The clinical pharmacist at my longitudinal, continuity clinic...					
... provides a high quality of care to my patients. (<i>Quality of care</i>)	31 (68.9)	13 (28.9)	0 (0)	0 (0)	1 (2.2)
... helps my patients achieve their goals more quickly than if I managed them alone. (<i>Quality of care</i>)	30 (66.7)	12 (26.7)	3 (6.7)	0 (0)	0 (0)
... helps patients obtain their therapeutic goals. (<i>Quality of care</i>)	28 (62.2)	16 (35.6)	1 (2.2)	0 (0)	0 (0)
... does a good job helping to co-manage my patients. (<i>Quality of care</i>)	26 (57.8)	15 (33.3)	3 (6.7)	1 (2.2)	0 (0)
... effectively provides patient education. (<i>Patient educator</i>)	29 (64.4)	14 (31.1)	2 (4.4)	0 (0)	0 (0)
... serves as a reliable source for patient education material. (<i>Patient educator</i>)	34 (75.6)	11 (24.4)	0 (0)	0 (0)	0 (0)
... takes into account the individual needs of my patients when providing patient education. (<i>Patient educator</i>)	22 (48.9)	21 (46.7)	2 (4.4)	0 (0)	0 (0)
... provides education to patients in a way that is different from what a physician provides. (<i>Patient educator</i>)	21 (46.7)	18 (40)	6 (13.3)	0 (0)	0 (0)
... provides care to my patients that is different than the care I provide or the care a staff physician provides. (<i>Patient educator</i>)	20 (44.4)	22 (48.9)	2 (4.4)	1 (2.2)	0 (0)
... has the education and training to perform the type of services that they provide. (<i>Autonomy</i>)	32 (71.1)	13 (28.9)	0 (0)	0 (0)	0 (0)
... is qualified to provide additional services that are not currently being offered at my clinic site. (<i>Autonomy</i>)	13 (28.9)	11 (24.4)	17 (37.8)	3 (6.7)	0 (0)
... is given too much independence in clinical encounters. (<i>Autonomy</i>)	2 (4.4)	3 (6.7)	8 (17.8)	23 (51.1)	9 (20)
... is an expert in the therapeutic areas in which he/she provides care. (<i>Autonomy</i>)	27 (60)	16 (35.6)	2 (4.4)	0 (0)	0 (0)
... should be given more independence in clinical encounters. (<i>Autonomy</i>)	12 (26.7)	12 (26.7)	16 (35.6)	4 (8.9)	1 (2.2)
... is actively involved in my clinical education. (<i>Resident educator</i>)	17 (37.8)	18 (42.2)	3 (6.7)	5 (11.1)	0 (0)
... is a strong resident educator. (<i>Resident educator</i>)	20 (44.4)	13 (28.9)	8 (17.8)	3 (6.7)	0 (0)
... uses educational techniques that improve resident understanding of pharmacotherapy. (<i>Resident educator</i>)	18 (40)	20 (44.4)	6 (13.3)	1 (2.2)	0 (0)
... provides education to residents in a way that is different from what a physician provides. (<i>Resident educator</i>)	21 (46.7)	18 (40)	4 (8.9)	2 (4.4)	0 (0)
... provides value that is uniquely different from other providers (i.e., physicians, nurses, dietitians, etc.). (<i>Integration</i>)	25 (55.6)	17 (37.8)	2 (4.4)	1 (2.2)	0 (0)
... should be involved with making medication-related decisions for patients with complex medication regimens. (<i>Integration</i>)	21 (46.7)	21 (46.7)	2 (4.4)	1 (2.2)	0 (0)
... functions as an integrated member of the clinic healthcare team. (<i>Integration</i>)	24 (53.3)	17 (37.8)	4 (8.9)	0 (0)	0 (0)
Ambulatory care clinical pharmacists are able to educate patients effectively to achieve desired outcomes. (<i>Patient educator</i>)	19 (42.2)	26 (57.8)	0 (0)	0 (0)	0 (0)
I spend enough time with the clinical pharmacist to gain an understanding of the capabilities of ambulatory care pharmacists. (<i>Resident educator</i>)	6 (13.3)	14 (31.1)	13 (28.9)	11 (24.4)	1 (2.2)
I would like the clinical pharmacist at my longitudinal clinic to be more formally involved in my clinical education. (<i>Resident educator</i>)	14 (31.1)	24 (53.3)	7 (15.6)	0 (0)	0 (0)
I work collaboratively with the clinical pharmacist at my longitudinal clinic. (<i>Integration</i>)	18 (40)	19 (42.2)	7 (15.6)	1 (2.2)	0 (0)
I feel comfortable asking the clinical pharmacist at my longitudinal clinic questions about medication therapy, even if outside of the areas for which he/she currently provides service. (<i>Integration</i>)	32 (71.1)	13 (28.9)	0 (0)	0 (0)	0 (0)
The level of care provided to patients would suffer if there was not a clinical pharmacist as part of the clinic team. (<i>Integration</i>)	16 (35.6)	24 (53.3)	2 (4.4)	2 (4.4)	1 (2.2)
I value the opinion of the clinical pharmacist at my longitudinal clinic on decisions regarding medication therapy. (<i>Integration</i>)	26 (57.8)	18 (40)	1 (2.2)	0 (0)	0 (0)
Ambulatory care pharmacists are able to motivate patients to achieve improved quality of care. (<i>Quality of care</i>)	20 (44.4)	20 (44.4)	5 (11.1)	0 (0)	0 (0)
Referring patients to a clinical pharmacist for medication management hurts my relationship with the patient. (<i>Quality of care</i>)	0 (0)	2 (4.4)	2 (4.4)	27 (60)	14 (13.1)
I am confident in the clinical pharmacist's ability to manage, monitor, and counsel patients on their medications and disease state(s) based on current guidelines. (<i>Quality of care</i>)	26 (57.8)	18 (40)	1 (2.2)	0 (0)	0 (0)
I am comfortable with the care my patients will receive when referred to the clinical pharmacist at my longitudinal clinic. (<i>Quality of care</i>)	24 (53.3)	20 (44.4)	1 (2.2)	0 (0)	0 (0)

Perhaps the most surprising finding from this survey is that despite the resident physicians viewing the pharmacist as being qualified to provide education and clinical services, while also being confident in the clinical pharmacists' ability to manage, monitor, and counsel patients on their medications, a small subset of resident physicians felt that referring patients to the clinical pharmacist for medication management could hurt their relationships with patients. While this research was not designed to discover reasons for these perceptions, a number of possibilities may exist. These perceptions could be a direct reflection of resident physicians indicating that they did not get to spend enough time with the clinical pharmacist to become completely

comfortable with the concept of patient referral and independent pharmacist management, while also lacking a full awareness of the disease states managed and broad scope of services provided by the pharmacist. This could be remedied through formal shadowing or joint appointments between the resident physician and clinical pharmacist at the start of, and periodically throughout, the longitudinal clinic experience, or simple distribution of a handout during the resident physician's first year in clinic that clearly explains and identifies the various roles of the clinical pharmacist.

There is a need for increased awareness of the role of the clinical pharmacist as shown by the discrepancy seen

Table 4. Comparison of Pharmacist Services. n (%)		
Activity/Service	Resident Response	Pharmacist Response
Disease state education	26 (57.8)	14 (93.3)
Drug therapy management per protocol or collaborative practice agreement	45 (100)	14 (93.3)
Formulary approval	22 (48.9)	4 (26.7)
Immunizations	5 (11.1)	1 (6.7)
Medication Therapy Management Services	37 (82.2)	9 (60)
Transitions of Care	24 (53.3)	6 (40)
Wellness visits/Disease screening	19 (42.2)	4 (26.7)
Other	1 (2.2)	2 (13.3)
Disease States Managed	Resident Response	Pharmacist Response
Anticoagulation	35 (77.8)	8 (53.3)
Asthma	23 (51.1)	2 (13.3)
COPD	17 (37.8)	3 (20)
Diabetes	39 (86.7)	7 (46.7)
GERD	5 (11.1)	1 (6.7)
GI (nausea/vomiting/ constipation/diarrhea)	5 (11.1)	0 (0)
Heart failure	11 (24.4)	2 (13.3)
HIV	7 (15.6)	0 (0)
Hyperlipidemia	13 (28.9)	7 (46.7)
Hypertension	19 (42.2)	8 (53.3)
Hypothyroidism	10 (22.2)	1 (6.7)
Mental health disorders	6 (13.3)	0 (0)
Metabolic syndrome	6 (13.3)	2 (13.3)
Migraine	6 (13.3)	0 (0)
Osteoporosis	6 (13.3)	2 (13.3)
Pain	7 (15.6)	0 (0)
Renal impairment/ CKD	8 (17.8)	0 (0)
Seizure	4 (8.9)	0 (0)
Smoking cessation	28 (62.2)	10 (66.7)
Weight loss	13 (28.9)	4 (26.7)
Other(s)	1 (2.2)	1 (6.7)

among the responses from pharmacists regarding their clinical activities compared with the responses from the resident physicians (Table 4). Of note, only 57.8% of resident physicians responded that the pharmacist provides disease state education versus 93.3% of the pharmacists. A lack of awareness of the pharmacists' services by resident physicians may reduce referrals and limit the pharmacist from being fully utilized in providing patient care at the practice site. It should be noted that the 15 pharmacists who responded may practice at up to 15 different sites, whereas the resident physicians came from only 4 different practice sites, possibly contributing to the discrepancy noted between the pharmacists and resident physicians for services provided. Future research should continue to explore these hypotheses.

One of the largest benefits to utilizing ambulatory care pharmacists for patient management is that by allowing the pharmacist to focus on the management of specific disease states through frequent follow-up visits, resident physicians may have more room in their schedules to see medically complex patients or address additional concerns of patients for whom chronic disease management would otherwise dominate their visits. The frequency of patient follow-up with the pharmacist perhaps plays a part in the perception that patient referral to the pharmacist hurts the resident physician's relationship with the patient, particularly if the patient is relatively new to the resident physician. Due to patient panel size, pharmacists are often able to see patients back every few weeks whereas the first available resident physician appointment may not be for a few months.

Additionally, the concern regarding impact on patient relationship may support the idea that the resident physicians would like the pharmacist to be more directly involved in their clinical education during their ambulatory care learning experience by leading topic discussions or providing relevant presentations. In certain settings, such as what is seen within the Veteran's Affairs (VA) environment, the view of the clinical pharmacist's role in the approval or denial of non-formulary medication requests may contribute to this view of "harm" to the patient relationship. Almost half (48.9%) of the resident physicians identified non-formulary medication requests as a service in which their pharmacist was involved. When a non-formulary medication is denied or an alternate medication is suggested in place of the non-formulary medication being requested, this could be viewed by the resident physician as hindering the relationship the physician has with the patient.

Slightly more than half of the resident physicians in this study strongly agreed or agreed that the pharmacist is qualified to provide additional services than those currently being offered at their clinics. Resident physicians' limited knowledge of the PharmD curriculum and limited collaboration with pharmacy students on projects during medical school may be contributing factors as to why a notable number of resident physicians were neutral and a few disagreed with pharmacists being able to provide additional services. Medical and pharmacy schools throughout the United States are focusing on incorporating interprofessional education (IPE) into the curriculum. It is worth noting that residency training, whether pharmacy or medical, is a perfect venue to implement IPE. While this

study did not specifically focus on IPE, it is worthwhile to note that 82.2% of resident physicians had not collaborated with pharmacy students on any projects during their medical school training and 13.3% had no prior exposure to pharmacists prior to starting their longitudinal clinic experience. While this does not represent all medical schools, it showcases the struggle that some medical programs may have with incorporating IPE into professional school training, and how a lack of IPE early in training can influence perceptions of working with varied healthcare disciplines. Additionally, the responses which differed based on demographic factors all follow what is known about establishing effective pharmacist-physician collaboration; colocation, past experiences, and ability to communicate effectively are important factors in establishing collaboration.^{14,18} The responses of resident physicians that have a friend that is a pharmacist support these concepts as a deeper relationship has been formed. Concerted efforts should be made to provide all health care professionals in training with opportunities to work closely with trainees from other disciplines, whether through the completion of multidisciplinary group projects while in school or some other manner while receiving clinical training.

One limitation that should be noted is that of survey bias. While all efforts were made to minimize any bias from the survey instrument, the use of a hard copy survey instrument may have impacted resident physicians' responses if there was concern that responses would be viewed by the clinical pharmacist with whom they directly work. Selection bias may also have occurred. Pharmacists were identified based on established preceptor relationships with pharmacy programs, which would exclude any non-preceptor pharmacists from participating. Additionally, pharmacists were asked to distribute the questionnaires to all resident physicians at their practice site, but may have only distributed questionnaires to the resident physicians at their site with whom they had good relationships or expected positive feedback from. An additional limitation is the small sample size and moderate response rate, however physician response rates to surveys are typically low and some studies have shown that response rates in this population are declining over time.¹⁹⁻
²³ Our resident physician response rate of 42% is similar to other studies.¹⁹⁻²²

This research highlights the perceptions of resident physicians within Indiana and may not be representative of views throughout the country. Investigators successfully attempted to increase the response rate following the

initial study pilot period by changing the questionnaire administration method. However, based on the research methods it is uncertain how many medical residency programs include clinical pharmacists as part of the ambulatory care healthcare team or how many unique training sites were represented among the 15 pharmacist responses. Given the small number of distributing pharmacists, the results may be more of a reflection of these specific pharmacists rather than overall perceptions of ambulatory care pharmacy services throughout Indiana, although aligned with the perceptions of non-resident physicians.^{14,17} Researchers attempted to be as comprehensive as possible in identifying potential sites for participation, however there is not a master list of pharmacists practicing in the ambulatory care setting, nor is there a comprehensive list of longitudinal ambulatory care training sites for resident physicians in Indiana.

CONCLUSIONS

This novel research highlights the perceptions of ambulatory care clinical pharmacists within resident physician longitudinal ambulatory care clinics. Resident physicians with a longer duration of exposure and personal friendship with a pharmacist are more likely to express positive perceptions. Areas for further enhancements in this interprofessional relationship have been identified related to perceptions about pharmacist autonomy and patient relationships.

PRESENTATIONS

A poster presentation about this project was presented in December 2014 at the American Society of Health-System Pharmacists (ASHP) Midyear Clinical Meeting in Anaheim, CA; a lecture presentation about this project was delivered at the Family Medicine Midwest Conference on October 8, 2016 in Indianapolis, IN.

CONFLICT OF INTEREST

No authors report any conflicts of interest.

FUNDING

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

1. Helling DK, Johnson SG. Defining and advancing ambulatory care pharmacy practice: it is time to lengthen our stride. *Am J Health Syst Pharm*. 2014;71(16):1348-1356. <https://doi.org/10.2146/ajhp140076>
2. Hammond RW, Schwartz AH, Campbell MJ, Remington TL, Chuck S, Blair MM, Vassey AM, Rospond RM, Herner SJ, Webb CE; American College of Clinical Pharmacy. Collaborative drug therapy management by pharmacists-2003. *Pharmacotherapy*. 2003;23(9):1210-1225.
3. American College of Clinical Pharmacy, McBane SE, Dopp AL, Abe A, Benavides S, Chester EA, Dixon DL, Dunn M, Johnson MD, Nigro SJ, Rothrock-Christian T, Schwartz AH, Thrasher K, Walker S. Collaborative drug therapy management and comprehensive medication management – 2015. *Pharmacotherapy*. 2015;35(4):e39-e50. <https://doi.org/10.1002/phar.1563>
4. Smith WE, Ray MD, Shannon DM. Physicians' expectations of pharmacists. *Am J Health Syst Pharm*. 2002;59(1):50-57. <https://doi.org/10.1093/ajhp/59.1.50>

5. Helling DK, Thies PW, Rakel RE. The effect of clinical pharmacy services on family practice residents' attitudes: a nationwide study. *Drug Intell Clin Pharm.* 1986;20(6):493-496.
6. Voris JC, Anderson RJ, Kimberlin CL. Physician and pharmacy student expectations of pharmacy practice. *Am J Pharm Educ.* 1982;46(1):37-41.
7. McDonough RP, Doucette WR. A conceptual framework for collaborative working relationships between pharmacists and physicians. *J Am Pharm Assoc.* 2001;41:682-692.
8. Carter BL. Primary care physician-pharmacist collaborative care model: Strategies for implementation. *Pharmacotherapy.* 2016;36(4):363-373. <https://doi.org/10.1002/phar.1732>
9. Dickerson LM, Denham AM, Lynch T. The state of clinical pharmacy practice in family practice residency programs. *Fam Med.* 2002;34(9):653-657.
10. Jarret JB, Lounsbury JL, D'Amico F, Dickerson LM, Franko J, Nagle J, Seehusen DA, Wilson SA. Clinical pharmacists as educators in family medicine residency programs: a CERA study of program directors. *Fam Med.* 2016;48(3):180-186.
11. Ables AZ, Baughman OL III. The clinical pharmacist as a preceptor in a family practice residency training program. *Fam Med.* 2002;34(9):658-662.
12. Jorgenson D, Muller A, Whelan AM. Pharmacist educators in family medicine residency programs: a qualitative analysis. *BMC Med Educ.* 2012;12:74. <https://doi.org/10.1186/1472-6920-12-74>
13. Love DW, Hodge NA, Foley WA. The clinical pharmacist in a family practice residency program. *J Fam Pract.* 1980;10(1):67-72.
14. Mercer K, Neiterman E, Guirguis L, Burns C, Grindrod K. "My pharmacist": Creating and maintaining relationship between physicians and pharmacists in primary care settings. *Res Social Adm Pharm.* 2019 [ahead of print]. <https://doi.org/10.1016/j.sapharm.2019.03.144>
15. Lounsbury JL, Moon J, Humphrey A, Prasad S. Optimizing resident physician use of clinical pharmacy services. *Fam Med.* 2013;45(1):33-36.
16. Sullivan GM, Artino AR Jr. Analyzing and interpreting data from Likert-type scales. *J Grad Med Educ.* 2013;5(4):541-542. <https://doi.org/10.4300/JGME-5-4-18>
17. Gordon C, Unni E, Montuoro J, Ogborn DB. Community pharmacist-led clinical services: physician's understanding, perceptions, and readiness to collaborate in a Midwestern state in the United States. *Int J Pharm Pract.* 2018;26(5):407-413. <https://doi.org/10.1111/ijpp.12421>
18. Al-Jumaili AA, Al-Rekabi MD, Doucette WR, Hussein AH, Abbas HK, Hussein FH. Factors influencing the degree of physician-pharmacist collaboration within Iraqi public healthcare settings. *Int J Pharm Pract.* 2017;25(6):411-417. <https://doi.org/10.1111/ijpp.12339>
19. Asch DA, Jedrzejewski MK, Christakis NA. Response rates to mail surveys published in medical journals. *J Clin Epidemiol.* 1997;50(10):1129-1136. [https://doi.org/10.1016/S0895-4356\(97\)00126-1](https://doi.org/10.1016/S0895-4356(97)00126-1)
20. Cho YI, Johnson TP, VanGeest JB. Enhancing surveys of health care professionals: a meta-analysis of techniques to improve response. *Eval Health Prof.* 2013;36(3):382-407. <https://doi.org/10.1177/0163278713496425>
21. Cook JV, Dickinson HO, Eccles MP. Response rates in postal surveys of healthcare professionals between 1996-2005: an observational study. *BMC Health Serv Res.* 2009;9:160. <https://doi.org/10.1186/1472-6963-9-160>
22. Cummings SM, Savitz LA, Konrad TR. Reported response rates to mailed physician questionnaires. *Health Serv Res.* 2001;35(6):1347-1355.
23. McLeod CC, Klabunde CN, Willis GB, Stark D. Health care provider surveys in the United States, 2000-2010: a review. *Eval Health Prof.* 2013;36(1):106-126. <https://doi.org/10.1177/0163278712474001>