

# Medical Resident Alumni Perspectives Regarding Preferred Pharmacotherapy Rotation Format

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**Abbreviations** FMR: Family Medicine Residency; SJRMC: Saint Joseph Regional Medical Center; ACGME: Accreditation Council for Graduate Medical Education

## Abstract

**Introduction:** Pharmacy integration into a Family Medicine Residency (FMR) curriculum is beneficial to the professional development and education of medical residents. While pharmacist involvement in FMR programs is well-documented, the ideal means of incorporating pharmacotherapy education as a standardized component of a residency curriculum is unknown. This study was conducted to determine the need, impact, and best approach to incorporate pharmacy experiences into a FMR curriculum, while secondarily identifying the medication-related content medical residents preferred to be taught by pharmacists.

**Materials and Methods:** A cross-sectional study was conducted via online survey sent to alumni of the Saint Joseph Regional Medical Center's (SJRMC) FMR in order to assess their perception of the pharmacy curriculum within the residency program, which has been delivered in a variety of formats since its inception.

**Results:** Of 113 alumni invited to participate, 51 (41%) completed the survey. Developing a required, longitudinal pharmacy experience was well-received, as most alumni believed that it would improve patient care (98%), increase confidence in medication choices (100%), and increase retention of pharmaceutical knowledge (96%). Seventy-two percent believed pharmacotherapy rotations should be a required component of the FMR curriculum, with 96% preferring longitudinal exposure throughout the residency compared to a single month rotation. Finally, the subjects identified as most preferred for pharmacists to teach were quantified, with diabetes, hypertension, pain management, heart failure and anticoagulation cited most commonly.

**Conclusions:** The majority of FMR alumni believed a pharmacy experience should be a required component of the residency program and would prefer it be delivered longitudinally throughout the residency.

## Introduction

Select Family Medicine Medical Residencies (FMR) have incorporated pharmacists to assist in medication education dating back to 1980 [1]. Inclusion of pharmacists in FMR has shown to improve medication prescribing, patient satisfaction, and patient outcomes [2].

Saint Joseph Regional Medical Center (SJRMC) has incorporated clinical pharmacy services into the FMR since 1996. A formal pharmacotherapy rotation was established in 1999. However, the Accreditation Council for Graduate Medical Education (ACGME) does not currently require pharmacy education or time spent with pharmacists within a medical residency. As a result, medical residents at SJRMC could elect to participate in a single-month pharmacotherapy rotation, but this experience has not historically been mandatory. Based on the perceived value of pharmacy education amongst the FMR physician faculty, however, SJRMC is currently transitioning to include pharmacotherapy rotations as a residency requirement.

A paucity of published literature exists evaluating the ideal means of incorporating pharmacist education into residency curricula. Instead, currently published literature has focused on the value of pharmacists in FMR with regards to patient satisfaction, outcomes and medication-related knowledge gained by residents [3-5]. Prior to incorporating required pharmacotherapy education into our FMR curriculum, we conducted a survey of our FMR alumni to assist in developing the new pharmacotherapy curriculum within the FMR.

The authors chose to survey FMR alumni, as opposed to current residents, as this group could offer a greater number of completed surveys and respond with more insight into the value of specific educational components based on real world practice experience.

The objective of this study was to determine the need, impact, and best approach to incorporate pharmacy experiences into a FMR curriculum, while secondarily, identifying the medication-related content medical residents preferred to be taught by pharmacists.

**Table 1:** Potential means of delivering pharmacotherapy education – those experienced by alumni and those in which alumni would have desired to experience if given the option.

Pharmacy Experiences	Experienced During Residency <sup>a</sup> N (%)	Desired Experience During Residency <sup>b</sup> N (%)
Pharmacy rotation (elective)	13 (26)	16 (31)
Didactics taught by pharmacists	32 (63)	35 (69)
Ability to consult pharmacists	37 (73)	33 (65)
Rounds	27 (53)	29 (57)
Interactions during pharmacy clinic	15 (29)	25 (49)
Patients managed by pharmacists	26 (51)	21 (41)
None	13 (26)	N/A

Survey question:

a: What experiences did you have with the Family Medicine Center (FMC) pharmacy team throughout your residency?

b: What experiences with pharmacy would you have preferred to have during your residency?

## Materials and Methods

### Survey and data collection procedures

Individuals eligible for this cross-sectional study, conducted at Saint Joseph Regional Medical Center in South Bend, Indiana, included all alumni of the SJRMC FMR program graduating between 1974 (the year of the residency’s first graduating class) and 2014. A link to a 10-question, anonymous, online survey was distributed via email in October 2014 to the 113 alumni whose contact information was still known, followed by a second reminder email. The survey, developed by SJRMC FMR pharmacists, assessed alumni’s exposure to clinical pharmacy services during residency and subjective perception of the value of this interaction, as well as preferred methods of incorporating pharmacy experiences into the FMR. Finally, respondents were asked to rank, in order, the five disease states they felt most important to be included in the pharmacotherapy curriculum from a list of 20 disease states the pharmacy faculty felt were most commonly taught within the residency. This study was approved by the SJRMC Institutional Review Board.

### Data analysis

The survey employed multiple question formats, including

**Table 2:** Alumni perspective of pharmacy involvement in the SJRMC family medicine residency.

Survey Question	4 - Strongly Agree N (%)	3 - Agree N (%)	2 - Disagree N (%)	1 - Strongly Disagree N (%)	Mean (±SD)
Pharmacy should be a required component of the family medicine residency program as opposed to being offered as an elective.	16 (31%)	21 (41%)	11 (22%)	3 (6%)	3.0 (±0.88)
I would have benefited from more consistent exposure to the pharmacy mentorship/teaching over the course of my residency.	14 (27%)	33 (65%)	4 (8%)	0 (0%)	3.2 (±0.57)
I would prefer longitudinal exposure to pharmacy-based experience throughout my residency as opposed to a one-time block rotation.	25 (49%)	24 (47%)	2 (4%)	0 (0%)	3.5 (±0.58)
Future residents would benefit from exposure to the pharmacy department at the beginning of their residency.	25 (49%)	22 (43%)	4 (8%)	0 (0%)	3.4 (±0.64)
Residents should have a strong knowledge on current medications and drug delivery devices.	31 (61%)	20 (39%)	0 (0%)	0 (0%)	3.6 (±0.49)
Residents should be able to review and evaluate medication-based literature relevant to my current practice.	21 (41%)	28 (55%)	2 (4%)	0 (0%)	3.4 (±0.56)
Pharmacy should be offered as an elective as opposed to being required for the residency.	8 (16%)	12 (23%)	23 (45%)	8 (16%)	2.4 (±0.94)

ranking various options, choosing all that apply, and assessing the respondent’s level of agreement (1=strongly disagree through 4= strongly agree) with statements related to their desired pharmacotherapy rotation experience and the value of specific components of the rotation. Descriptive statistics (means, standard deviations, and frequencies) were used to analyze the participants’ responses to these survey questions, and an alpha coefficient was calculated to assess the survey’s internal consistency and reliability. The Mann-Whitney tests were used to detect differences in responses among participants who completed a pharmacy rotation compared to those who did not. A p-value < 0.05 was used to determine statistical significance.

## Results

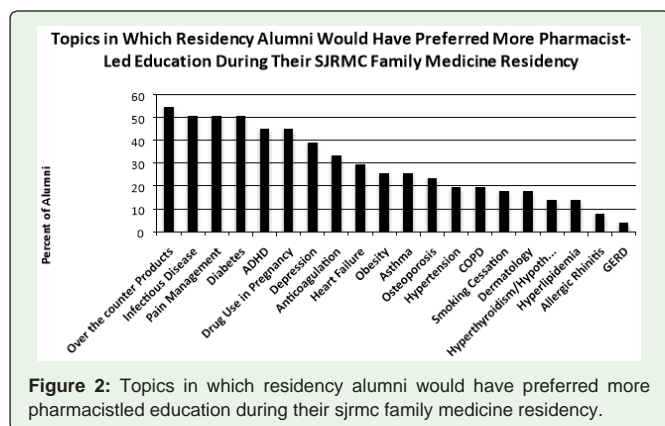
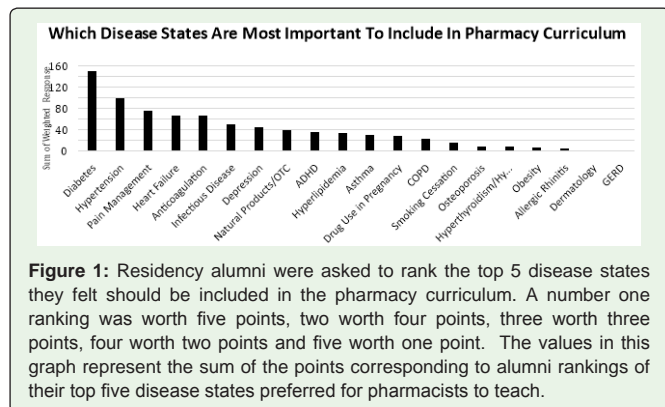
Fifty-one alumni completed the survey (41% response). Twenty-six percent completed an elective pharmacy rotation during residency, while 39% graduated prior to the rotation being offered. However, 74% of respondents interacted with pharmacists in some capacity during residency, with clinical consultation (73%) and didactic lecturing (63%) the most commonly cited means of interaction. Alumni identified didactic teaching (69%), clinical consultation (65%), inpatient medical rounds (57%), and interactions during a pharmacist clinic (49%) as their preferred manner of interacting with pharmacists (Table 1).

The alpha coefficient was 0.83 for the 10 survey items in Tables 2 and 3, suggesting that the items have relatively high internal consistency. Table 2 depicts the mean and response proportions for each of these questions in the survey. The majority of respondents stated they would prefer longitudinal pharmacotherapy education versus a single-month rotation (96%) and would have benefitted from more consistent exposure to pharmacy mentorship and teaching throughout residency (92%). Additionally, 72% of alumni expressed that pharmacotherapy should be a required component of the FMR curriculum. Interestingly, when the question was asked differently, 39% stated that the rotation should be offered as an elective (Table 2).

Table 3 reveals the anticipated benefits of incorporating longitudinal pharmacotherapy education throughout the FMR, according to alumni. Most believed such an experience would improve patient care provided by medical residents (98%), increase confidence in pharmacologic decision-making (100%), and enhance retention of pharmaceutical knowledge obtained (96%). When comparing whether the perceived value of a pharmacy experience was different

**Table 3:** Perceived value of longitudinal pharmacy experience offered throughout the residency.

Alumni perception	4-Strongly agree N (%)	3-Agree N (%)	2- Disagree N (%)	1-Strongly Disagree N (%)	Mean (±SD)
Improve patient care offered by medical residents	25 (49)	25 (49)	1 (2)	0 (0)	3.5 (±0.08)
Increase confidence in pharmacologic choices made by medical residents	27 (53)	24 (47)	0(0)	0 (0)	3.5 (±0.07)
Increase retention of pharmacologic knowledge obtained throughout the residency	25 (49)	24 (47)	2 (4)	0 (0)	3.5 (±0.08)



among those that had completed a pharmacy rotation during their residency versus those who hadn't, there was no statistical difference among any of the survey items, suggesting that even those who had not completed a pharmacy rotation during their residency saw value in incorporating pharmacy rotations.

Finally, respondents were asked to rank, in order, the five disease states they felt most important to be included in the pharmacotherapy curriculum from a list of 20 disease states the pharmacy faculty felt were most commonly taught within the residency. To determine the most preferred disease states, point values of 5 (most important) to 1 (fifth most important) were assigned to the ranked disease states and the sum of these point values was calculated for each disease state (e.g., if a disease state received one number one ranking and one number three ranking the sum would be 8). The residents rated diabetes (150), hypertension (98), pain management (75), heart failure (65) and anticoagulation (65) highest (Figure 1). Additionally, when asked which disease states or topics the residents would have preferred more pharmacist-led education than they had received during their residency, over the counter medications, diabetes, pain management, infectious diseases, attention deficit hyperactivity disorder, and drug use in pregnancy were cited most frequently (Figure 2).

## Discussion

The finding that our FMR alumni obtained value in pharmacy-related education during residency is consistent with previous literature. A study by Murphy and colleagues displayed improvement in residents' knowledge after completion of a pharmacotherapy rotation utilizing a pre- and post-intervention exam [3]. In this study, 15 medical residents completed a 20-question medication-related test before and after a one-month pharmacotherapy/research rotation. Mean post-test scores were significantly higher than pre-test (14.67 versus 10.13,  $p < 0.0001$ ).

While the positive perception of pharmacy experiences during residency expressed in our survey corroborate the value of pharmacotherapy rotations for medical residents displayed by Murphy and colleagues, the primary focus of our survey was not to identify the value of pharmacist education within a FMR, but instead to identify the ideal means of incorporating such a pharmacy component. To the authors' knowledge, this has not previously been studied. However, three studies were identified evaluating the role of pharmacists within FMR programs. In one such study, Jorgenson and colleagues surveyed FMR directors in Canada to determine the percentage of pharmacists directly involved in teaching family medicine residents, as well as the type and extent of pharmacists' teaching [4]. Approximately 25% of responding residencies had direct access to pharmacists for resident teaching but did not include a standardized pharmacotherapy curriculum. Jorgenson concluded that pharmacists play an important role in FMR and residents would benefit from standardized incorporation of pharmacists in the curriculum, a notion supported by the results of our current study.

Additionally, Dickerson found pharmacists working within a FMR spent 42.7% of their time teaching, with 42.1% of that teaching time devoted to family medicine residents as opposed to students or other health care professionals [2]. The methods of teaching were through point of care (45.1%), consultation or chart review (37.0%), didactic presentations (23.3%), or newsletter (9.8%). We also sought to identify the most common means of resident interaction with pharmacists within SJRMC. Our survey similarly identified clinical consultation (73%), didactic teaching (63%), and pharmacists rounding with the medical team (53%) as the most common.

A second study by Jorgenson, et al. assessed residents' perception of pharmacists as educators. In the study, interviews were conducted with pharmacists, residency directors, and residents to gather information on the perception of pharmacist educators in FMR programs with regard to improving patient care, drug knowledge, and confidence, as well as their appreciation for the expertise of pharmacists. All three groups agreed that pharmacist educators positively impact residents' education. This is consistent with our survey results, as more than 95% of those responding agreed that a longitudinal pharmacotherapy experience would improve their patient care, confidence in prescribing medications, and retention of

**Table 4:** Key features of proposed longitudinal pharmacotherapy curriculum.

- Develop drug monograph (Year 1) and medication class review (Year 2)
- Participate in medication-related topic discussions or journal clubs
- Discuss patients prior to resident's clinic, focusing on medication regimen optimization
- Participate in group patient education classes taught by FMR pharmacists
- Spend time in pharmacist-run outpatient clinics
- Discuss medication pricing, insurance claims, choosing medications based on formularies, custom compounding of medications, etc. with manager of retail pharmacy located within hospital
- Perform pharmacokinetic calculations for antibiotic dosing and parenteral nutrition formulation alongside inpatient pharmacist
- Assume more hands-on role in group education and clinic in Years 2 and 3 (e.g., teaching in group education classes as opposed to simply observing)

medication-related knowledge gained. However, similar to the other studies referenced, participants interviewed by Jorgenson stated that pharmacists did not utilize a standardized curriculum throughout the FMR. Thus, these studies describing pharmacist involvement in FMR provide some insight into the value of pharmacists within FMR and their current educational roles, but did not identify the ideal means of delivering this education.

The primary goal of our study was to assess how best to deliver pharmacotherapy content within our program based on the opinions of past graduates of our program. The majority of SJRMC alumni endorsed a required pharmacotherapy experience within the curriculum and longitudinal incorporation throughout the residency. In addition, resident alumni identified diabetes, hypertension, pain management, heart failure and anticoagulation as the most important disease states for pharmacists involved in a FMR to teach.

In response to this survey, SJRMC implemented a required pharmacy experience within the FMR in 2015, developed as a longitudinal exposure as suggested by the alumni, with each resident participating in a two-week pharmacotherapy rotation precepted by a pharmacist during each of their three residency years. If desired, 2-4 week elective pharmacotherapy rotations will still be offered, with these rotations customized to meet specific resident's goals. It should also be noted that since the proposal and decision to change to this longitudinal curriculum occurred after completion of this survey, alumni perspectives were not influenced by discussions related to implementation of a required pharmacotherapy curriculum prior to the survey, nor were the responses simply endorsements of a proposed curriculum. The components of the new longitudinal pharmacotherapy rotation are summarized in Table 4. Based on the results of this survey and nearly 20 years of experience with pharmacists working alongside residents in our program, we hope that the development of a standardized pharmacotherapy curriculum such as this will positively impact residents going forward, reinforcing optimal prescribing habits, enhancing retention of medication-related education, and improving patient outcomes through enhanced interdisciplinary patient care. However, as there is little information published regarding how to ideally structure pharmacotherapy rotations within a FMR, this rotation format will be reassessed and adjusted based on resident feedback.

Limitations of this study include a non-validated survey, single-center design, potential recall bias as the survey was based on feedback from former residents, and possible period effect based on the fact that the survey was distributed to all alumni of our program which has been around for over 40 years. Additionally, current contact information was not available for all alumni; therefore not all past residents received an invitation to participate. To the author's knowledge, this is the first study to evaluate the preferred means of incorporating pharmacist education into FMR curriculum, and the first to assess alumni perspective. Additionally, no previously published literature describing establishment of a required, longitudinal pharmacotherapy rotation within a FMR was identified.

## Conclusion

While ACGME does not require a pharmacy experience in FMR, a majority of SJRMC alumni endorsed pharmacotherapy education as a required component and preferred a longitudinal versus single-month rotation. Although this survey provides valuable insight into how best to incorporate pharmacy experiences into FMR programs, further research within other institutions is needed to optimize delivery of pharmacotherapy education within FMR.

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