Ambulatory Care Training Within Postgraduate Year 2 Pediatric Pharmacy Residency Programs

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OBJECTIVE This study evaluates pediatric ambulatory care training opportunities for postgraduate year 2 (PGY2) pediatric pharmacy residents.

METHODS An online survey was disseminated to PGY2 pediatric pharmacy residency directors. The questions involved the number and type of pediatric ambulatory care rotations offered; number of preceptors who practice in pediatric ambulatory care; whether or not a pediatric ambulatory care rotation is a requirement of the program; length and format of the rotations; amount of time residents spend in the pediatric ambulatory care setting; and the resident's role during pediatric ambulatory care rotations.

RESULTS The survey yielded an 85% response rate ($n = 41/48$). Most residency programs offer at least 1 pediatric ambulatory care rotation ($n = 38$; 93%), most of which are longitudinal experiences, and two thirds of programs require their resident(s) to complete a pediatric ambulatory care rotation ($n = 27$; 66%). These experiences involve a variety of specialty clinics, and residents assume diverse roles and responsibilities. Few programs offer residents the opportunity to practice under a collaborative drug therapy management agreement ($n = 6$; 15%) or develop new clinical services ($n = 6$; 15%). Most residency program directors ($n = 39$; 95%) reported that less than 25% of their residency graduates work in the pediatric ambulatory care setting.

CONCLUSIONS Ambulatory care experiences in PGY2 pediatric pharmacy residency programs are diverse in number and scope. There is an opportunity to expand pediatric ambulatory care rotation offerings, particularly with respect to collaborative drug therapy management and the establishment of new clinical services.

ABBREVIATIONS ASHP, American Society of Health-System Pharmacists; PGY, postgraduate year

KEYWORDS ambulatory care, pediatrics, pharmacy, residency

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Introduction

Pediatric clinical pharmacists play an integral role in ensuring appropriate and optimal pharmacotherapy for children across the continuum of care. Pediatric pharmacotherapy poses numerous challenges that are best suited for pharmacists with specialized training. Some of these challenges include limited data on the efficacy and safety of drug therapy in children; changes in pharmacokinetic and pharmacodynamic parameters with growth and development; dose calculations based on body weight or body surface area; manipulation of commercially available dosage forms for administration to young patients; age and developmentally appropriate medication counseling for patients as well as their caregivers; and an increased risk of adverse drug events.¹

Pediatric clinical pharmacists are well established in the inpatient setting, including neonatal and pediatric intensive care units, as well as general and specialty services. The critical role of the pediatric clinical phar-

macist in the inpatient setting has been recognized and embraced by the greater medical community for years, including a formal endorsement by the American Academy of Pediatrics.² Pediatric clinical pharmacist involvement in the ambulatory care setting is growing. By establishing clinical services in the ambulatory care setting, pediatric clinical pharmacists can reduce the risk of medication errors and improve health outcomes for children.³ There are unique challenges and issues that pertain to medication management in pediatric ambulatory care clinics, and numerous studies have shown how pharmacists can add value.^{4–10} Furthermore, pediatric clinical pharmacists strongly affirm that all children warrant access to care from clinical pharmacists trained in pediatrics.¹ In order to provide quality care across the care continuum, postgraduate year 2 (PGY2) pediatric pharmacy residency graduates should ideally have exposure to pediatric pharmacy practice in both the inpatient and outpatient settings. Although required competency areas, goals, and objectives for accredited PGY2 Pediatric Pharmacy residencies are

delineated through the American Society of Health-System Pharmacists (ASHP), there are no specific provisions for the number or extent of ambulatory care training experiences.¹¹ Advanced residency training opportunities in pediatric ambulatory care, including the establishment of new clinic services, is critical to ensure the continued growth of outpatient pediatric clinical pharmacy services that will enhance medication management for ambulatory pediatric patients with acute and chronic illnesses.

This study is the first to provide a formal evaluation of pediatric ambulatory care training opportunities for PGY2 pediatric pharmacy residents. We hypothesize that the number and scope of ambulatory care training opportunities across PGY2 pediatric pharmacy residency programs will be diverse, with most programs offering more inpatient training opportunities compared with outpatient training opportunities.

Materials and Methods

An online survey characterizing pediatric ambulatory care experiences within PGY2 pediatric pharmacy residency programs was completed in 2017. The PGY2 pediatric pharmacy residency programs were identified using the ASHP Online Residency Directory.¹² A search of the ASHP Online Residency Directory yielded 48 PGY2 pediatric pharmacy residencies with full accreditation (44 programs) or 4 programs with candidate accreditation status (Supplemental Table). A survey tool was developed using Google Forms to collect information about each program's pediatric ambulatory care rotation offerings. There were 15 survey questions, including a combination of multiple choice, choose all that apply, and open response questions. Questions inquired about the number and type of pediatric ambulatory care rotations offered, the number of preceptors who practice in pediatric ambulatory care, whether or not a pediatric ambulatory care rotation is a requirement of the program, the length and format (longitudinal versus block) of the rotations, the amount of time residents spend in the pediatric ambulatory care setting, and the role of the resident during his or her pediatric ambulatory care rotations.

The institutional review boards of the investigators' respective institutions deemed the study protocol exempt. The survey link was disseminated via email to the residency director of record for each PGY2 pediatric pharmacy residency program. A reminder email was sent 4 weeks after the initial email for programs that had yet to respond. Residency program directors were also contacted via telephone as needed if no response was garnered from the initial email requests. Data were analyzed using descriptive statistics.

Results

The survey yielded an 85% response rate from

PGY2 pediatric pharmacy residency programs ($n = 41/48$). Program characteristics pertaining to pediatric ambulatory care experiences are highlighted in the Table. On average, PGY2 pediatric pharmacy residency programs offer 17 total rotations, with only 3 of those in the pediatric ambulatory care setting. Most residency programs, however, offer at least 1 pediatric ambulatory care rotation ($n = 38$; 93%), and more than half of programs require their resident(s) to complete a pediatric ambulatory care rotation ($n = 27$; 66%). Most of these required rotations are structured as a longitudinal ambulatory care clinic experience that extends throughout the residency year ($n = 20$; 49%). On average, PGY2 pediatric pharmacy residents complete 1 rotation in pediatric ambulatory care, and about 21 weeks of the residency year involve a pediatric ambulatory care experience. In many cases, residents only spend a few hours in this setting each week as part of a longitudinal ambulatory care rotation. Each residency program has, on average, 2 to 3 preceptors who practice in a pediatric ambulatory care setting.

The PGY2 pediatric pharmacy residencies offer ambulatory care rotations in a variety of specialty clinics. The most prevalent specialty areas for pediatric ambulatory care rotations include hematology/oncology ($n = 23$; 56%), cystic fibrosis ($n = 17$; 41%), solid organ transplant ($n = 14$; 34%), nephrology ($n = 12$; 29%), and cardiology ($n = 11$; 27%). A minority of programs offer residents the opportunity to practice under a collaborative drug therapy management agreement during their pediatric ambulatory care rotation ($n = 6$; 15%). Postgraduate year 2 pediatric pharmacy residents assume diverse roles and responsibilities while on their pediatric ambulatory care rotations. The most common roles include educating patients and caregivers ($n = 33$; 80%), answering drug information questions ($n = 31$; 76%), taking medication histories ($n = 31$; 76%), monitoring drug therapy ($n = 29$; 71%), and educating physicians and other health care providers ($n = 29$; 71%). Lastly, most residency program directors ($n = 39$; 95%) reported that less than 25% of their PGY2 pediatric pharmacy residency graduates work in the pediatric ambulatory care setting.

Discussion

This survey revealed that there is a wide variety of ambulatory care experiences among PGY2 pediatric pharmacy residency programs across the country and that not all programs require an ambulatory care experience. Significant variability exists between programs in how many pediatric ambulatory care experiences are offered, how much time the resident spends in ambulatory care, and how many preceptors are available for ambulatory care experiences. Additionally, few preceptors and residents are practicing under a collaborative practice agreement, leaving room for improvement in the type of pharmacist integration within the ambula-

Table. Characteristics of Ambulatory Care Experiences Among Postgraduate Year 2 (PGY2) Pediatric Pharmacy Residencies (n = 41)

Program Characteristic	Results
Type of institution, n (%)	
Free-standing children's hospital	14 (34)
Pediatric hospital within a larger health system	27 (66)
Total rotation options (inpatient/outpatient/other), mean $\pm$ SD	17 $\pm$ 4.9
Pediatric ambulatory care rotations, mean $\pm$ SD	3.0 $\pm$ 2.4
Residencies that require a pediatric ambulatory care rotation, n (%)	27 (66)
Block rotation only	4 (9.8)
Longitudinal rotation only	20 (49)
Both block and longitudinal rotations	3 (7.3)
Pediatric ambulatory care rotations completed per resident, mean $\pm$ SD	1.3 $\pm$ 0.8
Weeks each resident spends in a pediatric ambulatory care setting, mean $\pm$ SD*	21 $\pm$ 19
Residency preceptors who practice in pediatric ambulatory care, mean $\pm$ SD	2.7 $\pm$ 3.5
Residency preceptors who practice under a collaborative practice agreement within a pediatric ambulatory care setting, mean $\pm$ SD	0.5 $\pm$ 0.8
Residencies where residents have the option of practicing under a collaborative practice agreement within a pediatric ambulatory care setting, n (%)	6 (15)
The role of the PGY2 pediatric pharmacy resident during ambulatory care rotations, n (%)	
Administering immunizations	1 (2.4)
Antimicrobial stewardship	6 (15)
Comprehensive medication management	25 (61)
Consultation service	22 (54)
Disease state management	14 (34)
Drug information questions	31 (76)
Drug monitoring	29 (71)
Formulary management	12 (29)
Medication histories	31 (76)
Medication therapy management	25 (61)
Medication reconciliation	28 (68)
Medication safety initiatives	13 (32)
Medication use policy development	12 (29)
Prior authorizations	18 (44)
Patient/caregiver education	33 (80)
Physician/other health care provider education	29 (71)
Precept pharmacy students	10 (24)
Precept PGY1 residents	8 (20)
Prescription verification	8 (20)
Research	7 (17)
Starting a new clinical service	6 (15)
Transition to adult care	6 (15)
Other (e.g., specialty pharmacy activities, processing new prescriptions and medication refills, writing prescriptions that providers cosign, profile reviews, revising total parenteral nutrition orders, communicating changes or initiation for home infusion with home infusion providers)	6 (15)
Percentage of residency graduates who practice in the pediatric ambulatory care setting, n (%)	
<25	39 (95)
25–49	1 (2.4)
50–74	0
>75	1 (2.4)*

* May only be a few hours per week as part of a longitudinal ambulatory care rotation.

† New program with 1 graduate.

Figure. Number and types of clinics* available for postgraduate year 2 pediatric pharmacy residency rotations.

*“Other” clinics include those for high-risk obstetrics, transitional care, adolescent medicine, sickle cell disease, pulmonary hypertension, dialysis, special care, neonatal clinic, growth factor, home infusion therapy, heart failure, hypertension, and obesity.

tory setting.

A joint statement from the Pediatric Pharmacy Advocacy Group and the Pediatrics Practice and Research Network of the American College of Clinical Pharmacy recommended that PGY2 pediatric pharmacy residents not only have diversity in their pediatric patient care experiences, but also have exposure to a variety of clinical settings.¹ This supports the need for training in pediatric ambulatory care. The PGY2 pharmacy residency program standards and competency areas for pediatrics were updated most recently in 2016.¹¹ With this update, the goals and objectives now are more broadly applicable to all practice areas of pediatric pharmacy; however, the goals or objectives are not specific to ambulatory care.

For consistency in ambulatory care experiences, it may be beneficial to include a standardized approach to meet the minimum expectations of pediatric ambulatory care experiences for PGY2 pediatric pharmacy residencies. For example, topics could include transitions of care (e.g., inpatient to outpatient, pediatric to adult care), effective patient education techniques, and navigating concerns with access to medications. Additionally, elective competency area E2 involves initiating a pediatric pharmacy–related service.¹¹ Only 15% of programs in our survey reported that starting a

new clinical service was part of the normal activities for the ambulatory care experience. Although not specific to ambulatory care, the goals and objectives in this competency area E2 are paramount to the growth of pediatric ambulatory care services and are required in the PGY2 ambulatory care pharmacy residency standards.¹¹

To advance the profession, board certification in pediatric pharmacy is an ultimate goal of many residents upon completion of a PGY2 pediatric pharmacy residency. The content outline developed by the Board of Pharmacy Specialties in preparation for the Pediatric Pharmacy Specialist Certification exam includes several tasks that may be learned best in the outpatient setting.¹³ They emphasize competency and knowledge of tasks related to patient safety, care transitions, medication access, medication reconciliation, medication adherence, and developmentally appropriate counseling techniques in all patient care settings, specifically naming outpatient encounters. In preparing residents for success with the board certification in the pediatric pharmacy exam, having completed outpatient experiences in sufficient breadth and depth would be beneficial.

Despite a push for growth in ambulatory care pharmacy practice, there are limited data and potential reimbursement issues that may contribute to expansion

challenges specific to pediatrics.^{3,14,15} This may limit the number of preceptors and experiences available to residents. It may also reflect a smaller number of available job openings in pediatric ambulatory care, which could relate to the low proportion of graduating PGY2 pediatric pharmacy residents who practice in an ambulatory care setting. This illustrates the need for increased training in pediatric ambulatory care during residency to prepare more individuals with the skills and confidence necessary to create and establish valuable and justifiable pediatric ambulatory care clinical pharmacy services.

This study investigates the current state of ambulatory care training afforded to postgraduate trainees in pediatric programs. It does not take into account other training programs, which may offer ambulatory care opportunities within pediatrics (e.g., PGY2 ambulatory care, PGY2 oncology at a children's hospital). Additionally, although an 85% survey response rate was achieved, the data set did not include information from 7 residency programs. An area for future study is investigating the disparity between the large percentage of programs requiring pediatric ambulatory care experiences versus the small number of graduates practicing in this field. Is the problem a lack of jobs, or a lack of confidence/desire in residents to accept these types of positions? Ambulatory care practice is an important area for growth in pediatric pharmacy, and increasing the number of pediatric ambulatory care pharmacy practices begins with ensuring robust training experiences for residents. Exposing PGY2 pediatric pharmacy residents to high-quality, collaborative, and innovative ambulatory practice areas will help advance pediatric ambulatory pharmacy services and offer another avenue to provide safe and effective medication use for children.

Conclusion

Ambulatory care experiences in PGY2 pediatric pharmacy residency programs are diverse in number and scope, with most programs offering more inpatient training opportunities compared with outpatient training opportunities. There is an opportunity to expand pediatric ambulatory care rotation offerings, particularly with respect to collaborative drug therapy management and the establishment of new clinical services.

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