

The Pharmacist's Role in the Care of Pediatric Emergency Department Patients

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The Pediatric Pharmacy Association (PPA) strongly urges health care institutions to establish and support the pharmacist's role in pediatric emergency department (ED) settings. Adult patient–centric guidelines have firmly established the general role of the pharmacist and pharmacy services in emergency medicine; however, pediatric pharmacy presence is often considered in case-based scenarios, such as pediatric cardiopulmonary resuscitation events. PPA recommends supporting the pharmacist's role in all pediatric ED settings and scenarios including, but not limited to, participation in direct patient care activities, education, safety, improvement initiatives, and transitions of care. Further, PPA advocates for the provision of appropriate training, credentialing, and ongoing mentorship and competency in these areas.

ABBREVIATIONS ASHP, American Society of Health-System Pharmacists; BPS, Board of Pharmacy Specialties; ED, emergency department; PGY2, postgraduate year 2; PPA, Pediatric Pharmacy Association

KEYWORDS emergency; emergency department; patient care; pediatrics; pharmacist

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Background

Children are particularly susceptible to medication errors, with up to a 3-fold increase in potential adverse drug events when compared with adults.¹ The pediatric emergency department (ED) is well established as a care setting predisposed to medication errors.² Common sources of pediatric medication error include indication, dose calculation, preparation, and administration. However, the inclusion of personnel with relevant experience and medication-related training reduces error rates and promotes safety.³

The role of the pharmacist and pharmacy services in general emergency medicine has been firmly established through guidelines. However, the role of the pediatric pharmacist in the ED has not been fully elucidated.⁴ Rather, pediatric pharmacy presence in the ED is often viewed regarding specific scenario-based situations, including as a supplement to adult-focused EDs or in pediatric cardiopulmonary resuscitation.^{5,6} Scenarios that use cross-area pharmacist coverage, inconsistent staffing, or emergent coverage can lead to errors due to changes in formulary, systems, approaches, or inability to retain practice competency in the ED. When considering the inherent risk of critically or emergently ill pediatric patients in various emergency settings, it is crucial that standards for the provision of pharmacy care be established and met. The purpose of this position statement is to review the rationale for pharmacist provision of care in pediatric emergency medicine,

establish the position of the Pediatric Pharmacy Association (PPA) in support of pediatric pharmacists in all ED settings, and provide recommendations for training and certification.

Rationale

Several national health care organizations support the presence and participation of a dedicated pharmacist in the ED. The American College of Emergency Physicians published a policy statement supporting the incorporation of dedicated pharmacist roles in the ED.⁷ The American Society of Health-System Pharmacists (ASHP) established guidelines describing recommended emergency medicine pharmacy services.⁴ Significant bodies of literature show that pharmacist presence in the ED reduces time to administration of important pharmacotherapeutic agents including, but not limited to, antibiotics, anticoagulants, and antidotes.^{8–10} However, despite advocacy from the American Academy of Pediatrics,² there remains a paucity of support for pharmacist participation in the pediatric ED. Additionally, while guidelines recommend that emergency medicine pharmacists maintain certifications in basic life support, advanced cardiovascular life support, and pediatric advanced life support, guidance on specific pediatric training is generally limited or omitted.

While PPA acknowledges that around-the-clock pharmacist staffing may not be feasible in all pediatric emergency settings, minimum practice recommendations

have been established in the adult population and could be incorporated for the pediatric population.^{4,7} For example, adult-focused literature describes pharmacist involvement in therapeutic optimization, timely drug information responses, turnaround time, throughput, staff education, patient education, process improvement, and medication reconciliation. These areas are directly relevant to the pediatric ED setting. Therefore, PPA supports the following recommendations for pharmacist care in pediatric emergency care settings.

Recommendations

Participation in Direct Patient Care Activities.

PPA advocates that pharmacists participate in direct pediatric patient care activities in the ED. Further, PPA supports the integration of pharmacists in pediatric EDs to the greatest time extent possible, as critically or emergently ill patients represent populations that can significantly benefit from pharmacist presence. A multicenter, prospective study of United States–based pediatric clinical ED and intensive care unit pharmacists reviewed the impact of pediatric pharmacy services.¹¹ During the trial period, 19 pediatric pharmacists documented approximately 1500 accepted interventions on 861 critically ill patients, resulting in a potential annual cost avoidance of almost 1 million dollars, and a potential avoidance to pharmacist salary ratio ranging from \$1.5:1 to \$5.2:1. Therefore, the provision of pharmacist participation in direct patient care activities can be incentivized as a cost-savings model.

A second study examined an ED initiative in which an ASHP and PPA combined guideline was used to create pediatric practice elements in a primarily adult ED.⁵ From the pooled guideline, 93 practice elements, organized by 9 practice standards, were initially selected for pharmacy service implementation, such as practice management, policy development, therapy optimization, and medication delivery and monitoring; 6 of these elements were ultimately excluded from analysis because they were deemed not applicable to the study site's practice model. Results showed that many of these pharmacy service practice elements (59.8%) were fully compliant at initial assessment as compared with the pooled guidelines, with an almost 20% increase in full compliance at final assessment. Examples of compliance gaps identified included items such as pediatric pharmacist involvement in emergency preparedness and pediatric antimicrobial stewardship. These standards may provide the basis for compliance analysis or serve as a potential blueprint for other pediatric EDs.

Additional considerations support direct pharmacist care in the pediatric ED. First, specific guidance exists to support pediatric pharmacist participation in cardiopulmonary resuscitation events.⁶ Next, the observed trend toward overcrowding can affect the number of boarding patients in the ED. One retrospec-

tive review showed that pediatric patients boarding in the ED for more than 8 hours experience increased risks of medication delays and omissions.¹² A second study showed that the presence of omission errors increased with antipsychiatric medications after 6 hours in the pediatric ED.¹³ The presence of a pediatric pharmacist may decrease these and other medication errors. Finally, when needed to supplement direct patient care, remote review or telepharmacy may be considered as appropriate.²

Participation in Education, Safety, and Improve-

ment. PPA recommends pharmacist participation in staff education, medication safety, process improvement, and disaster preparedness, as it pertains to pediatric emergency medicine. As medication error origins have been well established in pediatric emergency settings, pharmacist participation in education, safety, and process improvement is vital.^{2,3} Pharmacists are encouraged to provide education, training, and mentorship to other health care personnel in areas including, but not limited to, the medication use process, direct patient care, harm reduction, and emergency scenario response. Training and mentorship may also be tailored via formative and summative feedback. Extensive opportunity exists for improved training and education in any core pediatric pharmacy curriculum, especially as it relates to medication safety.¹⁴

Subspecialty opportunities for ED pharmacist involvement exist in the pediatric ED setting, including the role of the pediatric ED pharmacist in disaster preparedness. An observational study specifically assessed pediatric pharmacist participation in a disaster preparedness simulation.¹⁵ Ten total ED pharmacists participated in mass casualty simulations as participants, and 7 total administrative pharmacy members functioned as observers to assess pharmacists' learning during the simulation. Pharmacist performance was viewed as concise and prompt in at least 63% of observer ratings in the domains of communication, pharmacotherapy, problem solving, and teamwork. As training expands, pediatric pharmacists stand to provide significant value during mass casualty events.

Provision of Transitions of Care. PPA supports pharmacist participation during all instances of transitions of care in the ED. It is established that medication regimens are frequently adjusted upon care transitions, and positive outcomes related to pharmacist participation in medication reconciliation for adult populations are well documented.^{16,17} While literature involving pediatric ED patients is lacking, studies in other practice areas have demonstrated improvement in outcomes when a pharmacist participates in medication reconciliation across transitions of care. One retrospective review demonstrated that pharmacist involvement in medically complex pediatric patients' discharge medications optimized and improved regimen accuracy via patient

Table 1. Recommendations for Credentialing, Training, and Continuous Quality Improvement for Pediatric Pharmacists in the Emergency Department

Recommendation	Description
Certification and credentialing BLS PALS ACLS	Standard for all pharmacy staff ⁶ Standard for all pharmacy staff ⁶ Standard for all pharmacy staff
Mentorship and training Ongoing mentorship ⁶	New pharmacists and residents should be paired with experienced practitioners; periodic formative and summative review should occur
Simulation training	Incorporate the use of clinical educators or mentors to provide initial training and ongoing competency in simulated experiences (e.g., mock codes, and disaster preparedness)
Competency training and review	See Table 2; additional areas may include certifications or digital badges from national organizations; national policy or position statement review
Continuous quality improvement Direct representation	Participate in relevant committees, task forces, initiatives, and policy development
Ongoing formative and summative feedback ⁶	Participate in quality improvement initiatives; perform ongoing competency assessment; standardized periodic performance review

ACLS, Advanced Cardiac Life Support; BLS, Basic Life Support; PALS, Pediatric Advanced Life Support

education, provider consultation, dose or therapeutic change, monitoring, or other methods.¹⁸ A second study demonstrated that approximately 4 medication discrepancies exist per patient in a pediatric primary care setting, representing opportunity for pharmacist intervention.¹⁹ Finally, a recent review describes a proposed process and mechanism to support pharmacist-led transitions of care during pediatric patient discharge.²⁰ Therefore, pediatric pharmacist participation in ED transitions of care should improve medication and clinical outcomes.

Provision of Training. PPA asserts that pharmacists participating in emergency medicine provision of care have pediatric training, certification, and/or equivalent experience. PPA supports that pediatric-focused ED settings require a minimum of postgraduate year 2 (PGY2) pediatric residency, or equivalent experience or training.²¹ Equivalent training may include pediatric, pediatric critical care, or pediatric emergency medicine–focused experiences that establish a minimum requirement for core competency.²² In a clinical setting that combines adult and pediatric services, a minimum of 1 or more of the following should be required: completion of a PGY2 pediatric residency, and/or PGY2 critical care or emergency medicine residency from a program that includes pediatric experience, and/or equivalent experience or training. Advanced certification such as the pediatric pharmacy specialty certification, or equivalent by practice pathway, such as an emergency medicine specialty certification designated by the Board of Pharmacy Specialties (BPS), is strongly recommended.²³ Ongoing areas for monitoring and competency as described in Tables 1 and 2 should be assessed.²⁴

Ongoing competency, training, and mentorship for any ED pharmacists who work in settings that do not regularly provide care to pediatric patients should exist (Table 1). Suggested core topic areas for continuing education are included but not limited to those described in Table 2.²⁴ Conversely, similar adult-focused

Table 2. Suggested Topics for Review and Core Competency Pertaining to Pediatric Care in the Emergency Department*

Cardiopulmonary resuscitation
Diabetic ketoacidosis
Neonatal fever/sepsis
Pediatric hematologic/oncologic emergencies
Pediatric psychiatric emergencies
Pediatric pain and sedation
Pediatric shock/sepsis
Obstetric emergencies
Status asthmaticus
Status epilepticus
Toxicology/overdose
Trauma stabilization
Traumatic brain injury

* Baseline pediatric principles should be included in core competency reviews (e.g., calculations, fluid and electrolytes, and medication use safety principles).

competencies should exist for ED pharmacists who work in pediatric EDs that do not regularly provide care to adult patients.

Conclusion

In summary, PPA recommends establishing pharmacy presence in all pediatric emergency settings. PPA encourages all emergency settings to define, adopt, and adhere to policies and procedures that support pharmacist integration into pediatric patient care activities. Significant evidence exists in the adult literature to provide guidance and structure for ED pharmacist training and responsibilities and requires enhanced support in the pediatric literature. PPA further recommends appropriate staffing, training, advanced certification such as that issued by BPS, and competency for all pharmacists providing care in the pediatric emergency setting. This training will ensure that pharmacists working in pediatric ED settings can be meaningfully involved in direct patient care activities including transitions of care and staff education, enhanced process improvement, and medication safety promotion within this population.

Article Information

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References

1. Kaushal R, Bates D, Landrigan C, et al. Medication errors and adverse drug events in pediatric inpatients. *JAMA*. 2001;285(16):2114–2120.
2. Benjamin L, Frush K, Shaw K, et al. Pediatric medication safety in the emergency department. *Pediatrics*. 2018;141(3):e20174066.
3. Kaufmann J, Laschat M, Wappler F. Medication errors in pediatric emergencies—a systematic analysis. *Dtsch Arztebl Int*. 2012;109(38):609–616.
4. Ortmann MJ, Giesler Johnson E, Jarrell DH, et al. ASHP guidelines on emergency medicine pharmacist services. *Am J Health Syst Pharm*. 2021;78(3):261–275.
5. Hachem SN, Thomson JM, Heigham MK, MacDonald NC. Improving pediatric pharmacy services in a primarily adult emergency department. *Am J Health Syst Pharm*. 2022;79(suppl 2):S53–S64.
6. Johnson PN, Mitchell-Van Steele A, Nguyen AL, et al. Pediatric pharmacists' participation in cardiopulmonary resuscitation events. *J Pediatr Pharmacol Ther*. 2018;23(6):502–506.
7. ACEP Board of Directors. Pediatric pharmacists' participation in clinical pharmacist services in the emergency department. *Ann Emerg Med*. 2015;66(4):444–445.
8. Brisben TM, Maldonado CR, Bruner MM, et al. Emergency department pharmacist impact on time to administration of heparin: a brief report. *J Pharm Pract Res*. 2023;53(3):143–146.
9. Masic D, Hidalgo DC, Kuhrau S, et al. Pharmacist presence decreases time to prothrombin complex concentrate in emergency department patients with life-threatening bleeding and urgent procedures. *J Emerg Med*. 2019;57(5):620–628.
10. Moussavi K, Nikitenko V. Pharmacist impact on time to antibiotic administration in patients with sepsis in an ED. *Am J Emerg Med*. 2016;34(11):2117–2121.
11. Kiskaddon AL, Smith MM, Gilliland F, Rech MA. Pharmacist avoidance or reductions in medical costs in critically and emergently ill pediatrics: PHARM-PEDS study. *Crit Care Explor*. 2023;5(10):e0980.
12. Marconi GP, Claudius I. Impact of an emergency department pharmacy on medication omission and delay. *Pediatr Emerg Care*. 2012;28(1):30–33.
13. Sethuraman U, Kannikeswaran N, Farooqi A, et al. Antipsychiatric medication errors in children boarded in a pediatric emergency department. *Pediatr Emerg Care*. 2021;37(9):e538–e542.
14. Guidelines for improving pediatric safety. Emergency Medical Services for Children Innovation and Improvement Center. 2024. Accessed October 4, 2024. <https://emscimprovement.center/domains/pediatric-readiness-project/readiness-toolkit/readiness-toolkit-checklist/safety/>
15. Marks K, Chung S, Li J, et al. Experience of pharmacy involvement in a disaster simulation exercise within a pediatric hospital emergency department: a pilot project. *Am J Health Syst Pharm*. 2022;79(9):e124–e134.
16. Redmond P, Grimes TC, McDonnell R, et al. Impact of medication reconciliation for improving transitions of care (review). *Cochrane Database Syst Rev*. 2018;8:CD010791.
17. Mekonnen AB, McLachlan AJ, Brien JE. Effectiveness of pharmacist-led medication reconciliation programmes on clinical outcomes at hospital transitions: a systematic review and meta-analysis. *BMJ Open*. 2016;6(2):e010003.
18. Lingle A, Baker B, Williams K, et al. Effect of pharmacy involvement in transitions of care for children with medical

- complexity. *J Pediatr Pharmacol Ther.* 2023;28(4): 348–353.
19. Condren M, Bowling S, Hall B, et al. Medication reconciliation across care transitions in the pediatric medical home. *Jt Comm J Qual Patient Saf.* 2019;45(8):536–542.
 20. Hovey SW, Cho HJ, Kain C, et al. Pharmacist-led discharge transitions of care interventions for pediatric patients: a narrative review. *J Pediatr Pharmacol Ther.* 2023;28(3):180–191.
 21. Meyers RS, Costello-Curtin J. Implementing a pediatric pharmacy educational program for health-system pharmacists. *Am J Pharm Educ.* 2011;75(10):205.
 22. Boucher EA, Burke MM, Johnson PN, et al. Minimum requirement for core competency in pediatric pharmacy practice. *J Pediatr Pharmacol Ther.* 2015;20(6): 481–484.
 23. Board of Pharmaceutical Specialties. 2024. Accessed April 17, 2024. <https://bpsweb.org>
 24. Small L, Schuman A, Reiter PD. Training program for pharmacists in pediatric emergencies. *Am J Health Syst Pharm.* 2008;65:649–654.