



CPPI Practice Forum

Implementation of pharmacist-administered pediatric vaccines in the United States: major barriers and potential solutions for the outpatient setting

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INTRODUCTION

Pharmacists working in outpatient settings are in a prime position to improve pediatric vaccination rates by recommending, administering, or educating families and patients about vaccines. Pediatric vaccination rates are less than optimal in the United States (U.S.), many falling short of the goals set forth by Healthy People 2020, which may be contributing to pediatric morbidity and mortality.¹ For the 2018-2019 influenza season, less than half of children indicated for vaccination with the influenza vaccine were vaccinated by December and 101 influenza-associated pediatric deaths have occurred as of April 2019.^{2,3} For the adolescent population, fewer than 50% received the complete series of human papillomavirus (HPV) vaccine in 2017 and this same demographic had the lowest influenza vaccination rate of all pediatric age groups at 47.4% in the 2017-2018 influenza season.^{4,5}

As more than 90% of the U.S. population lives within two miles of a community pharmacy, pharmacies present an accessible option to improve pediatric vaccination rates and capacity.⁶ Beyond location, community pharmacies offer parents and patients a number of other convenience-

related benefits, including extended hours of operation, no need for appointments, and locations outside of healthcare facilities.⁷⁻⁹ Moreover, these conveniences may be especially helpful for routine adolescent vaccinations that require multiple doses at differing intervals, including the HPV and meningococcal vaccines, or for non-routine pediatric vaccinations that are not typically stocked in physician offices, such as travel vaccines or the pneumococcal polysaccharide vaccine.¹⁰ Though literature regarding the effectiveness of pediatric vaccination interventions by community pharmacists is notably lacking, studies have consistently demonstrated improved adult vaccination rates with community pharmacy involvement.¹¹⁻¹⁶ States with pharmacist vaccination authority overall have higher adult influenza vaccination rates than those without.¹⁵ One could expect similar success of improving vaccination rates in the pediatric population with increased authority for pharmacists.

The Pediatric Pharmacy Advocacy Group (PPAG) released a position paper in 2018 outlining recommendations for increased authority, documentation, advocacy, and continuing education (CE) for pharmacist-administered pediatric vaccines.¹⁷ The recommendations focus on pharmacist and student pharmacist ability to administer influenza, pneumococcal, meningococcal, and HPV vaccines to pediatric patients. Despite advocating for pharmacist involvement in administering vaccines to pediatric patients across all practice sites, the position paper did not discuss how best to implement this service and how student pharmacists should be trained to administer pediatric vaccinations within Doctor of Pharmacy (PharmD) curricula.¹⁷ This article will discuss the implementation of the PPAG position paper recommendations, including key barriers in outpatient settings and potential strategies to successfully incorporate the recommendations into practice. Although other barriers may exist, this article will discuss the regulatory, attitudinal, and logistical barriers associated with pharmacist-administered pediatric vaccines in outpatient settings.

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BARRIERS TO PHARMACIST-ADMINISTERED VACCINES IN OUTPATIENT SETTINGS AND POTENTIAL SOLUTIONS

Regulatory barriers

The PPAG position paper summarizes state-based regulations regarding pharmacist authority to administer pediatric vaccines; therefore, these regulations will not be extensively discussed in this piece.¹⁷ In short, the regulations for pharmacist-administered pediatric vaccines vary significantly according to state. Many states have certain age restrictions for pediatric patients, only give authority for certain vaccines (i.e., influenza vaccine), or may only be administered by a pharmacist via prescription. In fact, very few allow pharmacists to administer any vaccine to any pediatric patient via prescriber protocol.¹⁸ Moreover, student pharmacist authority to vaccinate pediatric patients cannot be assumed based on the authority for pharmacists. Since publication of the position paper, however, states continue to propose and pass legislation to expand pharmacist authority to administer pediatric vaccines highlighting the need to educate and train student pharmacists on administering pediatric vaccines.^{19,20} Currently, only three states (Connecticut, Florida, and Vermont) do not allow pharmacists to administer any vaccine to a pediatric patient, suggesting that the vast majority of students will enter into practice with the authority to administer pediatric vaccines.¹⁸ As such, Schools of Pharmacy should prepare their students for this practice because some students may relocate to a state where pharmacists have authority to administer pediatric vaccines or the legislation in that particular state may change, as evidenced by the trend over the past two decades of increased pharmacist authority to administer vaccines.²¹

Presently, under the direct supervision of a pharmacist, student pharmacists have varied authority to vaccinate pediatric patients.¹⁸ The American Pharmacist Association Pharmacy-Based Immunization Delivery Program, which the majority of Schools of Pharmacy use to train student pharmacists, focuses on the practical administration of vaccines to adults only.²² For pediatric vaccines, students in the program are trained only on immunization schedules and vaccine drug information, but do not practice pediatric injection technique. Therefore, student pharmacists may possess low baseline levels of confidence and comfort in administering pediatric vaccines, which was reported in a majority of students surveyed at one School of Pharmacy.²³ To increase confidence and comfort, Schools of Pharmacy should offer opportunities, as state legislation allows, for student pharmacists to train in pediatric vaccine administration. Experiential pharmacy education and service learning present opportunities to incorporate hands-on pediatric vaccine practice. Outside of coursework, states should expand student pharmacist authority to administer pediatric vaccines to gain practice-based experience, as was recently done in the state of Wisconsin.²⁴

Attitudinal Barriers

Physician and parental attitudes may add an additional barrier for pharmacist-administered pediatric vaccines, regardless of legislative authority. Pediatricians surveyed in

one study agreed that community pharmacies offer non-traditional delivery sites that could increase vaccination rates, but they expressed concerns about decreased opportunities for follow-up care and lack of comfort with pharmacists administering vaccines to their patients.²⁵ Another study reported pediatricians and family medicine physicians' concerns about inaccurate or incomplete vaccination records.²⁶ Additional evidence suggested that physician buy-in with pharmacist-administered HPV vaccination was higher with family medicine physicians than with pediatricians, suggesting that family medicine clinics may be more conducive to expanded pharmacist-administered pediatric immunizations.²⁷ Community pharmacists could begin by collaborating with physician offices to offer subsequent doses of a vaccine series (e.g., HPV, meningococcal) to patients who received the first dose at their providers' office. Such collaborations would allow the physicians to keep the adolescent well-child visit while also promoting receptivity among physicians and enabling the follow-up dose(s) to be at the convenience of the patient in a community pharmacy setting. In the ambulatory care setting, post-graduate training or board certification in ambulatory care or pediatrics may improve physician comfort with pharmacist-administered pediatric vaccines. Moreover, the creation of a pediatric immunization delivery program for pharmacists could improve physician receptivity, as well as improve comfort and confidence for pharmacists and student pharmacists alike. Additional evidence on the impact of pharmacist involvement on pediatric health outcomes is likely to further increase physician receptivity of the expansion of pharmacist-administered pediatric vaccinations.

At the parent level, previous studies have reported that fewer than half of parents are willing to bring their child to be vaccinated by a pharmacist, although this percentage may be higher for parents of adolescents, with a large majority of parents in one study endorsing pharmacist-administered HPV vaccination.²⁷⁻²⁹ Parental concerns may reflect a lack of awareness of pharmacist authority to administer vaccines or perceptions that physician offices are safer places for vaccination.^{28,30} Indeed, Shah *et al.* reported that parents who expressed higher satisfaction with their pharmacies and higher belief in pharmacist competence were significantly more likely to endorse pharmacist-administered HPV vaccines.²⁷ Although beyond the scope of this article, vaccine hesitancy among parents is another major contributing factor to suboptimal pediatric vaccination rates, in which pharmacists could play a key role in educating and debunking myths associated with vaccines.^{31,32} Evidence suggests that increasing parental familiarity and experience with pharmacist-administered vaccinations through advocacy may effectively improve parental buy-in.³³

Logistical barriers

Missed opportunities for vaccination are a clinically relevant risk factor for pediatric patients in the U.S. and preliminary studies suggest that pharmacists can reduce missed vaccination opportunities and vaccine errors in the pediatric ambulatory care setting.³⁴⁻³⁶ One study comparing two pediatric clinics in a health-system setting found a significantly reduced number of missed vaccine opportunities and vaccine-related error rates in the clinic

with a pharmacist compared to the clinic without a pharmacist.³⁵ Furthermore, in a study of pharmacist involvement on an adult primary care team, the pharmacist significantly improved immunization rates for influenza and tetanus-diphtheria-acellular pertussis vaccines by performing an immunization needs assessment, informing the patient of their vaccine needs, and administering the vaccine compared to other non-pharmacist clinicians.¹¹ A major barrier to pharmacist-administered vaccines in an ambulatory care setting is the workflow within clinics, depending on the clinic type. Nurses typically provide vaccines based on physician recommendations in pediatrician offices. Family medicine clinics may or may not have an established immunization workflow. In either clinic setting, pharmacists may not be involved in the immunization practices, if one is present in the clinic at all. As noted previously, pharmacists in family medicine clinics would be an ideal starting place for this kind of service to enhance pediatric care while decreasing appointment burden on other healthcare professionals. Pharmacists interested in expanding their role in pediatric immunizations in the ambulatory care setting should begin the discussion with their practice site's providers on the need for and evidence supporting additional pharmacist involvement. Depending on the clinic workflow and space, pharmacists could offer specific clinic days for annual influenza vaccinations or for recommending and administering back-to-school immunizations. Although this preliminary evidence for pharmacist involvement in clinic-based pediatric immunization services is positive, more rigorous studies may be needed to further expand practice in the U.S.

Another logistical barrier occurs predominantly in the community pharmacy setting. Pediatric patients less than two years of age require specific positioning for injections into the anterolateral thigh muscle. Additionally, pediatric patients may have a fear of injections further necessitating an additional set of hands to safely position the child to receive a vaccine. Community pharmacists are sometimes the sole healthcare professional at a location, limiting the availability of qualified personnel to assist with this positioning during vaccinations. Anecdotally, families note difficulty finding a pharmacist in the community willing to administer a pediatric vaccine to younger patients, which diminishes the convenience factors mentioned previously. For pharmacists already in practice, CE on the proper anchoring technique for administering vaccines to pediatric patients, especially for those less than two years of age, in addition to the education of student pharmacists discussed

previously, could reduce the impact of this barrier. Finally, pharmacies should review their current workflow for adult immunizations and consider the necessary changes needed to accommodate pediatric vaccinations, including screenings for weight and vaccine appropriateness or additional documentation to ensure regulatory compliance.

Finally, complete and accurate immunization documentation is a problem that is not limited to pharmacist-administered vaccines. Electronic medical records are rarely available to clinicians outside a particular health-system and immunization information systems (IIS) may be limited by lack of widespread use.^{37,38} Continued advocacy at the state level for pharmacist access to IIS would facilitate pharmacist involvement in administering pediatric vaccines in any outpatient setting. Access to IIS could allow pharmacists to evaluate the vaccine needs of a pediatric patient and the ability to document in IIS would improve vaccine record accuracy and continuity across delivery sites, which may also improve physicians' receptivity.

CONCLUSION

Pharmacists are well positioned to play a key role in tackling the public health concern of low pediatric vaccination rates, as discussed in the 2018 PPAG position paper. The position paper has stimulated conversations surrounding pharmacist-administered pediatric vaccines by outlining recommendations for increased authority, documentation, advocacy, and CE. While there are many barriers to the practical implementation of the PPAG recommendations, outpatient settings are poised to assist in improving pediatric vaccination rates, starting with overcoming the regulatory, attitudinal, and logistical barriers to pharmacist-administered pediatric vaccines. Pharmacists and pharmacy educators should reference the opportunities and strategies in the context of outpatient settings presented here to more effectively incorporate the PPAG recommendations into their practice sites and PharmD curricula.

CONFLICT OF INTEREST

None to declare.

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References

1. Office of Disease Prevention and Health Promotion. Healthy People 2020 - Immunization and Infectious Diseases. <https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases> (accessed April 29, 2019).
2. Jenco M. CDC: Flu vaccination rates improved, still too low. AAP News. <https://www.aappublications.org/news/2018/12/14/flu vaccine121418> (accessed May 5, 2019).
3. Centers for Disease Control and Prevention. Situation Update: Summary of Weekly FluView Report. <https://www.cdc.gov/flu/weekly/summary.htm> (accessed May 30, 2019).
4. Walker TY, Elam-Evans LD, Yankey D, Markowitz LE, Williams CL, Mbaeyi SA, Fredua B, Stokley S. National, regional, state, and selected local area vaccination coverage among adolescents aged 13-17 Years - United States, 2017. *MMWR Morb Mortal Wkly Rep.* 2018;67(33):909-917. <https://doi.org/10.15585/mmwr.mm6733a1>
5. Centers for Disease Control and Prevention. Estimates of Flu Vaccination Coverage among Children — United States, 2017–18 Flu Season. <https://www.cdc.gov/flu/fluview/coverage-1718estimates-children.htm#figure1> (accessed May 30, 2019).

6. Drug Store News. Rx Impact: A Drug Store News Special Report. http://www.drugstorenews.com/sites/drugstorenews.com/files/rximpact_2016_0.pdf (accessed May 30, 2019).
7. Skelton JB; American Pharmacists Association; Academy of Managed Care Pharmacy. Pharmacist-provided immunization compensation and recognition: white paper summarizing APhA/AMCP stakeholder meeting. *J Am Pharm Assoc* (2003). 2011;51(6):704-712. <https://doi.org/10.1331/JAPhA.2011.11544>
8. Bach AT, Goad JA. The role of community pharmacy-based vaccination in the USA: current practice and future directions. *Integr Pharm Res Pract*. 2015;4:67-77.
9. Goad JA, Taitel MS, Fensterheim LE, Cannon AE. Vaccinations administered during off-clinic hours at a national community pharmacy: implications for increasing patient access and convenience. *Ann Fam Med*. 2013;11(5):429-436. <https://doi.org/10.1370/afm.1542>
10. Houle SK. Pharmacy travel health services: current perspectives and future prospects. *Integr Pharm Res Pract*. 2018;7:13-20.
11. Higginbotham S, Stewart A, Pfalzgraf A. Impact of a pharmacist immunizer on adult immunization rates. *J Am Pharm Assoc* (2003). 2012;52(3):367-371. <https://doi.org/10.1331/JAPhA.2012.10083>
12. Otsuka SH, Tayal NH, Porter K, Embi PJ, Beatty SJ. Improving herpes zoster vaccination rates through use of a clinical pharmacist and a personal health record. *Am J Med*. 2013 Sep;126(9):832. <https://doi.org/10.1016/j.amjmed.2013.02.018>
13. Isenor JE, Edwards NT, Alia TA, Slayter KL, MacDougall DM, McNeil SA, Bowles SK. Impact of pharmacists as immunizers on vaccination rates: A systematic review and meta-analysis. *Vaccine*. 2016;34(47):5708-5723. <https://doi.org/10.1016/j.vaccine.2016.08.085>
14. Hogue MD, Grabenstein JD, Foster SL, Rothholz MC. Pharmacist involvement with immunizations: a decade of professional advancement. *J Am Pharm Assoc* (2003). 2006;46(2):168-179. <https://doi.org/10.1331/154434506776180621>
15. Drozd EM, Miller L, Johnsrud M. Impact of pharmacist immunization authority on seasonal influenza immunization rates across states. *Clin Ther*. 2017;39(8):1563-1580. <https://doi.org/10.1016/j.clinthera.2017.07.004>
16. Baroy J, Chung D, Frisch R, Apgar D, Slack MK. The impact of pharmacist immunization programs on adult immunization rates: A systematic review and meta-analysis. *J Am Pharm Assoc* (2003). 2016;56(4):418-426. <https://doi.org/10.1016/j.japh.2016.03.006>
17. Meyers R, Weinhau J, Holmes A, Giroto JE. Advocacy Committee on behalf of the Pediatric Pharmacy Advocacy Group. Position Paper: Pharmacists and Childhood Vaccines. *J Pediatr Pharmacol Ther*. 2018;23(4):343-346. <https://doi.org/10.5863/1551-6776-23.4.343>
18. American Pharmacist Association. Pharmacist Administered Vaccines. 2019. https://media.pharmacist.com/practice/IZ_Authority_012019_corrected_April_2019.pdf (accessed May 30, 2019).
19. New York Board of Pharmacy. Pharmacists as Immunizers. https://www.health.ny.gov/prevention/immunization/providers/pharmacists_as_immunizers.htm (accessed April 30, 2019).
20. General Assembly of North Carolina. Immunizing Pharmacists. 2019. <https://www.ncleg.gov/Sessions/2019/Bills/House/PDF/H388v2.pdf> (accessed June 10, 2019).
21. Schmit CD, Penn MS. Expanding state laws and a growing role for pharmacists in vaccination services. *J Am Pharm Assoc* (2003). 2017;57(6):661-669. <https://doi.org/10.1016/j.japh.2017.07.001>
22. Prescott WA, Bernhardt C. Immunization Education in US Pharmacy Colleges and Schools. *Am J Pharm Educ*. 2017 [ahead of print]. <https://doi.org/10.5688/ajpe6765>
23. Terriff CM, McKeirnan K. Training student pharmacists to administer emergency pediatric influenza vaccine: A comparison of traditional vs. just-in-time training. *Curr Pharm Teach Learn*. 2017;9(4):560-567. <https://doi.org/10.1016/j.cptl.2017.03.006>
24. Wisconsin Legislature. Wisconsin Act 42. 2017. <http://docs.legis.wisconsin.gov/2017/related/acts/42> (accessed April 29, 2019).
25. Kempe A, Wortley P, O'Leary S, Crane LA, Daley MF, Stokley S, Babbal C, Dong F, Beaty B, Seewald L, Suh C, Dickinson LM. Pediatricians' attitudes about collaborations with other community vaccinators in the delivery of seasonal influenza vaccine. *Acad Pediatr*. 2012;12(1):26-35. <https://doi.org/10.1016/j.acap.2011.07.004>
26. Saville AW, Szilagyi P, Helmkamp L, Albertin C, Gurfinkel D, Vangela S, Dickinson LM, Zhou X, Roth H, Kempe A. Potential strategies to achieve universal influenza vaccination for children: provider attitudes in two states. *Acad Pediatr*. 2018;18(8):873-881. <https://doi.org/10.1016/j.acap.2018.07.003>
27. Shah PD, Calo WA, Marciniak MW, Gilkey MB, Brewer NT. Support for pharmacist-provided HPV vaccination: National surveys of U.S. physicians and parents. *Cancer Epidemiol Biomarkers Prev*. 2018;27(8):970-978. <https://doi.org/10.1158/1055-9965.EPI-18-0380>
28. Calo WA, Gilkey MB, Shah P, Marciniak MW, Brewer NT. Parents' willingness to get human papillomavirus vaccination for their adolescent children at a pharmacy. *Prev Med*. 2017;99:251-256. <https://doi.org/10.1016/j.ypmed.2017.02.003>
29. Rand CM, Humiston SG, Schaffer SJ, Albertin CS, Shone LP, Blumkin AK, Stokley S, Szilagyi PG. Parent and adolescent perspectives about adolescent vaccine delivery: practical considerations for vaccine communication. *Vaccine*. 2011;29(44):7651-7658. <https://doi.org/10.1016/j.vaccine.2011.08.002>
30. Shah PD, Marciniak MW, Golden SD, Trogdon JG, Golin CE, Brewer NT. Pharmacies versus doctors' offices for adolescent vaccination. *Vaccine*. 2018;36(24):3453-3459. <https://doi.org/10.1016/j.vaccine.2018.04.088>
31. Evrony A, Caplan A. The overlooked dangers of anti-vaccination groups' social media presence. *Hum Vaccines Immunother*. 2017;13(6):1475-1476. <https://doi.org/10.1080/21645515.2017.1283467>
32. American Academy of Pediatrics. Joint Statement Supporting the VACCINES Act. <http://www.aap.org/en-us/about-the-aap/aap-press-room/pages/Joint-Statement-Supporting-the-VACCINES-Act.aspx> (accessed June 10, 2019).
33. Deshpande M, Schauer J, Mott DA, Young HN, Cory P. Parents' perceptions of pharmacists as providers of influenza vaccine to children. *J Am Pharm Assoc* (2003). 2013;53(5):488-495. <https://doi.org/10.1331/JAPhA.2013.13017>
34. Bardenheier BH, Yusuf HR, Rosenthal J, Santoli JM, Shefer AM, Rickert DL, Chu SY. Factors associated with underimmunization at 3 months of age in four medically underserved areas. *Public Health Rep*. 2004;119(5):479-485. <https://doi.org/10.1016/j.phr.2004.07.005>

35. Haas-Gehres A, Sebastian S, Lamberjack K. Impact of pharmacist integration in a pediatric primary care clinic on vaccination errors: A retrospective review. *J Am Pharm Assoc* (2003). 2014;54(4):415-418. <https://doi.org/10.1331/JAPhA.2014.13094>
36. Wise KA, Sebastian SJ, Haas-Gehres AC, Moore-Clingenpeel MD, Lamberjack KE. Pharmacist impact on pediatric vaccination errors and missed opportunities in the setting of clinical decision support. *J Am Pharm Assoc* (2003). 2017;57(3):356-361. <https://doi.org/10.1016/j.japh.2017.02.025>
37. Centers for Disease Control and Prevention. Vaccination Records. <https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/records.html> (accessed June 10, 2019).
38. Martin DW, Lowery NE, Brand B, Gold R, Horlick G. Immunization information systems: a decade of progress in law and policy. *J Public Health Manag Pract*. 2015;21(3):296-303. <https://doi.org/10.1097/PHH.000000000000040>