

Improving Youth Confidence in Using Asthma Medication Devices Correctly: An Important Step Toward Improving Health Outcomes



Betsy Sleath, PhD^{a,b} Chapel Hill, NC

Previous work has found that using inhalers correctly can be a challenge for youth¹ and that youth are often overconfident in their ability to use their inhaled asthma medications correctly.² Caregivers also are not confident that their children have correct inhaler technique, with close to 26% of caregivers reporting a concern that their child is not using them correctly.³ Sleath et al³ found that approximately 25% of youth reported not being sure whether they were using their inhalers correctly, which is similar to previous findings that were reported using data that were almost 10 years old.⁴ It is concerning that these numbers have not changed over a decade.

The guidelines of the National Asthma Education and Prevention Program of the National Heart, Lung, and Blood Institute state that providers should teach patients and their families medication skills such as inhaler technique during medical visits.⁵ The guidelines also emphasize that the providers should demonstrate proper inhaler technique and have the child return the demonstration.⁵ If providers ask youth to demonstrate inhaler technique during visits, providers can assess and then correct the technique if needed. However, provider education on how to assess and provide feedback on asthma medication device technique may be needed first. Also, youth might be embarrassed to admit to their providers that they do not know how to use their inhalers.

An alternative setting where inhaler technique can be assessed and taught to children is in schools. Geryk et al⁶ conducted a systematic review of school-based interventions that included inhaler technique; only 9 studies met inclusion criteria. School nurses implemented inhaler technique instruction in 6 of the 9 studies; inhaler technique instruction ranged from 15 minutes to 1 hour.⁶

In this issue of the *Journal of Allergy and Clinical Immunology: In Practice*, Volerman et al⁷ present a prospective quasiexperimental study of 64 children ages 8 to 14 years with physician-diagnosed asthma who were identified during school-based screening and were primarily black. An asthma educator assessed baseline inhaler technique and then taught and assessed inhaler technique using teach-to-goal.^{8,9} In previous work, teach-

to-goal has been shown to improve inhaler technique and to reduce acute respiratory events 30 days after discharge among adults with asthma or chronic obstructive pulmonary disease in hospital settings.^{8,9} The Volerman et al⁷ study is the first project to use teach-to-goal in a school setting with youth. In this study, the asthma educators tailored the education they provided to the needs of the youth. The proportion of youth misusing their inhalers decreased significantly from 97% to 17% post teach-to-goal and mastery improved from 2% to 75%.⁷

A limitation of the Volerman et al⁷ study is that it examined improvement in inhaler technique only immediately after the intervention. Future research needs to examine how teach-to-goal programs aimed at youth impact their inhaler technique, medication adherence, and health outcomes longitudinally. Another limitation of the study is that only 64 of the 189 eligible youth participated. In addition, the youth who participated were primarily black. Future research should use teach-to-goal with youth from diverse racial and ethnic groups and with youth who speak languages other than English.

The Volerman et al⁷ study was conducted in an urban area (Chicago's South Side). Previous work has found that rural school nurses were less likely than urban school nurses to have had asthma training.¹⁰ Future research should examine new ways to improve youth inhaler technique in both urban and rural areas.

Despite the limitations, the Volerman et al⁷ study illustrates the importance of finding innovative ways to educate youth on how to use their inhalers correctly. The research team conducted this study through an academic partnership. Schools are an important setting where asthma inhaler technique training can be conducted. Carpenter et al¹¹ performed a pilot study with school nurses who enrolled 25 youth aged 7 through 17 years who watched tailored videos that (a) gave feedback on which steps were performed correctly, (b) praised them for correct steps, and (c) explained why incorrectly performed steps were important. Children's inhaler technique improved and the improvements were maintained 1 month later.¹¹ Generic versions of these videos are available in Spanish and English on the website of the American Academy of Allergy, Asthma, and Immunology (<https://www.aaaai.org/conditions-and-treatments/videos/asthma>).

As stated in the European Respiratory Society Task Force report, proper inhaler technique is a necessary step of successful asthma treatment.¹² A recent study by Chiu et al¹³ concluded that patients with asthma who did not understand their disease and/or inhaler technique had lower adherence than patients who were more confident about their treatment. Programs like the one used in the Volerman et al⁷ study help increase youth self-confidence in using their inhalers. Social cognitive theory argues that a youth's self-confidence or self-efficacy in their own ability to manage a condition (eg, inhaler technique) is an

^aDivision of Pharmaceutical Outcomes and Policy, UNC Eshelman School of Pharmacy, University of North Carolina at Chapel Hill, Chapel Hill, NC

^bCecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, Chapel Hill, NC

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Corresponding author: Betsy Sleath, PhD, Division of Pharmaceutical Outcomes and Policy, UNC Eshelman School of Pharmacy, University of North Carolina at Chapel Hill, CB# 7573, Chapel Hill, NC 27599. E-mail: betsy_sleath@unc.edu.

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essential component in successfully carrying out a treatment plan.¹⁴ Previous work has found that adolescent self-efficacy in asthma management correlates strongly with asthma medication adherence.¹⁵

In summary, the Volerman et al⁷ findings are important because the research team took the teach-to-goal method that had been used with adults in hospital settings and successfully implemented the method in schools and found that it improved inhaler technique with primarily black youth aged 8 through 14 years in school settings. Future research needs to be longitudinal in nature, and investigators need to examine how improved inhaler technique is associated with youth medication adherence and health outcomes over time.

REFERENCES

- Sleath B, Ayala GX, Gillette C, Williams D, Davis S, Tudor G, et al. Provider demonstration and assessment of child device technique during pediatric asthma visits. *Pediatrics* 2011;127:642-8.
- Alexander DS, Geryk L, Arrindell C, DeWalt DA, Weaver MA, Sleath B, et al. Are children with asthma overconfident that they are using their inhalers correctly? *J Asthma* 2016;53:107-12.
- Sleath B, Carpenter DM, Walsh KE, Davis SA, Hayes Watson C, Lee C, et al. Factors associated with adolescent and caregiver reported problems in using asthma medications. *J Asthma* 2019;56:451-7.
- Sleath B, Ayala GX, Davis S, Williams D, Tudor G, Yeatts K, et al. Child and caregiver-reported problems and concerns in using asthma medications. *J Asthma* 2010;47:633-8.
- National Heart, Lung, and Blood Institute. Guidelines for the diagnosis and management of asthma. Expert panel report 3 2007. National Heart, Lung, and Blood Institute Publication Number 08-5846. Available from: <http://www.nhlbi.nih.gov/files/docs/guidelines/asthsumm.pdf>. Accessed January 11, 2019.
- Geryk LL, Roberts CA, Carpenter DM. A systematic review of school-based interventions that include inhaler technique education. *Respir Med* 2017;132:21-30.
- Volerman A, Toups MM, Hull A, Press VG. A feasibility study of a patient-centered educational strategy for rampant inhaler misuse among minority children with asthma. *J Allergy Clin Immunol Pract* 2019;7:2028-30.
- Press VG, Arora VM, Shah LM, Lewis SL, Ivy K, Charbeneau J, et al. Misuse of respiratory inhalers in hospitalized patients with asthma or COPD. *J Gen Intern Med* 2011;26:635-42.
- Press VG, Arora VM, Trela KC, Adhikari R, Zadavec FJ, Liao C, et al. Effectiveness of interventions to teach metered-dose and diskus inhaler techniques: a randomized trial. *Ann Am Thorac Soc* 2016;13:816-24.
- Carpenter DM, Estrada RD, Roberts CA, Elio A, Prendergast M, Durbin K, et al. Urban-rural differences in school nurses' asthma training needs and access to asthma resources. *J Pediatr Nurs* 2017;36:157-62.
- Carpenter DM, Alexander DS, Elio A, DeWalt D, Lee C, Sleath BL. Using tailored videos to teach inhaler technique to children with asthma: results from a school nurse-led pilot study. *J Pediatr Nurs* 2016;31:380-9.
- Pijnenburg MW, Baraldi E, Brand PL, Carlsen KH, Eber E, Frischer T, et al. Monitoring asthma in children. *Eur Respir J* 2015;45:906-25.
- Chiu KC, Boonsawat W, Cho SH, Cho YJ, Hsu JY, Liam CK, et al. Patients' beliefs and behaviors related to treatment adherence in patients with asthma requiring maintenance treatment in Asia. *J Asthma* 2014;51:652-9.
- Bandura A. Social foundations of thought and action: a social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall; 1986.
- Sleath B, Carpenter DM, Slota C, Williams D, Tudor G, Yeatts K, et al. Communication during pediatric asthma visits and self-reported asthma medication adherence. *Pediatrics* 2012;130:627-33.