

Using Videos to Improve Children's Inhaler Technique: A Randomized Controlled Trial

DELESHA CARPENTER, PHD, MSPH

ASSISTANT PROFESSOR

UNC DIVISION OF PHARMACEUTICAL OUTCOMES AND POLICY

MAY 17, 2014



Pediatric Asthma

Asthma affects more than 7 million children in U.S.

Accounts for 3.4 million office visits and > 750,000 ED visits each year

3rd leading cause of hospitalization in children < 15 years of age

A leading cause of school absences

Direct health care costs estimated at \$50.1 billion annually



<http://www.lung.org/lung-disease/asthma/resources/facts-and-figures/asthma-children-fact-sheet.html>

Inhaler Technique Education

Suboptimal inhaler technique linked with worse asthma control and more ED visits

Inhaler technique skills should be demonstrated at every patient visit

Sleath and colleagues (2011) found that providers asked children to demonstrate their inhaler technique in fewer than **13%** of office visits

Only **8%-20%** of children performed all steps correctly on an inhaler technique assessment



Teaching Children Proper Technique

Kid-friendly

Cost-effective

Easily integrated into practice workflow

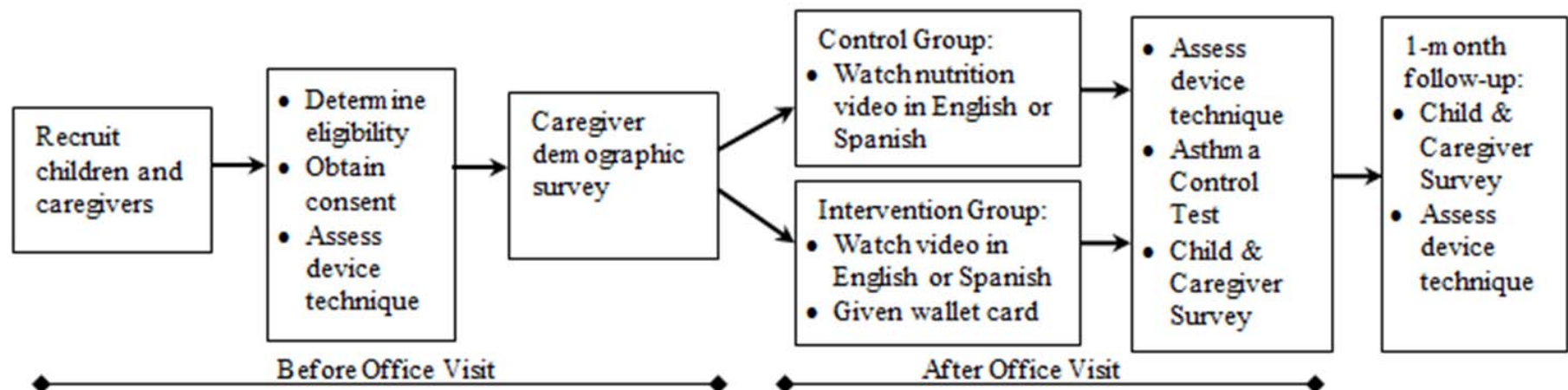
Accessible in multiple languages

Improves inhaler self-efficacy

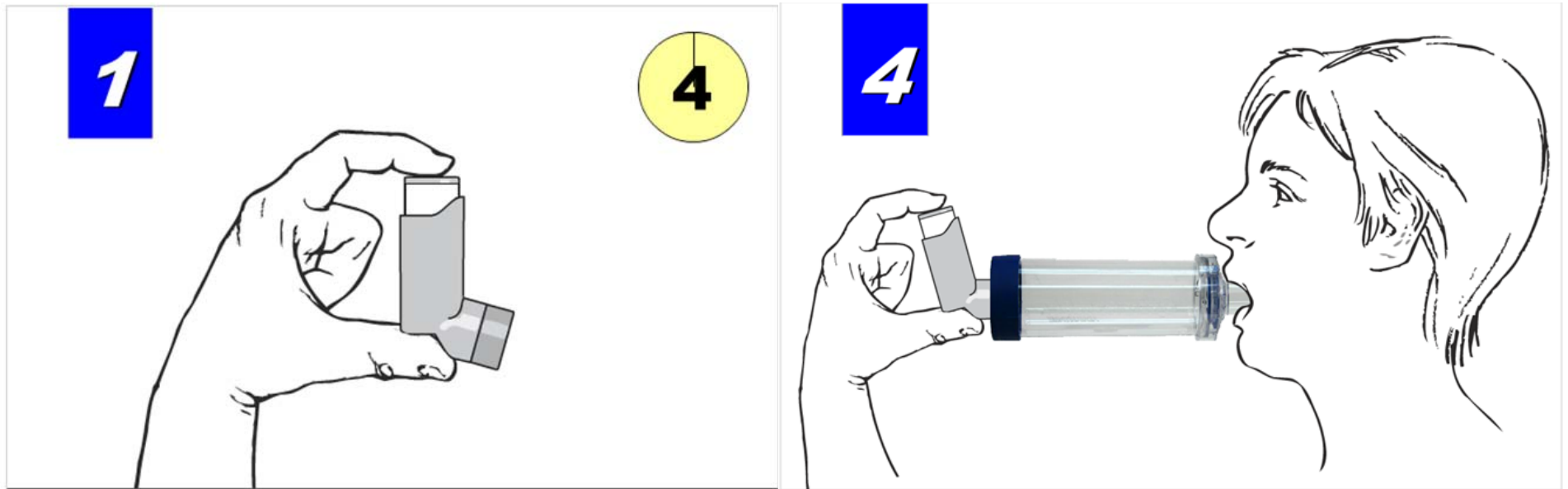
Sustainable



Study Design

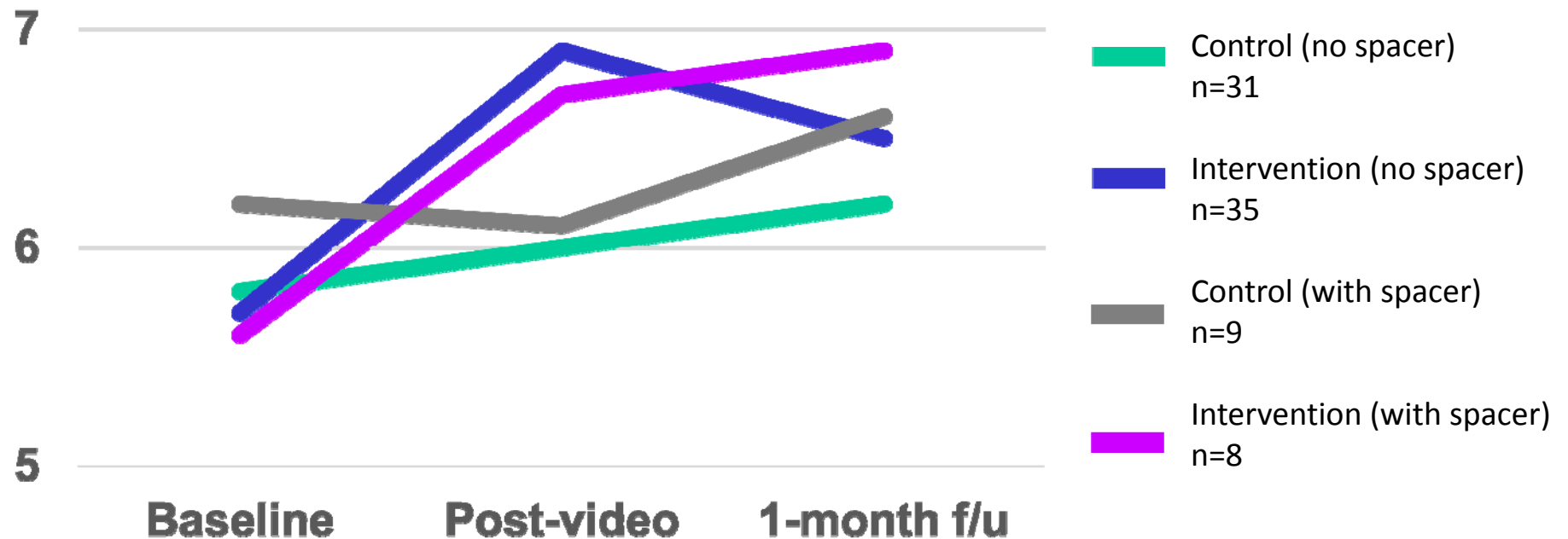


3-Minute Videos



Patient Characteristics	Control Group (n=45)	Intervention Group (n=46)
Age in years; mean (<i>sd</i>)	10.8 (2.9)	10.9 (2.6)
Female	20 (44%)	22 (48%)
Race		
Non-Hispanic White	18 (40%)	19 (41%)
Black	6 (13%)	14 (30%)
Hispanic/Latino	12 (27%)	10 (22%)
Moderate to severe persistent asthma	23 (51%)	20 (44%)
Years with asthma; mean (<i>sd</i>)	3.7 (3.3)	3.5 (3.8)
Taking a control MDI medication	19 (42%)	19 (41%)
Watched video in Spanish	3 (7%)	1 (2%)

Mean Change in Inhaler Steps Performed Correctly Over Time



Linear Mixed Model Regression Results

	Control Group	Intervention Group	Between-group Difference in Change from Baseline	
	Mean change (SE)	Mean change (SE)	Mean difference (95% CI)	p
MDI technique				
Immediately post-intervention	0.03 (0.16)	1.12 (0.16)	1.08 (0.53, 1.63)	0.003
1-month follow-up	0.32 (0.17)	0.87 (0.16)	0.55 (-0.02, 1.11)	0.056
Inhaler self-efficacy 1-month follow-up	-0.10 (0.14)	0.28 (0.13)	0.38 (-0.00, 0.76)	0.052
Asthma control 1-month follow-up	1.20 (0.63)	1.93 (0.61)	0.73 (-1.02, 2.49)	0.407

Limitations and Conclusions

The research assistant who assessed inhaler technique was not blinded to children's assignment to the intervention and control groups.

Our study only had 75% power to detect a 1-step difference in inhaler technique.

Inhaler technique videos led to a significant, immediate 1-step mean improvement in children's technique.

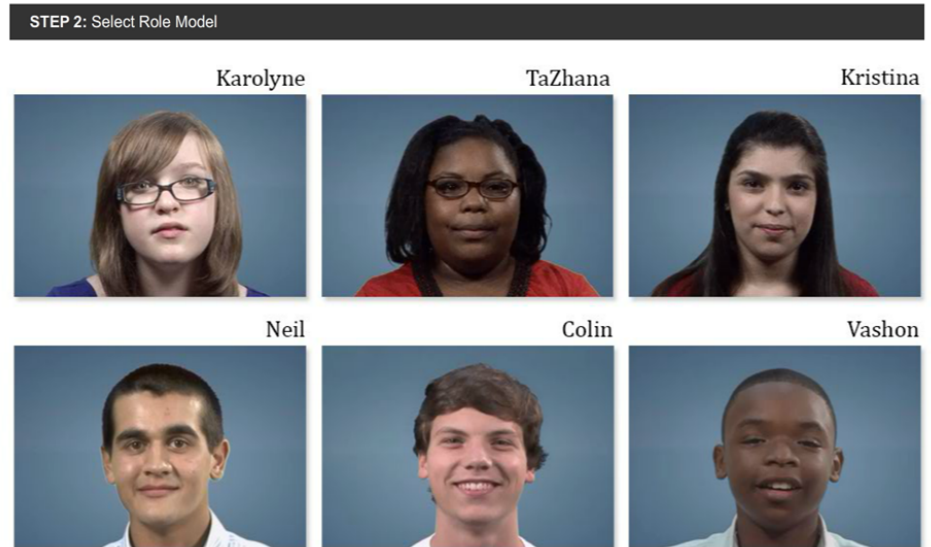
The beneficial effect of the video intervention on children's inhaler technique may deteriorate over time.



Next Steps

Examine whether booster inhaler technique video sessions are necessary to maintain technique improvements over time.

Assess whether tailored videos outperform generic videos in terms of technique improvements and long-term clinical outcomes.



Acknowledgments

Co-Investigators & Collaborators

Betsy Sleath (co-PI)

Tamera Coyne-Beasley

Sue Blalock

Dan Reuland

Mark Weaver

Ceila Loughlin

Lorie Geryk

Rachel Mooneyham

Charles Lee

Pediatric practices



Funding

This project was supported by Award Number ULTR000083 from the National Center for Advancing Translational Sciences. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Center for Advancing Translational Sciences or the National Institutes of Health. Dr. Carpenter's salary was partially supported by the National Center for Research Resources and the National Center for Advancing Translational Sciences, National Institutes of Health, through Grant KL2TR000084.

Questions

dmcarpenter@unc.edu

828.250.3946

@LeshaCarpenter



References

- Akinbami LJ, Moorman JE, Garbe PL, Sondik EJ. Status of childhood asthma in the United States, 1980-2007. *Pediatrics*. 2009;123(Suppl_3):S131-S145.
- Sleath B, Ayala GX, Gillette C, Williams D, Davis S, Tudor G, Yeatts K, Washington D. Provider demonstration and assessment of child device technique during pediatric asthma visits. *Pediatrics*. 2011;127(4):642-648.
- Pedersen S. Inhaler use in children with asthma. *Danish Med Bull*. 1987;34 234-249.
- Pedersen SK, Frost L, Arnfred T. Errors in inhalation technique and efficacy of inhaler use in asthmatic children. *Allergy*. 1986;41:118-124.
- Price D, Bosnic-Anticevich S, Briggs A, Chrystyn H, Rand C, Scheuch G, Bousquet J. Inhaler competence in asthma: Common errors, barriers to use and recommended solutions. *Respir Med*. 2013;107(1):37-46.
- Giraud V, Roche N. Misuse of corticosteroid metered-dose inhaler is associated with decreased asthma stability. *Eur Respir J*. 2002;19(2):246-251.
- Melani AS, Bonavia M, Cilenti V, Cinti C, Lodi M, Martucci P, Serra M, Scichilone N, Sestini P, Aliani M, Neri M. Inhaler mishandling remains common in real life and is associated with reduced disease control. *Respir Med*. 2011;105(6):930-938.
- National Heart Lung and Blood Institute (NHLBI). *Guidelines for the Diagnosis and Management of Asthma: Expert Panel Report 3*. 2007. Available from: www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf. Accessed November 11, 2012.
- Sleath B, Carpenter DM, Ayala GX, Williams D, Davis S, Tudor G, Yeatts K, Davis S, Ayala G. Communication during pediatric asthma visits and child asthma medication device technique 1 month later. *J Asthma*. 2012;49(9):918-925.
- Ayala GX, Miller DL, Zagami E, Riddle C, Willis S, King D. Asthma in middle schools: What students have to say about their asthma. *J School Health*. 2006;76(6):208-214.
- Barnett SB, Nurmagambetov TA. Costs of Asthma in the United States: 2002-2007. *Journal of Allergy and Clinical Immunology*. 2011; 127:145-52.