Original Article:

Press VG, Kelly CA, Kim JJ, et al. Virtual Teach-To-Goal™ Adaptive Learning of Inhaler Technique for Inpatients with Asthma or COPD. J Allergy Clin Immunol Pract. 2017 Jan 5. pii: S2213-2198(16)30576-1.

Summary by: Gregory Metz, MD, AE-C

This study evaluated the use of a virtual Teach-To-Goal adaptive learning intervention on MDI inhaler technique for adult patients admitted with asthma or COPD. Previous investigation into in-person teach-to-goal sessions demonstrated improvement in correct inhaler use. However, these educational meetings are labor and cost intensive. Consequently, a self-directed and virtual Teach-To-Goal (V-TTG) educational platform was developed. In this program, participants answered several questions about inhaler technique. Next, participants watched videos with oral explanations followed by additional questions. If any question was answered incorrectly, the participant was prompted to watch a corresponding video again and repeat until mastery was demonstrated. If needed, the correct answer was provided following 3 incorrect attempts.

In this study, adults admitted with the diagnosed asthma or COPD to the general medicine service at a single site were enrolled if they were going to use a metered dose inhaler after discharge. Participants were excluded if they were unable to communicate clearly in English, could not provide consent or were admitted to the ICU. A total of 683 were screened, 282 were eligible, 90 were enrolled and 83 completed the study. In this study, most participants were female (62.2%), African-American (94.4%) and had asthma. All participants received standard care combined with the addition of the virtual Teach-To-Goal inhaler technique (V-TTG) program. The primary outcome was correct MDI inhaler technique (with a spacer) as evidenced by correctly navigating $\geq$10 of 12 steps required for correct MDI use. The primary result was that the incorrect use of an MDI with spacer decreased from 83% before the intervention to 24% afterward ($p<0.001$). The table below lists the 13 steps of correct MDI use along with the percentage of patients performing that step correctly before and after V-TTG participation.

Step #	Skill	Pre-intervention	Post-intervention	P value
1	Remove cap from inhaler and spacer	100%	100%	>.999
2	Shake inhaler	57%	87%	<.001
3	Attach inhaler to back of spacer	27%	98%	<.001
4	Breathe out completely	24%	81%	<.001
5	Breath out away from the spacer/MDI	22%	80%	<.001
6	Put spacer mouthpiece into mouth, close lips around mouthpiece	94%	98%	.5
7	Activate inhaler by pressing down on the canister once	74%	89%	.02
8	Breathe in slowly, no whistle sound	28%	82%	<.001
9	Hold breath for 5 seconds	39%	86%	<.001
10	Remove the spacer/MDI from mouth before breathing normally	90%	95%	.2
11	Breathe normally for 30-60 seconds	43%	76%	<.001
12	Repeat the sequence for second inhalation	67%	87%	.004

Limitations to the study include the homogeneous study population. Moreover, it only evaluated the intervention for hospital admitted patients with asthma or COPD and not those in an outpatient setting. It was also a single site study located in an urban setting, so its generalizability to a larger patient population is not known. The study's assessments included immediate follow-up questions after the intervention. It is also not clear if this intervention will improve long-term retention of inhaler skills or whether it is cost effective. However, these exciting results demonstrate promise for this virtual inhaler teaching intervention that could be performed at home and repeated to promote ongoing mastery of correct inhaler technique.