

## MANAGEMENT AND SELECTION OF DEVICES IN INFANTS AND TODDLERS

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### Valved Holding Chamber vs. Spacer

- VHC
  - has one way valve to hold medication in place
  - Eliminates need to coordinate inhalation with actuation
  - Improves deposition of respirable particles in the airways
- Spacer only provides space between MDI mouthpiece and patient's mouth
  - Does not hold medication in spacer
  - Patient must still inhale in time with actuation to get medication
  - No data to show improvement of respirable particles

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## Valved Holding Chamber



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## Soother



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## Spacers



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## Nebulizers

- Multiple studies to support use of MDIs with VHC over nebulizers
- Few parents use nebulizers as instructed
  - Patient does not take deep breaths
  - Do not use until medicine is finished
  - Do not keep mask on face (blow-by)
  - Breath through nose instead of mouth if using mouthpiece
- Parents still ask for nebulizers!
- If prescribing nebulized medications know which nebulizers are recommended for long term use

## Nebulizers for Repeated Use



## Budesonide Respules



## Inhaler knowledge in health care professionals

- 1994 study by Hanania published in Chest
  - Assessed knowledge and ability to use MDI, MDI with VHC and DPI
  - Hands on demonstration with placebo inhalers
  - Eleven clinically relevant questions related to use and maintenance of the tested devices
  - Included 30 RTs, 30 RNs, and 30 medical house staff physicians

## Results

	RT	RN	MD
Knowledge	67% +/- 5	39% +/-7	48% +/- 7
Skill MDI	97% +/- 3	82% +/-13	69% +/- 24
Skill MDI w VHC	98% +/- 2	78% +/- 20	57% +/-31
Skill DPI *	60% +/- 30	12% +/- 23	21% +/- 30
Formal training	77%	30%	43%

\* Author's Note: Shorter length of time in clinical use

## Study of Caregiver Skills

- Evaluated inhaler skills of caregivers of children 2-9 years of age
- Physician diagnosed asthma
- At least 1 acute exacerbation in previous year
- All with persistent asthma
- All with current prescription for ICS
- Most (87%) classified as not well controlled or poorly controlled

Resnik, Silver, Cao Evaluation of MDI-spacer utilization and technique in caregivers of urban minority children with persistent asthma. J Asthma, 2014; 51(2): 149-154

## Other Data

- n=169
- Mothers as caregivers 95%
- Had spacer at home 92%
- Used spacer all or most of the time 71%
- Unemployed 56.2%
- Single family household 48.4%
- Technique explained 92.9%
- Technique demonstrated 85.2%
- Asked for return demonstration 53.8%

## Correct Steps for MDI with VHC (Mask)

- Assemble spacer
- **Shake before use**
- Assemble MDI – Spacer
- **Form a seal**
- Place mask on face
- **Cover mouth and nose**
- Hand position
- Exhaled
- **Actuate once**
- **Take at least 6 deep and slow breaths**
- **Wait at least 30 seconds between actuations**

## Results

Skill	Percent correct
Assemble spacer	94
Shake inhaler *	69.2
Assemble MDI Spacer	97.6
Place mask on face	97.6
Cover mouth and nose *	93.5
Hand position	56.9
Exhaled	17.3
Actuate once *	80.5
Took 6 breaths *	39.1
Waited 30 seconds *	11.8

\* Deemed critical skills

## Conclusions

- No association between duration of diagnosis and correct use
- Correct technique was associated with higher level of caregiver education
- No association between control and correct technique

## Summary

- Caregiver technique varies greatly
- Caregiver skills deteriorate quickly
- Frequent review and correction by HCP critical to correct technique



## What Could Possibly go Wrong?

