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
Valved Holding Chamber

Soother
Spacers

• 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
Nebulizers for Repeated Use

- Side Stream
- Aero Eclipse
- Pari

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

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


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**

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**Results**

<table>
<thead>
<tr>
<th>Skill</th>
<th>Percent correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assemble spacer</td>
<td>94</td>
</tr>
<tr>
<td>Shale inhaler *</td>
<td>69.2</td>
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<tr>
<td>Assemble MDI Spacer</td>
<td>97.6</td>
</tr>
<tr>
<td>Place mask on face</td>
<td>97.6</td>
</tr>
<tr>
<td>Cover mouth and nose *</td>
<td>93.5</td>
</tr>
<tr>
<td>Hand position</td>
<td>56.9</td>
</tr>
<tr>
<td>Exhaled</td>
<td>17.3</td>
</tr>
<tr>
<td>Actuate once *</td>
<td>80.5</td>
</tr>
<tr>
<td>Took 6 breaths *</td>
<td>39.1</td>
</tr>
<tr>
<td>Waited 30 seconds *</td>
<td>11.8</td>
</tr>
</tbody>
</table>

* 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?