Question 7: In the child with asthma exacerbation in the ED, should heliox driven albuterol vs. oxygen or room air driven albuterol be used to prevent hospitalization, decrease time in the ED or improve pulmonary function?

**GRADEprofiler Table:**

<table>
<thead>
<tr>
<th>Pulmonary Function (follow-up median 15-60 minutes; measured with: percentage change from baseline ; Better indicated by higher values)</th>
<th>Quality assessment</th>
<th>Summary of findings</th>
<th>Effect</th>
<th>Quality</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of studies</td>
<td>Design</td>
<td>Limitations</td>
<td>Inconsistency</td>
<td>Indirectness</td>
<td>Imprecision</td>
</tr>
</tbody>
</table>
| 1 | randomized trials | serious 
2 | no serious inconsistency | no serious indirectness | no serious imprecision | none | 11 | 11 | - | SMD 0.32 higher (0.52 lower to 1.16 higher) | MODERATE |

1 Rodrigo (CDSR) 2010- only one Pediatric study Carter 1996
2 Allocation generation and concealment were not clearly identified.
3 Children were hospitalized, not in the ED.
4 Crossover study, no mention of washout
5 Small number of subjects.

**Synthesis Author:** EBP Scholar (Allen, N. H.)
**Date:** 2010-11-03

**GRADEprofiler Table of single study since Rodrigo, 2010:**

<table>
<thead>
<tr>
<th>Hours to discharge (follow-up mean 67 hours; Better indicated by higher values)</th>
<th>Quality assessment</th>
<th>Summary of findings</th>
<th>Effect</th>
<th>Quality</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of studies</td>
<td>Design</td>
<td>Limitations</td>
<td>Inconsistency</td>
<td>Indirectness</td>
<td>Imprecision</td>
</tr>
</tbody>
</table>
| 1 | randomised trials | no serious limitations | no serious inconsistency | serious 
2 | no serious indirectness | no serious imprecision | none | 22 | 20 | - | MD 2.8 higher (14.15 lower to 19.75 higher) | MODERATE |

1 Rodrigo (CDSR) 2010- only one Pediatric study Carter 1996
2 Allocation generation and concealment were not clearly identified.
3 Children were hospitalized, not in the ED.
4 Crossover study, no mention of washout
5 Small number of subjects.

<table>
<thead>
<tr>
<th>Asthma Score at 24 hours (follow-up 24 hours; range of scores: 0-12; Better indicated by lower values)</th>
<th>Quality assessment</th>
<th>Summary of findings</th>
<th>Effect</th>
<th>Quality</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of studies</td>
<td>Design</td>
<td>Limitations</td>
<td>Inconsistency</td>
<td>Indirectness</td>
<td>Imprecision</td>
</tr>
</tbody>
</table>
| 1 | randomised trials | no serious limitations | no serious inconsistency | serious 
2 | no serious indirectness | no serious imprecision | none | 22 | 20 | - | MD 0.5 higher (0.44 lower to 1.44 higher) | MODERATE |

1 Rodrigo (CDSR) 2010- only one Pediatric study Carter 1996
2 Allocation generation and concealment were not clearly identified.
3 Children were hospitalized, not in the ED.
Forest Plot of Single Studies since Rodrigo (2010)
Helium driven albuterol v air/oxygen albuterol, outcome: Time to hospital discharge.

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Heliox- Experimental Mean</th>
<th>SD</th>
<th>Total</th>
<th>Air/Oxygen- Control Mean</th>
<th>SD</th>
<th>Total</th>
<th>Mean Difference IV, Fixed, 95% CI</th>
<th>Mean Difference IV, Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bingham 2010</td>
<td>66.2</td>
<td>28.16</td>
<td>22</td>
<td>63.4</td>
<td>27.84</td>
<td>20</td>
<td>100.0% 2.80 [-14.15, 19.75]</td>
<td>2.80 [-14.15, 19.75]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td></td>
<td></td>
<td>22</td>
<td></td>
<td></td>
<td>20</td>
<td>100.0% 2.80 [-14.15, 19.75]</td>
<td>2.80 [-14.15, 19.75]</td>
</tr>
</tbody>
</table>

Heterogeneity: Not applicable
Test for overall effect: Z = 0.32 (P = 0.75)

Helium driven albuterol v air/oxygen albuterol, outcome: Asthma Score at 24 hours.

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Heliox- Experimental Mean</th>
<th>SD</th>
<th>Total</th>
<th>Air/Oxygen- Control Mean</th>
<th>SD</th>
<th>Total</th>
<th>Mean Difference IV, Fixed, 95% CI</th>
<th>Mean Difference IV, Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bingham 2010</td>
<td>2.9</td>
<td>0.97</td>
<td>22</td>
<td>2.4</td>
<td>1.94</td>
<td>20</td>
<td>100.0% 0.50 [-0.44, 1.44]</td>
<td>0.50 [-0.44, 1.44]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td></td>
<td></td>
<td>22</td>
<td></td>
<td></td>
<td>20</td>
<td>100.0% 0.50 [-0.44, 1.44]</td>
<td>0.50 [-0.44, 1.44]</td>
</tr>
</tbody>
</table>

Heterogeneity: Not applicable
Test for overall effect: Z = 1.04 (P = 0.30)


**Risk of bias summary figure:**

- **Random sequence generation (selection bias):** Low risk
- **Allocation concealment (selection bias):**
- **Blinding (performance bias and detection bias):**
- **Incomplete outcome data (attrition bias):**
- **Selective reporting (reporting bias):**

**Included Single Study Characteristics and Risk of Bias Tables:**

**Bingham 2010**

**Characteristics of included study:**

- **Methods:** RCT
- **Participants:** N= 42 children aged 2-21 years of age with moderate to severe status asthmaticus.
- **Interventions:**
  - Treatment 1: helium powered nebulized albuterol (70% helium/ 30% oxygen mixture). Flow 16 L/min
  - Treatment 2: air/oxygen powered nebulized albuterol. Flow 10 L/min.
  - Both groups received 15 mg/hour
- **Outcomes:** Hospital length of stay; clinical asthma score (CAS) using trained observers; adverse events
- **Notes:** USA; end point- no need for continuous albuterol or discharge from the hospital. Removed from the study if invasive or noninvasive respiratory support was needed.

**Risk of bias:**

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors' judgment</th>
<th>Support for judgment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Low risk</td>
<td>In blocks of five, using a random number generator</td>
</tr>
</tbody>
</table>
Allocation concealment (selection bias) Low risk Sealed envelope
Blinding (performance bias and detection bias) Low risk Observer was blinded to treatment
Incomplete outcome data (attrition bias) Low risk Used intention to treat analysis
Selective reporting (reporting bias) Low risk
Other bias Low risk

Search Strategy:

PubMed search September 16, 2010


39 results

CINAHL search September 16, 2010

S1 (MH "Acute Disease") Limiters - Exclude MEDLINE records Search modes - Boolean/Phrase
S2 (MH "Emergency MedicalServices+)" OR (MH "Emergency Service+") OR (MH "Emergency Nursing+") OR (MH "Emergency Medicine") Limiters - Exclude MEDLINE records Search modes - Boolean/Phrase
S3 (MH "Asthma+") Limiters - Exclude MEDLINE records Search modes - Boolean/Phrase S4 heliox OR zileuton OR zafirlukast OR methylxanthines Search modes - Boolean/Phrase
S5 (MH "Disease Exacerbation") Search modes - Boolean/Phrase
S6 (MH "Magnesium Sulfate") OR (MH "Continuous Positive Airway Pressure") OR (MH "Epinephrine+") OR (MH "Terbutaline") OR (MH "Leukotriene Antagonists+") OR (MH "Montelukast") OR (MH "Phosphodiesterase Inhibitors+") Limiters - Exclude MEDLINE records
Search modes - Boolean/Phrase
S7 S1 or S2 or S5 Search modes - Boolean/Phrase
S8 S3 and S7 Search modes - Boolean/Phrase
S9 S4 or S6 Search modes - Boolean/Phrase
S10 S8 and S9 Search modes - Boolean/Phrase

The Office of Evidence Based Practice, 2011
Center of Clinical Effectiveness
S11 S8 and S9 Limiters - Published Date from: 20060301-20101031; English Language; Human; Publication Type: Algorithm, Clinical Trial, Journal Article, Nursing Interventions, Practice Guidelines, Protocol, Systematic Review; Age Groups: All Child Search modes - Boolean/Phrase

S12 S8 and S9 Limiters - Published Date from: 20060301-20101031; English Language; Age Groups: All Child Search modes - Boolean/Phrase

0 results