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5-2023

Bronchiolitis: Albuterol Use

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Specific Care Question

For children \leq 24 months of age with bronchiolitis, does the use of albuterol versus not using albuterol impact the outcomes of oxygen saturation, clinical severity score, length of stay, time to resolution, or readmission rates in either the inpatient or outpatient environments?

Recommendations from the Bronchiolitis Committee Based on Current Literature (Best Evidence) Only

The subject matter experts and the Department of EBP recommend following the present standard of care (supportive care consisting of nasal or nasopharyngeal suctioning, supplemental oxygen, feeding and/or hydration, and/or antipyretics as needed) established based on the American Academy of Pediatrics 2014 Clinical Practice Guideline for the management of bronchiolitis (Ralston et al., 2014). The American Academy of Pediatrics 2014 Clinical Practice Guideline provided a strong recommendation against the use of albuterol, or salbutamol, when treating infants or children with a diagnosis of bronchiolitis (Ralston et al., 2014). Based on review of current literature, there is no evidence to support a change in practice. Studies comparing albuterol, or other bronchodilators, to no albuterol are lacking. When there is lack of scientific evidence standard work should be developed, implemented, and monitored.

Literature Summary

Background

Bronchiolitis is considered the most common lower respiratory tract infection infants and children experience within their first two years of age (Gadomski & Scribani, 2014; Ralston et al., 2014; Ricci et al., 2015). While bronchiolitis characteristically starts with upper respiratory symptoms such as a runny nose and cough, the lower respiratory infection will typically manifest over a few days and may progress to wheezing, shortness of air, and a worsening cough for which hospitalization may be considered (Gadomski & Scribani, 2014; Ralston et al., 2014).

Based on the range of symptom severity and efforts to provide evidence-based guidance on the diagnosis and management of care for infants and children with bronchiolitis, the American Academy of Pediatrics (AAP) developed a clinical practice guideline (Ralston et al., 2014). Bronchodilator use for symptom management was addressed. The AAP strongly recommends against the use of albuterol (or salbutamol) in infants and children diagnosed with bronchiolitis. The AAP made the recommendation based on a systematic review of the evidence and meta-analysis in which findings did not demonstrate a consistent benefit or significant change with regard to symptom resolution or length of stay when a beta-agonist such as albuterol was used. This recommendation is based on evidence published prior to 2014 (Ralston et al., 2014).

Despite the recommendation against routine use, albuterol continues to be used in the treatment for infants and children with bronchiolitis (Dunn et al., 2020; Rodriguez-Martinez et al., 2019). The search dates for this review were determined based on the publication date of the current AAP guideline (Ralston et al., 2014). The search dates extended to one year prior to the publication of the AAP guideline to include studies which may not have been identified otherwise (Ralston et al., 2014).

Study characteristics. The search for suitable studies was completed on January 26, 2023. M. Collins, MD, MPH and E. Scott, DO reviewed the 127 titles and/or abstracts found in the search and identified^a 14 single studies believed to answer the question. After an in-depth review of the single studies^a, none of the studies identified directly answered the specific question. There were no studies which compared beta agonist use to supportive care alone, as the studies compared the use of a beta agonist to another solution or compared provider practices.

Identification of Studies

Search Strategy and Results (see Figure 1)

- 1) 'bronchiolitis'/exp OR bronchiolitis:ti,ab,kw
- 2) 'beta agonist':ti,ab,kw OR bronchodial*:ti,ab,kw OR albuterol:ti,ab,kw

Evidence Based Practice

- 3) 'bronchodilating agent'/exp OR 'salbutamol'/exp OR 'salbutamol sulfate'/exp OR 'beta adrenergic receptor stimulating agent'/exp
- 4) inhaled:ti,ab,kw OR inhalation:ti,ab,kw OR nebulized:ti,ab,kw OR nebulize:ti,ab,kw OR 'metered dose inhaler'/exp OR 'inhalational drug administration'/exp OR 'nebulizer'/exp
- 5) 'bronchodilator aerosol'/exp OR 'bronchodilating agent'/exp/dd_ih OR 'salbutamol'/exp/dd_ih OR 'salbutamol sulfate'/exp/dd_ih OR 'beta adrenergic receptor stimulating agent'/exp/dd_ih
- 6) #2 OR #3
- 7) #4 AND #6
- 8) #5 OR #7
- 9) #1 AND #8
- 10) #9 AND (2013:py OR 2014:py OR 2015:py OR 2016:py OR 2017:py OR 2018:py OR 2019:py OR 2020:py OR 2021:py OR 2022:py OR 2023:py) AND ([infant]/lim OR [newborn]/lim OR [preschool]/lim) AND ('article'/it OR 'article in press'/it) NOT ('case report'/de OR 'case study'/de OR 'human cell'/de)

Search Dates: 2013-Current

Records identified through database searching *n* = 127

Additional records identified through other sources *n* = 1

Studies Included in this Review

| Citation | Study Type |
|----------|------------|
| None | |

Studies Not Included in this Review with Exclusion Rationale

| Citation | Reason for exclusion |
|----------------------------------|--|
| Adhikari et al. (2016) | Wrong comparison |
| Barati et al. (2022) | Wrong comparison |
| Bawazeer et al. (2014) | Wrong comparison |
| Carroll et al. (2016) | Compared provider practices |
| Dunn et al. (2020) | Compared provider practices |
| Hurme et al, (2021) | Wrong comparison |
| Khoso et al. (2022) | Wrong comparison |
| Kose et al. (2014) | Wrong comparison |
| Rodriquez-Martinez et al. (2019) | Compared provider practices |
| Shams et al. (2021) | Wrong comparison |
| Ullah et al. (2021) | Wrong comparison |
| Uysalol et al. (2017) | Wrong comparison |
| Verma et al. (2013) | Review of articles written prior to 2013 |
| Walsh & Rothenberg (2015) | Position paper |

Methods Used for Appraisal and Synthesis

^aRayyan is a web-based software used for the initial screening of titles and / or abstracts for this analysis (Ouzzani, Hammady, Fedorowicz & Elmagarmid, 2017).

^bThe Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram depicts the process in which literature is searched, screened, and eligibility criteria is applied (Page et al., 2021).

References to Appraisal and Synthesis Methods

^aOuzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan-a web and mobile app for systematic reviews. *Systematic Reviews*, 5(1), 210. doi:10.1186/s13643-016-0384-4

^b Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *International journal of surgery*, 88, 105906. **For more information, visit www.prisma-statement.org.**

Question Originator

A. Nedved, MD

Findings from this review were presented with the question originator and J. Hartley, DO; S. Woods, BHS, RRT; M. Collins, MD, MPH; M. Gripka, MT (ASCP) SM; K. Hess, PharmD; K. Berg, MD, FAAP on April 24, 2023.

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Acronyms Used in this Document

| Acronym | Explanation |
|---------|--|
| CAT | Critically Appraised Topic |
| EBP | Evidence Based Practice |
| PRISMA | Preferred Reporting Items for Systematic Reviews and Meta-Analyses |
| AAP | American Academy of Pediatrics |
| RDAI | Respiratory Distress Assessment Instrument |



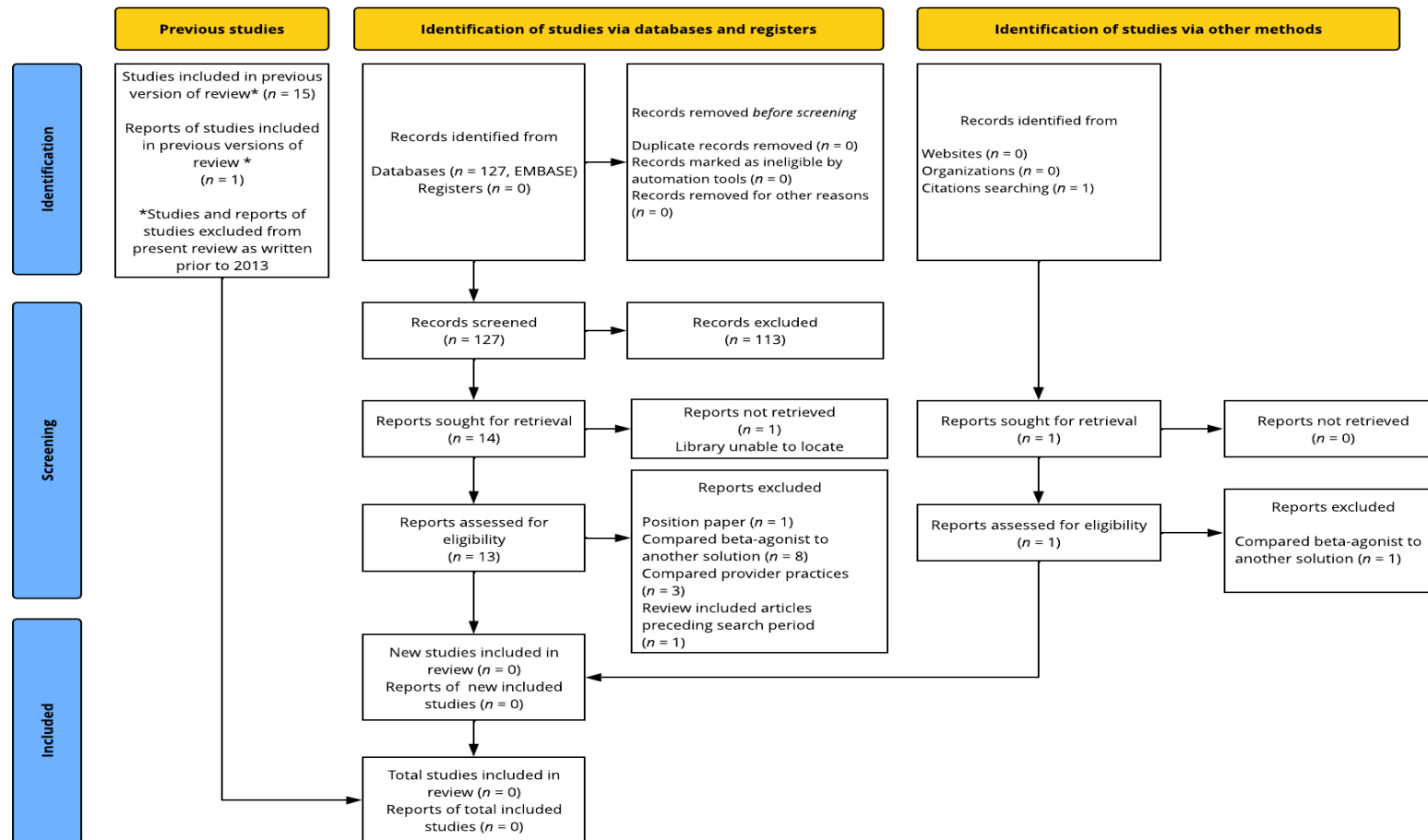
| | |
|-----|---------------------|
| ICU | Intensive Care Unit |
| hr | hour |

Statistical Acronyms Used in this Document

| Statistical Acronym | Explanation |
|---------------------|-----------------------------|
| <i>N</i> | Total number in sample |
| RCT | Randomized controlled trial |

Figure 1

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)^b



From: Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., et al., (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *British Medical Journal*, 372 (n71). <https://doi.org/10.1136/bmj.n71>

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