

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Antibiotics for Acute Asthma Exacerbations: Clinical Effectiveness, Cost-Effectiveness, and Guidelines

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Research Questions

1. What is the clinical effectiveness of antibiotics for acute asthma exacerbations without clear signs of bacterial infection?
2. What is the cost-effectiveness of antibiotics for acute asthma exacerbations without clear signs of bacterial infection?
3. What are the evidence-based guidelines regarding the use of antibiotics for acute asthma exacerbations?

Key Findings

Three randomized-control trials and four evidence based guidelines were identified regarding the use of antibiotics for acute asthma exacerbations.

Methods

A limited literature search was conducted on key resources including PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2007 and March 17, 2017. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Patients experiencing acute asthma exacerbations and no clear signs of infection
Intervention	Antibiotics with or without standard care
Comparator	No antibiotics
Outcomes	Q1: Clinical effectiveness (e.g. changes in patient symptoms or outcomes, resolution of exacerbations, etc.) Q2: Cost-effectiveness Q3: Evidence-based recommendations
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized control trials, non-randomized studies, economic evaluations, evidence-based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

Three randomized-control trials and four evidence based guidelines were identified regarding the use of antibiotics for acute asthma exacerbations. No relevant health technology assessments, systematic reviews, meta-analyses, non-randomized studies or economic evaluations were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Three randomized-control trials (RCT) ¹⁻³ and four evidence based guidelines⁴⁻⁷ were identified regarding the use of antibiotics for acute asthma exacerbations. Two RCTs¹⁻² used azithromycin for the treatment of acute exacerbations and one RCT³ used clarithromycin for the treatment of exacerbations. There was no statistically or clinically significant difference between 500 mg of azithromycin daily for three days added to usual care when compared to usual care in adults.¹ However, a three-day course of 10mg/kg azithromycin reduced the duration of asthma-like exacerbation episodes in young children aged one to three.² The authors of another RCT,³ whereby 15mg/kg clarithromycin added to usual exacerbation treatment for three weeks was administered to school-aged children, observed that the intervention was associated with a higher number of symptom-free days, a reduction in the number and severity of days with loss of control after the first episode, and lowered duration of the initial exacerbation.

Four evidence-based guidelines were identified.⁴⁻⁷ Two guidelines recommend that antibiotics not be prescribed for patients with acute asthma or exacerbations^{4,7} and that, should a prescription of an antibiotic be used, it should be guided by objective measures such as procalcitonin levels⁴. Another guideline by Sick Kids⁶ recommends against the use of antibiotics for children with acute episodes of asthma except in cases with comorbid conditions that require their use. Finally, macrolide antibiotics are not recommended for either adults or children with severe asthma according to the International European Respiratory Society/American Thoracic Society guidelines.⁵

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

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Non-Randomized Studies

No literature identified.

Economic Evaluations

No literature identified.

Guidelines and Recommendations

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See: Section 9.3.8 Antibiotics
5. Chung KF, Wenzel SE, Brozek JL, Bush A, Castro M, Sterk PJ, et al. International ERS/ATS guidelines on definition, evaluation and treatment of severe asthma. *Eur Respir J.* 2014 Feb;43(2):343-73.
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<https://www.sickkids.ca/clinical-practice-guidelines/clinical-practice-guidelines/export/CLINS99/Main%20Document.pdf>
See: 3.1.8 The following treatments are NOT recommended
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<https://www.thoracic.org/statements/resources/allergy-asthma/asthma.pdf>
*See: Other treatments, page 362
Discussion, page 383*

Appendix — Further Information

Systematic Reviews and Meta-Analyses – Alternate Population

8. Kew KM, Undela K, Kotorts I, Ferrara G. Macrolides for chronic asthma. *Cochrane Database Syst Rev*. 2015 Sep 15;(9):CD002997.
[PubMed: PM26371536](#)
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[PubMed: PM25252142](#)

Randomized Controlled Trials

Acute Exacerbations Unspecified

10. Daoud A, Gloria CJ, Taningco G, Hammerschlag MR, Weiss S, Gelling M, et al. Minocycline treatment results in reduced oral steroid requirements in adult asthma. *Allergy Asthma Proc*. 2008 May;29(3):286-94.
[PubMed: PM18534087](#)

Alternate Population

11. Brusselle GG, Vanderstichele C, Jordens P, Deman R, Slabbynck H, Ringoet V, et al. Azithromycin for prevention of exacerbations in severe asthma (AZISAST): a multicentre randomised double-blind placebo-controlled trial. *Thorax*. 2013 Apr;68(4):322-9.
[PubMed: PM23291349](#)
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[PubMed: PM22773713](#)

Non-Randomized Studies – Alternate Population

13. Arfe A, Blasi F, Merlino L, Corrao G. Respiratory drugs and macrolides prevent asthma exacerbations: A real-world investigation. *Respir Med*. 2016 Oct;119:7-12.
[PubMed: PM27692150](#)

Clinical Practice Guidelines – Uncertain Methodology

14. Cheng AH, Campbell S, Chartier LB, Goddard T, Magee K, McEwen J, et al. Choosing Wisely Canada®: Five tests, procedures and treatments to question in Emergency Medicine. *CJEM*. 2017 Mar 2;1-9.
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See: Add-on treatment – More Information - Antibiotics in acute asthma.

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See: Recommendations and Antibiotics and asthma management
17. Australian Asthma Handbook [Internet]. South Melbourne (AUS): National Asthma Council Australia. Managing flare-ups in children 6 years and over; 2016 [cited 2017 Mar 22]. Available from: <http://www.astmahandbook.org.au/management/children/6-years-and-over/flare-ups>
See: Recommendations
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See: "There are insufficient data to recommend for or against the use of antibiotics in the treatment of acute exacerbations".

Review Articles

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