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

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About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada’s health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.
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

<table>
<thead>
<tr>
<th>Population</th>
<th>Patients experiencing acute asthma exacerbations and no clear signs of infection</th>
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<tbody>
<tr>
<td>Intervention</td>
<td>Antibiotics with or without standard care</td>
</tr>
<tr>
<td>Comparator</td>
<td>No antibiotics</td>
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<tr>
<td>Outcomes</td>
<td>Q1: Clinical effectiveness (e.g. changes in patient symptoms or outcomes, resolution of exacerbations, etc.)</td>
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<tr>
<td></td>
<td>Q2: Cost-effectiveness</td>
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<td></td>
<td>Q3: Evidence-based recommendations</td>
</tr>
<tr>
<td>Study Designs</td>
<td>Health technology assessments, systematic reviews, meta-analyses, randomized control trials, non-randomized studies, economic evaluations, evidence-based guidelines</td>
</tr>
</tbody>
</table>
**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)\(^1{\text{-}}^3\) and four evidence based guidelines\(^4{\text{-}}^7\) were identified regarding the use of antibiotics for acute asthma exacerbations. Two RCTs\(^1,^2\) used azithromycin for the treatment of acute exacerbations and one RCT\(^3\) 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.\(^4{\text{-}}^7\) Two guidelines recommend that antibiotics not be prescribed for patients with acute asthma or exacerbations\(^4{\text{-}}^7\) and that, should a prescription of an antibiotic be used, it should be guided by objective measures such as procalcitonin levels.\(^4\) Another guideline by Sick Kids\(^6\) 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


Non-Randomized Studies

No literature identified.

Economic Evaluations

No literature identified.

Guidelines and Recommendations


See: Section 9.3.8 Antibiotics


See: 3.1.8 The following treatments are NOT recommended


See: Other treatments, page 362
Discussion, page 383
Appendix — Further Information

Systematic Reviews and Meta-Analyses – Alternate Population

   PubMed: PM26371536

   PubMed: PM25252142

Randomized Controlled Trials

Acute Exacerbations Unspecified

    PubMed: PM18534087

Alternate Population

    PubMed: PM23291349

    PubMed: PM22773713

Non-Randomized Studies – Alternate Population

    PubMed: PM27692150

Clinical Practice Guidelines – Uncertain Methodology

    PubMed: PM28251880

   See: Recommendations and Antibiotics and asthma management

   See: Recommendations


   PubMed: PM23656743

   See: “There are insufficient data to recommend for or against the use of antibiotics in the treatment of acute exacerbations”.

Review Articles

   PubMed: PM28116959

   PubMed: PM26354869

   PubMed: PM24247040

   PubMed: PM24948430

   PubMed: PM23754138

   PubMed: PM24327002