

# Systematic Review Snapshot

## TAKE-HOME MESSAGE

Despite some limitations in current evidence, antibiotics appear to be beneficial for patients with acute exacerbations of chronic obstructive pulmonary disease, particularly those of higher severity.

## METHODS

### DATA SOURCES

The Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, Cumulative Index to Nursing and Allied Health Literature, Allied and Complementary Medicine Database, PsycINFO, and ClinicalTrials.gov were searched from inception to April 2012. Abstracts and references were reviewed, and trialists and pharmaceutical companies were contacted for unpublished data.

### STUDY SELECTION

The authors included randomized controlled trials comparing any antibiotic with placebo for the treatment of acute exacerbations of chronic obstructive pulmonary disease. Studies of patients with asthma, acute bronchitis, pneumonia, or bronchiectasis were excluded.

### DATA EXTRACTION AND SYNTHESIS

Two authors independently screened references and abstracted data. Quality of evidence was determined with domain-based and Grading of Recommendations Assessment, Development and Evaluation approaches. Heterogeneity was expressed with the  $I^2$  statistic. Pooled risk ratios, Peto odds ratios, and weighted mean differences were calculated with fixed-effect models.

## Are Routine Antibiotics Beneficial for Exacerbations of Chronic Obstructive Pulmonary Disease?

EBEM Commentators

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### Results

Comparison of antibiotics versus placebo for primary outcome of treatment failure.

Subgroup	No. Trials	No. Participants	Quality of Evidence	Heterogeneity ( $I^2$ ), %	Pooled RR (95% CI)	NNTB (95% CI)
Outpatient	7	931	Low	35	0.75 (0.60–0.94)	13 (8–46)
Inpatient	4	612	High	47	0.77 (0.65–0.91)	10 (6–45)
ICU	1	93	High	N/A	0.19 (0.08–0.45)	2 (2–3)

RR, risk ratio of treatment failure with antibiotic compared with placebo; CI, confidence interval; NNTB, number needed to treat for an additional beneficial outcome; N/A, not applicable.

### Commentary

Chronic obstructive pulmonary disease refers to a group of diseases characterized by air trapping and airflow limitation. It is the third leading cause of death in the United States, with a mortality rate that is increasing.<sup>1,2</sup> Acute exacerbations account for 1.5 million emergency department (ED) visits, and \$11.3 billion in hospital costs annually.<sup>3,4</sup> They adversely affect both quality of life and prognosis.<sup>1</sup> The rationale for empiric antibiotic therapy is based on an assumption of bacterial causality and a desire to avoid infectious complications but remains controversial.<sup>5</sup>

This meta-analysis included 12 trials studying 13 antibiotics, reporting on

the primary outcome of treatment failure (defined as no resolution or deterioration of symptoms, additional antibiotic course, or death caused by chronic obstructive pulmonary disease) between 7 days and 1 month. Outpatient, inpatient, and ICU status were used as proxies for severity of exacerbation, with primary outcome results kept separate a priori. The quality of evidence for ICU and inpatients was high; however, several outpatient studies were limited by inadequate descriptions of allocation concealment or blinding.

A significantly lower incidence of treatment failures was observed in the antibiotic group across the spectrum of disease severity but disap-

peared for outpatients when the analysis was restricted to currently used drugs. Mortality and length of stay benefits were limited to ICU patients alone. Significantly more diarrhea occurred in the antibiotic group (odds ratio 2.62), with no differences in dyspepsia, mouth pain, or exanthema.

Although none of the studies in this review took place in the ED, its eligibility criteria defined chronic obstructive pulmonary disease exacerbations in a standardized manner and included participants whose baseline characteristics were generally applicable across practice settings. Despite some heterogeneity among outpatient and inpatient results, taken individually, the included trials generally

support the conclusion that antibiotics appear to be beneficial in acute exacerbations of chronic obstructive pulmonary disease, particularly those of higher severity.

Editor's Note: This is a clinical synopsis, a regular feature of the *Annals* Systematic Review Snapshot (SRS) series. The source for this systematic review snapshot is: Vollenweider DJ, Jarret H, Steurer-Stey CA, et al. Antibiotics for exacerbations of chronic obstructive pulmonary disease (review). *Cochrane Database Syst Rev*. 2012;(12):CD010257. doi:10.1002/14651858.CD010257. (Assessed as up-to-date: September 13, 2012.)

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*Michael Brown, MD, MSc, Alan Jones, MD, and David Newman, MD, serve as editors of the SRS series.*