Cost and clinical consequence of antibiotic non-adherence in acute exacerbations of chronic bronchitis


CRD summary
The authors concluded that non-adherence to antibiotic treatment for acute exacerbations of chronic bronchitis may impair treatment effectiveness and increase treatment costs. Given the absence of any studies relating to patients with acute exacerbations of chronic bronchitis, the lack of validity assessment and risk of publication bias, the reliability of the authors' conclusions is unclear.

Authors' objectives
To assess the impact of non-adherence to antibiotics' effectiveness in patients with acute exacerbations of chronic bronchitis and assess the economic impact of non-adherence for Spain, Italy and USA.

Searching
MEDLINE and EMBASE were searched for published peer-reviewed papers. Search dates were not reported, but the authors stated that inclusion was not limited by the date of publication. Search terms were reported. Bibliographies of all identified papers were handsearched.

Study selection
Randomised controlled trials (RCTs) of antibiotic treatment in patients with acute respiratory tract infection were eligible for inclusion. Studies of immunocompromised patients or patients who took immunosuppressants were excluded from the review. Hospital-based studies were excluded. Outcomes of interest were costs and cure or treatment success (defined as a return to a level respiratory function consistent with the patient's condition prior to the current episode). In order to included for analysis, studies needed to report treatment success according to treatment adherence.

One RCT of three- and five-day courses of oral amoxicillin (15mg/kg) in children with non-severe pneumonia was included in the review. In this study, adherence was defined as 80% of dose taken and treatment success was defined as decrease in rapid respiratory rate and decrease in fever.

The authors did not state how the studies were selected for the review.

Assessment of study quality
The authors did not state that they assessed study validity.

Data extraction
The number of patients successfully treated was extracted according to good or poor compliance status and used to calculate the relative risk (RR) with 95% confidence intervals (CIs) of treatment success for each compliance group.

One reviewer abstracted data and these were verified by a second reviewer. Where necessary, the authors were contacted for further information.

Methods of synthesis
A decision analytic model was designed to compare costs and treatment outcomes for patients with good compliance compared with patients with poor compliance. This model was based on an observational study of treatment pathways for patients with acute exacerbation of chronic bronchitis. Resource utilisation for treatment failure in Spain, Italy and USA were estimated using surveys or observational studies. Costs per episode were determined for each country using a retrospective survey or published data. Some costs used were for patients with conditions other than acute exacerbation of chronic bronchitis.
Results of the review
Twenty five studies met the inclusion criteria for the review, but only one study fulfilled the criteria for inclusion in the analysis (n was unclear).

Antibiotic treatment was successful in 81% of patients treated on a three-day regimen and in 83% of patients treated with a five-day regimen. Patients who complied with antibiotic treatment were significantly more likely to respond to treatment than patients who were poor compliers with three-day treatment regimens (RR 0.75, 95% CI 0.73 to 0.78) and five-day treatment regimens (RR 0.67, 95% CI 0.63 to 0.71).

The decision analytic model predicted 76% treatment success for good-compliant patients and 49.3% (Spain), 54.6% (Italy) and 59.9% (USA) treatment success for poor-compliant patients.

Cost information
In Spain, per-episode cost of good-compliant patients was €151 compared to €264 for poor-compliant patients. In Italy, per-episode cost for good compliant patients was €223 compared to €393 for poorly compliant patients. In USA, per-episode cost for good-compliant patients was US$406 dollars compared to US$545 dollars for poorly compliant patients. Increased compliance rate in poor-compliance groups reduced the cost differential for every country.

Authors' conclusions
Non-adherence to antibiotic treatment for acute exacerbations of chronic bronchitis may impair treatment effectiveness and increase treatment costs.

CRD commentary
The review question was clearly stated. Inclusion criteria for intervention and study design were clear and inclusion criteria for outcomes were implicit in the model. Inclusion criteria for participants were broader than the review question. Only two databases were searched and so relevant studies may have been missed. Only published studies were included, so there was a risk of publication bias. It was unclear whether language restrictions were applied to the search and so language bias could not be ruled out. The authors did not state whether appropriate steps were taken in the study selection process to minimise reviewer error and bias. Data abstraction was carried out by one reviewer and checked by another, which provided some check against reviewer error and bias. It did not appear that the validity of the included study was assessed, so it was not possible to ascertain the reliability or validity of the findings. Several studies met the review inclusion criteria, but only one study met criteria for inclusion in the analysis. This study was of children with pneumonia; therefore, the results may not be generalisable to adults with chronic bronchitis. The method used to combine the studies appeared appropriate. Most of the authors were employees/paid consultants of Pfizer Inc. Given the absence of any studies that related to patients with acute exacerbations of chronic bronchitis, the lack of validity assessment and risk of publication bias, the reliability of the authors' conclusions is unclear.

Implications of the review for practice and research
Practice: The authors stated that additional resources aimed at improving adherence may reduce costs.

Research: The authors stated that further research was needed to investigate the effectiveness and adherence rates of other interventions of comparable costs.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.