EVIDENCE-BASED CHILD HEALTH: A COCHRANE REVIEW JOURNAL
Evid.-Based Child Health **1**: 693–694 (2006)
Published online in Wiley InterScience (www.interscience.wiley.com). **DOI:** 10.1002/ebch.28

Expert Commentary

Commentary on 'Interventions to improve antibiotic prescribing practices in ambulatory care'

Joan L. Robinson*
University of Alberta and Stollery Children's Hospital, Edmonton, Alberta, Canada

This is a commentary on a Cochrane review, published in this issue of EBCH, first published as: Arnold SR, Straus SE. Interventions to improve antibiotic prescribing practices in ambulatory care. *Cochrane Database of Systematic Reviews* 2005, Issue 4. Art. No.: CD003539. DOI: 10.1002/14651858.CD003539.pub2.

Further information for this Cochrane review is available in this issue of EBCH in the accompanying EBCH Summary and Characteristics and Key Findings Tables articles.

There is overwhelming evidence that the increasing prevalence of antibiotic-resistant organisms (ARO) is a direct result of widespread use of antibiotics, primarily for respiratory tract infections. Despite impressive technologic advances that allow for newly-recognized viruses such as the Severe Acute Respiratory Syndrome (SARS) coronavirus to be identified within weeks, accurate differentiation of a viral from a bacterial etiology is still not practical for most respiratory tract infections, resulting in overuse of antibiotics in inpatient and outpatient settings worldwide.

In the high-quality review 'Interventions to improve antibiotic prescribing practices in ambulatory care' (1), Arnold and Straus review 39 outpatient studies in children and adults published up to 2002 where an attempt was made to optimize the decision to prescribe antibiotics, the antibiotic chosen, or the dose prescribed and the outcome of this intervention was evaluated. As compared to reviews looking at management of a specific disease, this is a complex task. There is considerable heterogeneity in the severity and degree of diagnostic certainty for the conditions for which antibiotics were prescribed in the studies. The reasons for inappropriate prescription of antibiotics vary depending on the local incidence of different infectious diseases, the availability of over-the-counter antibiotics, and the medicolegal climate. One would anticipate variability in the interventions that would be effective for physicians working within the same clinic and marked variability between physicians working in different cultures, hindering extrapolation of results of studies to other settings.

Unsolicited educational material sent to physicians resulted in no significant change in prescribing habits, with the exception of a very specific guideline sent to physicians in Finland recommending that macrolides be avoided for group A streptococcal (GAS) pharyngitis. At least a temporary improvement in outcome was achieved in some studies of physician audit with feedback, academic detailing (usually by pharmacists), or physician reminders (such as a prompt at the time an online prescription is entered indicating that a shorter course may be adequate for the diagnosis entered), and in most studies of educational meetings (with seminars being more effective than didactic lectures) or of combinations of interventions. Education of patients by unique, specific interventions appeared to be effective in each of five studies, with a 45 to 75% reduction in the use of antibiotics if patients were given an antibiotic prescription to fill in 3–7 days at their own discretion.

As alluded to by the authors, the true measure of the value of an intervention would be a sustained change in antibiotic-prescribing habits resulting in a decrease in colonization or infection with ARO in the population with no increase in the incidence of adverse drug reactions or of suboptimally treated bacterial infections. It is disappointing that only three of the 39 studies reported the long-term result of the intervention on antibiotic-prescribing habits (with all showing sustained improvement), as even change of a small magnitude could potentially be cost-effective and favourably affect the incidence of ARO. Only four studies looked at the possible effect of the intervention on the incidence of ARO in the community (with two showing a positive effect), possibly because in some cases the intervention was introduced to such a small percentage of prescribers that one would not expect to see a community-wide effect. Also, as the authors point out, it may be years before such interventions alter the incidence of ARO. Adverse drug reactions to antibiotics are uncommon and often misdiagnosed, so it is not surprising that none of the studies included this outcome. Similarly, it is difficult to determine when persisting symptoms are due to suboptimally treated

*Correspondence to: Dr Joan L. Robinson, University of Alberta and Stollery Children's Hospital, Edmonton, Alberta, Canada.
E-mail: jr3@ualberta.ca

bacterial infections, so only two studies attempted to determine if delayed or non-use of antibiotics altered patient outcome, confirming previous studies showing no difference (2) and minimal difference (3) in symptoms in patients with the common cold and acute otitis media respectively.

Rather than indicating interventions that should be tried in any given setting, this review clarifies the direction that future studies should take. The authors express the greatest enthusiasm for combined interventions, stating, 'These were the only interventions with effect sizes of sufficient magnitude to potentially reduce the incidence of antibiotic-resistant bacteria'. However, the qualitative methodology required for this review does not allow for direct comparison between interventions.

The authors found no studies on some potentially useful interventions such as development of local consensus proceedings or use of local opinion leaders as advocates for appropriate antibiotic use. The success of the communication to the physicians in Finland about GAS therapy could be because it was perceived as being 'a local guideline'. Physician audits may be more successful if there are consequences related to physician performance. Another intervention mentioned by the authors that has been studied only as part of a multi-faceted intervention is education of the general public via the mass media or the school system. Physicians rely on patient expectations in determining if it is advisable to withhold antibiotics, and may choose that option more often if they know the patient understands about ARO and might question the physician's judgment if antibiotics are prescribed. A further benefit of education of the general public is that physicians form part of that audience. I remember sending a paper to local pediatricians with new evidence that a 5-day course of antibiotics is adequate for acute otitis media (4). I suspected the impact was minimal and this was confirmed months later when one of them told me about this new information he had read in the local daily newspaper, quoting the same paper I had sent to him!

In conclusion, we are yet to find the 'magic bullet' for the multi-factorial problem of inappropriate prescription of antibiotics. One or more strategies are being applied in many locales, and a more structured approach to studying the outcome of these interventions might delay or prevent us facing the day when all available oral antibiotics are ineffective for common infections.

Potential conflict of interest

None known.

References

1. Arnold SR, Straus SE. Interventions to improve antibiotic prescribing practices in ambulatory care. *Cochrane Database of Systematic Reviews* 2005, Issue 4. Art. No.: CD003539. DOI: 10.1002/14651858.CD003539.pub2.
2. Arroll B, Kenealy T, Kerse T. Do delayed prescriptions reduce the use of antibiotics for the common cold?: a single-blind controlled trial. *J Family Practice*. 2002; **51**: 324–328.
3. Little P, Gould C, Wilimson I, Moore M, Warner G, Dunleavy J. Pragmatic randomized controlled trial of two prescribing strategies for childhood acute otitis media. *BMJ*. 2001; **322**: 336–342.
4. Kozyrskyj AL, Hildes-Ripstein GE, Longstaffe SE, Wincott JL, Sitar DS, Klassen TP, Moffatt ME. Treatment of acute otitis media with a shortened course of antibiotics: a meta-analysis. *JAMA*. 1998; **279**: 1736–1742.

DOI: 10.1002/ebch.28