

# Cost-effectiveness of outpatient parenteral antibiotic therapy for children with cellulitis

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Title: The Cost-effectiveness of outpatient parenteral antibiotic therapy for children with cellulitis

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Outpatient parenteral antimicrobial therapy (OPAT) is a method for delivering intravenous antimicrobials in outpatient settings and is an alternative to inpatient care [1-2]. Although this approach is not commonly used in children primarily due to the potential risks, it is gradually gaining importance and has been used for the treatment of a number of infections. Research has shown that OPAT leads to a reduction in admissions, a reduction in length of stay in hospitals and is cost saving compared to inpatient care [3-6]. It has also been shown that OPAT reduces the risk of hospital acquired infections which is a contributory factor to antimicrobial resistance [7].

A study by Ibrahim and colleagues published in *The Lancet Infectious Diseases* [8] assessed the cost-effectiveness of OPAT compared to standard hospital care for the intravenous treatment of moderate/severe cellulitis in children. The analysis assumed a societal perspective and was conducted alongside the Cellulitis at Home Or Inpatient in Children from Emergency (CHOICE) randomised controlled trial [9]. To the best of our knowledge, this is the first study to investigate the cost-effectiveness of OPAT for children with cellulitis. The study showed that OPAT is less costly (mean hospital cost difference per patient episode of -\$1809; 95% CI -1324 to -2295 and mean family cost difference per patient episode of -\$410; 95% CI -312 to -508), more effective (quality adjusted life year (QALY) difference of 0.0006; 95% CI 0.0004 to 0.0008) and cost-effective compared to standard hospital care. The implication of the results suggests that using OPAT to deliver intravenous antimicrobials in outpatient settings should be adopted more widely for the management of children with moderate/severe cellulitis. However, a possible limitation of the study relates to the artificial nature of the single site trial which limits the generalisability and external validity of the findings. The authors however attempted to address this using sensitivity analyses.

A fundamental issue associated with economic evaluation studies that consider children relates to how health related quality of life is measured. The study by Ibrahim and colleagues included participants aged between 6 months to 18 years and used the Child Health Utility 9D (CHU9D) questionnaire [10] to derive QALYs. The advantage of using the CHU9D for economic evaluations is that it is preference-based and can be used to generate QALYs. However, this measure may not be valid for the full range of participants included in the study, such as those below 5 years. It is therefore suggested that economic evaluations of this sort consider other health-related quality of life measures in addition to the CHU9D. In addition, the study understandably used proxy completion for younger children (below 6 years) and self-completion for older children (above 6 years) which raises questions relating to consistency and proxy bias [11].

The importance of including the cost of antimicrobial resistance in economic evaluation studies that consider antibiotic use has been highlighted by a few studies [12-13], and although there is a lot of uncertainty and practical issues associated with the estimation of this cost, it is important that studies such as that by Ibrahim and colleagues are encouraged to account for the cost of antimicrobial resistance within economic evaluations. Doing so will ensure that there is an assessment of the impact of the different treatment pathways on antimicrobial resistance and also ensure that sub-optimal policy recommendations are avoided. This would however require additional research into how the costs associated with antimicrobial resistance are estimated and included within economic evaluations.

Whilst the findings by Ibrahim and colleagues represent an important first step in determining the cost-effectiveness of OPAT compared to standard hospital care for children with moderate/severe cellulitis, it is possible that the single centre trial and artificial environments may limit the generalisability and external validity of the findings. It is recommended that additional studies are undertaken in other settings to determine the cost-effectiveness of OPAT for children with moderate/severe cellulitis.

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