

Critical Review Form

Meta-analysis

[Kirkland SW, Cross E, Campbell S, Villa-Roel C, Rowe BH. Intramuscular versus oral corticosteroids to reduce relapses following discharge from the emergency department for acute asthma. Cochrane Database Syst Rev. 2018 Jun 2;6:CD012629.](#)

Objectives: "To examine the effectiveness and safety of a single dose of intramuscular (IM) corticosteroids provided prior to discharge compared to a short course of oral corticosteroids in the treatment of acute asthma patients discharged from an ED or equivalent acute care setting." (p. 6)

Methods: This systematic review and meta-analysis sought to identify randomized controlled trials including children or adults presenting to the ED primarily for acute asthma exacerbation without coexisting complications who were discharged home. Those studies comparing a single dose of IM corticosteroids, given prior to discharge, with a short course of oral corticosteroids were included.

The primary outcome was relapse, defined as any unscheduled visit to a healthcare provider or need for additional corticosteroids for worsening asthma symptoms. Secondary outcomes included serious adverse events (hospitalization, ICU admission, death), adverse events, results of pulmonary function testing, symptom scores, duration of symptoms, compliance with oral steroids/placebo, quality of life measurement, and the number of doses of beta-agonist taken within 24 hours of discharge.

A literature search completed on March 14, 2018 identified 912 studies, from which 9 studies were eventually included in the review. Of these, 5 studies included adult patients with a mean age ranging from 31 to 42 years old. The IM corticosteroid studies varied in these studies and included betamethasone, dexamethasone, methylprednisolone, and triamcinolone. The oral steroid administered also varied, including prednisone in 2 studies, methylprednisolone in 2 studies, and dexamethasone in one study.

| Guide | Question | Comments |
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| I | <i>Are the results valid?</i> | |
| 1. | Did the review explicitly address a sensible question? | Yes. The concept of giving a single dose of long-acting steroids has been well-studied in children , but has not been looked at as closely in adults. Given concerns with patient satisfaction and medication compliance, the ability to give a single dose of steroids (IM or PO) in the |

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| | | ED prior to discharge may not only make patients happier, but may potentially improve compliance and decrease relapse rates. |
| 2. | Was the search for relevant studies detailed and exhaustive? | Yes. The literature search included the Cochrane Central Register of Controlled Trials, MEDLINE, Embase, and CINAHL, along with several other databases, and also included the abstracts of several major respiratory conferences. The authors also searched the gray literature and ClinicalTrials.gov . |
| 3. | Were the primary studies of high methodological quality? | Uncertain. The overall risk of bias in the 5 adult studies was rated as "unclear." While 3 of the studies appear to be at low risk of bias, the other 2 were of very uncertain risk due to poor reporting in the articles. |
| 4. | Were the assessments of the included studies reproducible? | Yes. "Two review authors (SWK and EC) assessed risk of bias independently for each included study using the criteria outlined in the <i>Cochrane Handbook for Systematic Reviews of Interventions</i> (Higgins 2011)." (p. 8) This is a widely used tool that is easy to interpret and should be easy to reproduce. |
| II. | <i>What are the results?</i> | |
| 1. | What are the overall results of the study? | <ul style="list-style-type: none"> • There was no significant difference in relapse rates between IM vs. oral corticosteroids among 559 adult participants: RR 0.97 (95% CI 0.71 to 1.33, I² = 0%). • Considering 4 studies comprising 272 patients in which PEF was measured in an adult population, there was no difference in PEF at follow-up between patients receiving IM vs. oral corticosteroids: mean difference -7.78 L/min (95% CI -38.83 L/min to 23.28 L/min, I² = 33%). • Adherence with the oral corticosteroid regimen was measured in 3 adult studies, and ranged from 66.7% to 100%. |
| 2. | How precise are the results? | See above. |
| 3. | Were the results similar from study to study? | Yes. The I² value for the primary outcome of relapse was 0%, suggesting a very low degree of heterogeneity between adult studies. |
| III. | <i>Will the results help me in caring for my patients?</i> | |
| 1. | How can I best interpret the results to apply them to the care of my patients? | While the data is limited to a small number of studies, and while the studies are of unclear methodologic quality, this systematic review and meta-analysis suggests that IM corticosteroids administered in the ED are likely as effective as a course of oral corticosteroids prescribed after discharge. This may be especially among |

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| | | those patients felt to be at high risk of non-adherence to a prescribed regimen (e.g. those unable to afford the prescription, those without transportation, and those with a history of medication non-adherence). |
| 2. | Were all patient important outcomes considered? | Yes and no. The authors of the review attempted to look at a wide range of outcomes, including adverse events and quality of life, but the included studies were very limited in the reporting of these outcomes. |
| 3. | Are the benefits worth the costs and potential risks? | Uncertain, but likely yes. As noted, while this evidence is inconclusive, there appears to be no increase in the rate of relapse when a single dose of IM corticosteroids are administered following an ED visit for an exacerbation of asthma when compared to a course of oral corticosteroids. This may be especially beneficial among patients at high risk for medication non-adherence. |

Limitations:

1. **This systematic review and meta-analysis pooled the results from studies looking at both children and adults, which would lead to significant [clinical heterogeneity](#). Given this limitation, limited data specific to an adult population was provided.**
2. **There was practice variation between the studies in terms of the oral and IM corticosteroids administered.**
3. **The included studies were of unclear [methodologic quality](#) due to lack of reporting or underreporting of key data.**
4. **The included studies did not assess key secondary outcomes, including quality of life, time of work/daily activities, and patient satisfaction.**

Bottom Line:

This systematic review and meta-analysis comparing IM and oral corticosteroids for the outpatient management of asthma exacerbations found that, among adults, relapse rates were similar between the interventions: RR 0.97 (95% CI 0.71 to 1.33, $I^2 = 0\%$). These results are primarily limited by lack of reporting of key secondary outcomes, and unclear methodologic quality of the studies.