

# Paramedic – Evidence Based Medicine (P-EBP) Program

## Paramedic CAT (Critically Appraised Topic) Worksheet

**Title:** *Will the prehospital administration of corticosteroids by Paramedics decrease hospital admission rates in the severely asthmatic adult patient?*

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**Clinical Scenario:** *Paramedics arrive at the scene of a 50-year-old male patient in severe respiratory distress. He has a long history of asthma, including numerous previous exacerbations for which he has been hospitalized. Today his shortness of breath has been progressively worsening and he has found no relief with his prescribed inhalers. After prehospital administration of an aerosol mask containing Salbutamol & Ipratropium Bromide, the patient feels little relief. Paramedics quickly move to add second line pharmacological therapies to this patient's treatment and initiate the administration of corticosteroids. The intent behind administration of this medication is two-fold. Paramedics hope this medication will not only help reduce airway inflammation, and therefore reverse the effects of the acute exacerbation, but they also are hopeful that administration of this medication early in the treatment continuum will decrease the patient's risk of yet another hospital admission.*

### **PICO (Population – Intervention – Comparison – Outcome) Question:**

*In prehospital adult patients, experiencing a severe asthma exacerbation, will the administration of corticosteroids by paramedics, in addition to standard of care, when compared to standard of care alone, decrease hospital admission rates.*

### **Search Strategy:**



# Paramedic - Evidence Based Medicine (P-EBP) Program

(((((prehospital OR out-of-hospital OR EMS OR paramed\* OR OOH OR EMT OR ambulance)))) AND (((corticosteroid OR CCS OR CS OR steroid)))) AND asthma) AND adult

## Search Outcome:

20

## Relevant Papers:

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
Rowe B. et al, 2008	863 patients experiencing acute asthma treated within the first hour of arrival to the ED	Systematic Review including only RCTs and quasi-RCTs  LOE 1	Hospital admission rate  Pulmonary function	Early (within 1 hour of arrival to the ED) administration of corticosteroids (CS) decreased admission rates  Pooled OR: 0.5 with 95% CI of 0.31, 0.81	Although this study population was not in the prehospital setting, the treatment group was administered the drug within 1 hour of arrival. Therefore, one could infer that even earlier treatment (prior to arrival to the ED) may show the same or even increased benefit.  Sample size was good, and



# Paramedic - Evidence Based Medicine (P-EBP) Program

					systematic review methodology was high quality
Stead, L. 1998	OOH adults transported to ED by ambulance with subsequent dx of Asthma	Retrospective chart review; no randomization  LOE II	Hospital admission rates  ED LOS	0% hospital admission rate in steroid tx group compared to 4% in control group  No P values or CI reported with results  No difference found in ED LOS between groups	Low power – only 11 patients in steroid treatment group.  Study mentioned that sample size of 105 was needed with 0/105 admissions to obtain statistically significance, however only 11 enrolled  Differences noted to history and demographics of pts in the Control and Steroid groups, however no P values included  There was increased beta-agonist use in the steroid group compared to the control group
Knapp, B. 2002	OOH adults transported to ED by ambulance with moderate to severe asthma	Retrospective chart review; no randomization  LOE II	Hospital admission rates	12.9% of pts who received OOH CS were admitted to hospital vs 33.3% for pts that received CS in ED (P value 0.025)	Retrospective and no randomization  Good exclusion criteria (age cut off, smoking hx) to reduce results being diluted by possible underlying COPD dx.  Well matched treatment/control groups

**Comments:** Two of the three studies matched my PICO quite well, while the third was a slightly different patient population. All three had differing levels of evidence and/or various levels of power, however all showed promising results reflecting the early usage of corticosteroids in the severe asthmatic patient.

Further research is needed, specifically in the prehospital environment, with higher patient enrollment numbers. Ideally, this research would be in the form of an RCT.



# Paramedic - Evidence Based Medicine (P-EBP) Program

There would also be benefit of adding more quantitative measures to future studies that placed a better framework around the classification of "severe asthma" whether that be a written assessment tool, peak flow measurement, etc. This could alleviate potential questions that may arise as to the internal validity of a study that classifies "severe asthma" solely based on the provider's clinical judgement.

**Consider:** Although throughout my research on this topic, I did come across multiple studies that discussed EMS systems that have long been utilizing prehospital corticosteroids. However, I hesitate to say there is enough good quality evidence to implement the same treatment option in my practice. Although there is a plethora of good quality evidence showing the benefit of corticosteroid use for the in-hospital asthma patient population, we must be careful to not full generalize those results to the prehospital patient without further research.

The literature surrounding prehospital use of corticosteroids in the severe asthmatic patient is limited and, although the two studies I appraised both showed a benefit for the usage of corticosteroids by paramedics, both lacked statistical significance and study power.

**Clinical Bottom Line:** The two prehospital based studies, in combination with extrapolation of the ED-based study results, hint at a potential real benefit to patients receiving corticosteroids in the prehospital environment for severe asthma. It is possible that this potential could be confirmed with further good quality research.

## References:

Rowe, B. H., Spooner, C., Ducharme, F., Bretzlaff, J., Bota, G. (2001). Early emergency department treatment of acute asthma with systemic corticosteroids. *Cochrane Database of Systematic Reviews*, 1, CD002178

Knapp, B., Wood, C. (2003). The prehospital administration of intravenous methylprednisolone lowers hospital



# *Paramedic - Evidence Based Medicine (P-EBP) Program*

admission rates for moderate to severe asthma. *Prehospital Emergency Care*, 7 (4), 423-426

Stead, L., Whiteside, T. (1999). Evaluation of a new EMS asthma protocol in New York City: A preliminary report. *Prehospital Emergency Care*, 3 (4), 338-342



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