Objective: To assess the evidence underpinning recommendations for a target theophylline level between 10-20mg/l in children suffering an acute exacerbation of asthma.

Methods: A systematic review comparing outcomes of children who achieved serum theophylline concentrations between 10-20mg/l with those who did not. Primary outcomes were time until resolution of symptoms, mortality and need for mechanical ventilation. Secondary outcomes were date until discharge criteria are met, actual discharge, adverse effects and FEV1.

Data sources: MEDLINE, CINAHL, CENTRAL and Web of Science. Search performed in October 2015.

Eligibility criteria: Interventional or observational studies utilizing intravenous theophyllines for an acute exacerbation of asthma in children where serum theophylline levels and clinical outcomes were measured.

Results: 10 RCTs and 2 observational studies were included. Children with serum levels between 10-20mg/l did not have a reduction in duration of symptoms, length of hospital stay or need for mechanical ventilation or better spirometric results compared with levels <10mg/l. Levels above 20mg/l are not associated with higher rates of adverse effects.

Discussion: Dosing strategies aiming for levels between 10-20mg/l are not associated with better outcomes. Clinicians should rely on clinical outcomes and not serum levels when using intravenous theophyllines in children suffering an acute exacerbation of asthma.