Critical appraisal – Randomised controlled trial questions – Lockwood et al, 2003

Introduction	
Are the aims clearly stated?	Yes The paper describes the results of a comparative clinical study of the efficacy of flunixin, ketoprofen and carprofen in conjunction with ceftiofur in naturally occurring bovine respiratory disease.
Methods	
Is the study design suitable for the aims?	Yes
Which population was studied?	66 mixed breed calves (mean weight 197kg), with dyspnea score of 1 or 2, a clinical illness score of 2 or more and/or a depression score of 2 or 3 and body temperature of at least 40^{o}C, split into 4 groups ceftiofur and flunixin (N=17), ceftiofur and ketoprofen (N=16), ceftiofur and carprofen (N=16), and ceftiofur only (N=17)
Were the treatments randomly allocated? If yes, how was the randomisation done?	Yes Randomisation table
Were the groups comparable prior to intervention?	The data is not given but all calves met the inclusion criteria and clinical illness scores were similar.
Was the person who administered the interventions blinded?	Not clear
Is it clear what measurements were carried out in the study?	Polypnoea Dyspnoea Coughing Depression

	Clinical illness score Rectal temperature Post mortem findings
Were the correct measurements chosen? Do they reflect (or are they strongly related to) the outcome of interest?	Yes Yes
Were previously established validated methods used to make the measurements? (e.g. Glasgow pain score, International Units etc)	Yes for respiratory rate and body temperature Subjective scoring system used for clinical signs
What outcomes were measured?	Rectal temperature Respiratory rate Subjective clinical illness score Clinical success Lung consolidation
Are the outcomes clinically relevant?	Yes
Were the outcomes assessed blind?	Yes
Are the statistical methods described?	Yes
Was the statistical significance level stated?	No
Was the sample size justified?	No

Was ethical approval obtained?	Not stated
Are the methods described in enough detail that you could repeat them?	Yes
Results	
Were the basic data adequately described?	No
Do the numbers add up? Are all subjects accounted for?	It is not made explicit that all results are for all calves but where the numbers are given they are correct
Was the statistical significance (p value) stated in the results? Is this consistent with the methods? (It should be stated in the sample size or power calculation)	Yes Not applicable as not mentioned in methods
Were any side effects of the intervention reported if applicable?	No
What were the main findings/key results?	The pyrexia of the calves treated with the three NSAIDs was significantly reduced in comparison with the group treated with antibiotic alone during the first 24 hours ($p<0.05$). After 48 and 72 hours there was no significant difference in rectal temperature between groups. There was no significant difference between treatment groups in terms of clinical illness score, dyspnea, and clinical success. The use of flunixin in conjunction with ceftiofur resulted in a statistically significant reduction in the mean extent of lung consolidation compared

	to other groups (P=0.03).
Discussion and conclusion	
What do the main findings/key results mean?	Flunixin reduces body temperature in the first 24 hours but does not affect the clinical signs of disease.
Are the negative findings discussed? How are the negative findings interpreted?	Yes It focusses on the difference between the NSAIDs
Does the discussion reflect the results?	Yes but it is VERY brief
Interpretation	
What are the clinical implications of this study? Are the subjects in the study similar to those in the BET/your own?	Flunixin may be useful in calves to control body temperature during the first 24hours of pneumonia Yes
General	
Who funded this study?	Not stated