Acute bronchiolitis is the leading cause of lower respiratory tract infection during the first year of life and a major cause of morbidity and mortality in this age group. It is disappointing that although bronchiolitis is a very common condition that causes significant morbidity and mortality in infancy, only a few specific treatments have so far clearly shown clinically important improvements. One of the available treatments, bronchodilators, has shown statistically significant, although clinically insignificant, changes in clinical scores among outpatients. The effect for inpatients is less clear and even contradictory.

However, a subgroup of infants with bronchiolitis may have reversible airway obstruction resulting from smooth muscle constriction and attempts to characterise this subgroup of patients, who demonstrate clinical improvements after bronchodilator administration, have been so far been unsuccessful. For these reasons, the 2006 American Academy of Pediatrics (AAP) bronchiolitis guidelines did not recommend the routine use of bronchodilators. The guidelines said that it was acceptable to consider their use on a trial basis, but that their ongoing use should only be considered if there was a documented positive clinical response to the trial using an objective means of evaluation.

Acute bronchiolitis is the leading cause of lower respiratory tract infection during the first year of life and a major cause of morbidity and mortality in this age group. It is disappointing that although bronchiolitis is a very common condition that causes significant morbidity and mortality in infancy, only a few specific treatments have so far clearly shown clinically important improvements. One of the available treatments, bronchodilators, has shown statistically significant, although clinically insignificant, changes in clinical scores among outpatients. The effect for inpatients is less clear and even contradictory.

However, a subgroup of infants with bronchiolitis may have reversible airway obstruction resulting from smooth muscle constriction and attempts to characterise this subgroup of patients, who demonstrate clinical improvements after bronchodilator administration, have been so far been unsuccessful. For these reasons, the 2006 American Academy of Pediatrics (AAP) bronchiolitis guidelines did not recommend the routine use of bronchodilators. The guidelines said that it was acceptable to consider their use on a trial basis, but that their ongoing use should only be considered if there was a documented positive clinical response to the trial using an objective means of evaluation.

Acute bronchiolitis is the leading cause of lower respiratory tract infection during the first year of life and a major cause of morbidity and mortality in this age group. It is disappointing that although bronchiolitis is a very common condition that causes significant morbidity and mortality in infancy, only a few specific treatments have so far clearly shown clinically important improvements. One of the available treatments, bronchodilators, has shown statistically significant, although clinically insignificant, changes in clinical scores among outpatients. The effect for inpatients is less clear and even contradictory.

However, a subgroup of infants with bronchiolitis may have reversible airway obstruction resulting from smooth muscle constriction and attempts to characterise this subgroup of patients, who demonstrate clinical improvements after bronchodilator administration, have been so far been unsuccessful. For these reasons, the 2006 American Academy of Pediatrics (AAP) bronchiolitis guidelines did not recommend the routine use of bronchodilators. The guidelines said that it was acceptable to consider their use on a trial basis, but that their ongoing use should only be considered if there was a documented positive clinical response to the trial using an objective means of evaluation.

THE 2006 AAP BRONCHIOLITIS GUIDELINES VERSUS THE 2014 VERSION

The updated 2014 AAP bronchiolitis guidelines no longer recommend a trial of bronchodilators. They state that ‘Given the greater strength of the evidence demonstrating no benefit, and that there is no well-established way to determine an “objective method of response” to bronchodilators in bronchiolitis, this option has been removed’. Likewise, the guidelines state that ‘If a clinical trial of bronchodilators is undertaken, clinicians should note that the variability of the disease process, the host’s airway, and the clinical assessments, particularly scoring, would limit the clinician’s ability to observe a clinically relevant response to bronchodilators’ (1).

It is unfortunate that the main reason that the 2014 AAP bronchiolitis guidelines no longer recommend a trial of bronchodilators is the lack of a well-established way to determine an ‘objective method of response’. There are at least three studies that do not support this reason for no longer recommending a bronchodilator trial. In 2013, our group published a study that showed that when the modified Wood’s Clinical Asthma Score was used in infants hospitalised for acute bronchiolitis, it showed adequate psychometric properties, including an appropriate sensitivity to change, that is the ability of a score to detect a clinically important change over time (2). Likewise, Flores-Gonzalez et al. showed a clear decrease in the Wood-Downes scale, as modified by Ferres, when comparing scores obtained at admission with those obtained at discharge. This reflected the good clinical evolution necessary for discharging the patient from the hospital and returning him or her to home care (3). Finally, Ramos

Articles in the series A Different View are edited by William Meadow (wlm1@uchicago.edu). We encourage you to offer your own different view either in response to A Different View you do not fully agree with, or on an unrelated topic. Send your article to Dr. Meadow (wlm1@uchicago.edu).
Fernández et al. created and validated an acute bronchiolitis severity scale and showed that this scale can be a reliable tool for measuring the severity of acute bronchiolitis (4). Taken together, these studies show that some scales have demonstrated their ability to detect clinically important changes over time and to measure different levels of bronchiolitis severity, making them useful tools for determining an objective method of response to bronchodilators.

On the other hand, in the 2014 update of the Cochrane systematic review of the efficacy of bronchodilators for patients with bronchiolitis, bronchodilators did not show that they improve oxygen saturation, reduce hospital admission after outpatient treatment, shorten the duration of hospitalisation, nor reduce the time to resolution of the illness at home. However, in this systematic review, the authors acknowledged that the meta-analysis continued to be limited by the small sample sizes and the lack of standardised study design and validated outcomes across the studies. The authors finally concluded that future trials with large sample sizes, standardised methodology across clinical sites and consistent assessment methods were needed to completely answer the question of efficacy (5).

USING A NEBULISER OR METERED-DOSE INHALER AND VALVE HOLDING CHAMBER
In addition, the great majority of studies assessing the efficacy of bronchodilators for treating bronchiolitis have been based on bronchodilators administered by a nebuliser, not by a metered-dose inhaler with a valved holding chamber (MDI+VHC). A well-conducted meta-analysis was carried out to compare the efficacy of bronchodilators administered by MDI+VHC or nebuliser in children under five years of age with acute exacerbations of wheezing or asthma in the emergency department. It concluded that when it came to delivering bronchodilators to children under five years of age with moderate to severe acute exacerbations of wheezing or asthma, the MDI+VHC was more effective than a nebuliser in decreasing hospitalisation and improving the clinical score (6).

It is important to mention this meta-analysis, because the comparative studies that were included reported that they studied 10% to 83% of infants with their first wheezing exacerbation. This suggests that a significant percentage of the included patients were really suffering from bronchiolitis. So it is still not clear whether the reported lack of efficacy of bronchodilators in the treatment of bronchiolitis is due, at least in part, to the method of administration (e.g. by a nebuliser). It is important to have well-established tools available to determine an objective method of response to bronchodilators and to improve the methodology of future studies. This will enable us to fully answer the question of the efficacy of bronchodilators for patients with bronchiolitis.

BARRIERS TO ADHERENCE
It is also important to account for the wide use of bronchodilators by physicians, shown by recent evidence, in the routine management of patients with bronchiolitis, although only a portion of them do so in a systematic manner (7). It has been reported that one important barrier to physicians’ adhering to clinical practice guidelines is that instead of recommending the addition of a new behaviour, the guidelines recommend eliminating an established behaviour. Another barrier to adherence is that physicians may not be able to overcome the inertia of previous practice or they may not have the motivation to change (8).

For these reasons, it is highly probable that physicians who treat patients with bronchiolitis do not adhere to the recommendation about the use of bronchodilators expressed in the 2014 AAP bronchiolitis guidelines.

CONCLUSION
For all of the aforementioned reasons, the authors consider that the recommendation about the use of bronchodilators expressed in the 2006 AAP bronchiolitis guidelines is more appropriate than that expressed in the 2014 AAP guidelines. We also recommend that a monitored trial of bronchodilators should be considered for all patients with acute bronchiolitis, with the recommendation to continue it only if there is a documented positive clinical response to the trial using an objective means of evaluation. Due to the fact that the neither the agent, the number of doses, the duration, nor the best procedure for performing this trial is clearly established in the literature, future studies should resolve these issues, to reinforce a more concrete and practical recommendation.

ACKNOWLEDGEMENTS
We thank Charlie Barrett for his editorial assistance.

References
6. Castro-Rodriguez JA, Rodrigo GJ. Beta-agonists through metered-dose inhaler with valved holding chamber versus nebulizer for acute exacerbation of
