BACKGROUND/RATIONALE
Asynchronous patient-ventilator interaction—the mismatch between patient respiratory effort and breath delivery by the ventilator—has been associated with deleterious effects including patient discomfort, increased sedative use and increased time on mechanical ventilation. Clinician response to asynchrony varies by practitioner and can include changing the ventilator settings or administering sedation, which could decrease respiratory drive such that respiration is managed by the ventilator in the absence of patient effort. While increasing sedation may improve synchrony, it has been shown that increased administration of sedatives can result in prolonged mechanical ventilation and time spent in the ICU. Therefore, alternative asynchrony management techniques, including ventilator setting changes, may be preferable if they are equally effective without having harmful effects on the patient.

This study being reviewed was observational in nature and examined the efficacy of clinician-directed interventions to manage asynchrony. The investigators observed clinical management of asynchrony, specifically double triggering or breath-stacking asynchrony, and determined how the various interventions improved patient-ventilator interaction.

METHODS
- Mechanically ventilated (MV) patients (n=30) who exhibited severe breath-stacking (double-triggering) asynchrony, defined as Asynchrony Index (AI) ≥ 10%, were identified
  - Patients were all ventilated in Assist Control Ventilation (ACV) at time of enrollment
- Clinicians were observed as they managed the care of an asynchronous patient. Clinician-driven interventions in response to asynchrony were classified into three categories:
  – No intervention
  – Adjustment of ventilator settings
  – Increase in sedation/analgesia
- Variables assessed prior to and after clinician intervention included asynchrony (AI), ventilator settings, sedation/analgesia scores, and drug dosing

RESULTS
- Severe breath-stacking AI was 44% (27-87%) among MV patients enrolled.
- Sustained infusion of sedatives and fentanyl was used in 57% and 70% of patients, respectively.
- 50 clinician care decisions were made by managing physicians in response to asynchrony. (See Figure 1)

Figure 1
• Adjusting ventilator settings had a greater impact on reducing breath-stacking asynchrony compared to increasing sedation/analgesia.
  – Switching to pressure support ventilation (PSV) and increasing inspiratory time in ACV were both associated with decreasing AI.

AUTHORS’ CONCLUSIONS
• Bedside adjustment of ventilator settings is more effective at reducing asynchrony than drug-dose adjustment.
• In response to asynchrony, clinicians can adjust ventilator settings, including switching from ACV to PSV or increasing inspiratory time in ACV, to limit the risk of both ventilator-induced lung injury and overuse of sedatives and analgesics.
• The authors propose an algorithm for the management of severe asynchrony with the objective of avoiding unnecessary increases in the dosing of sedation/analgesia while promoting spontaneous breathing whenever possible.

EVALUATION
Pro
• Provides evidence that the manipulation of ventilator settings, including application of a spontaneous breathing mode, can have a more significant impact on asynchrony than administration of sedatives/analgesia.

Con
• Baseline inspiratory time was very short, which might account for the high prevalence of asynchrony as well as contribute to the large improvement in synchrony observed with the increase in inspiratory time.