CRD summary
This review investigated the effects of mechanical ventilation with lower tidal volumes on ventilator-associated lung injury in patients without acute lung injury (ALI) or acute respiratory distress syndrome (ARDS). The author concluded that the use of lower tidal volumes was associated with a reduction in ventilator-associated lung injury, but inconsistent results were also found in some studies. Without further details on study quality and given the other methodological concerns in the review process, the author's conclusions may not be reliable.

Authors' objectives
To assess the effects of lung-protective mechanical ventilation with lower tidal volumes on ventilator-associated lung injury in patients without acute lung injury (ALI) or acute respiratory distress syndrome (ARDS).

Searching
The following databases were searched without restriction: MEDLINE, EMBASE, Cochrane Database of Systematic Reviews (CDSR), Cochrane Controlled Trial Register (CCTR), Current Controlled Trials (CCT) and Clinical trials.gov. The search terms were reported, but the search dates were not. The reference lists of retrieved publications were also screened.

Study selection
Clinical studies on lung-protective mechanical ventilation with lower tidal volumes in patients without ALI/ARDS were eligible for inclusion. The author did not state specific types of study design. Studies which included patients with previous lung disease were excluded.

The majority of included patients experienced short-term ventilation in the operating rooms or in the postoperative phase; patients in three studies had long-term ventilation in intensive care units. The included randomised controlled trials (RCTs) compared mostly 4 mL/kg to 6 mL/kg with 9 mL/kg to 15 mL/kg for tidal volume of ventilation in patients. The primary outcome reported in the review included the incidence of ventilator-associated lung injury, mortality and pulmonary infection. The additional outcomes were duration of intubation, plasma cytokine levels and pulmonary coagulopathy.

Abstracts were screened for selection and full texts of potentially eligible studies were further assessed for inclusion. The author did not state how many reviewers preformed the selection.

Assessment of study quality
The author did not state that the study validity was assessed.

Data extraction
The author stated neither how the data were extracted for the review nor how many reviewers performed the data extraction.

Methods of synthesis
The studies were combined in a narrative synthesis. The studies were grouped according to the study design and summarised in accompanying data tables.

Results of the review
Thirteen studies (n=19,676) were included in the review. Four studies (n=19,188) were retrospective or observational studies. Nine studies (n=488) were prospective RCTs.
RCTs (nine RCTs). Two RCTs reported that lung-protective mechanical ventilation with lower tidal volumes was associated with a shorter duration of intubation, a lower incidence of pulmonary infection or a reduction of postoperative mechanical ventilation for patients without ALI/ARDS compared to controls with larger tidal volumes. Four RCTs reported the harmful effects of mechanical ventilation with large tidal volumes in patients without ALI/ARDS, but three RCTs did not show any effect of the use of large tidal volumes on ventilator-associated lung injury. Most of the RCT differences were in biochemical surrogate outcomes.

Retrospective/observational studies (four studies). Three studies showed that the development of ALI/ARDS was associated with mechanical ventilation using large tidal volumes for longer than 12 hours in patients without ALI/ARDS at the onset of ventilation. One study suggested similar harmful effects of the use of large tidal volumes for several hours ventilation in patients without ALI/ARDS.

Authors' conclusions
Lung-protective mechanical ventilation with lower tidal volumes was associated with a reduction in ventilator-associated lung injury in patients without ALI/ARDS, but inconsistent results were also found in some studies.

CRD commentary
This review's inclusion criteria were not specified for study design or outcomes. The author searched a number of relevant databases for both published and unpublished studies and it appeared that the author had attempted to reduce the possibility of language and publication biases. Adequate details of the primary studies were provided. However, methods to minimise bias in the review process were not reported and a formal validity assessment was not carried out.

The author did not discuss the level of clinical heterogeneity between the included studies; it was difficult to assess whether the decision to adopt a narrative synthesis was appropriate. The author's conclusions reflected the evidence presented. However, without further details on study quality and given the other methodological concerns it was difficult to judge their reliability.

Implications of the review for practice and research
Practice: The author stated that large tidal volumes in mechanical ventilation should not be used for patients without ALI/ARDS at the onset of mechanical ventilation.

Research: The authors stated that more prospective studies were needed to assess optimal ventilator management strategies for patients without ALI/ARDS.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.