**Review title**EVENT - Temporal Changes in Ventilator Settings in Patients with Uninjured Lungs: A Systematic Review

**Anticipated start date**June 2014

**Primary contact**Dr. Maximilian Schaefer, Department of Anaesthesiology, Düsseldorf University Hospital, Germany

**Review team**Dr. Tanja Meyer-Treschan, Department of Anaesthesiology, Düsseldorf University Hospital, Germany  
Dr. Ary Serpa Neto, Department of Critical Care Medicine, Hospital Israelita Albert Einstein, Sao Paolo, Brazil  
Prof. Paolo Pelosi, Department of Surgical Sciences and Integrated Diagnostics, San Martino Policlinico Hospital, Genoa, Italy   
Prof. Marcelo Gama de Abreu, Department of Anesthesiology and Intensive Care Therapy, Hospital Carl Gustav Carus, Dresden, Germany  
Prof. Peter Kienbaum, Department of Anaesthesiology, Düsseldorf University Hospital, Germany  
Prof. Marcus J. Schultz, Department of Intensive Care, Academic Medical Center, University of Amsterdam, Netherlands

**Funding**Institutional funding.

**Objective**This systematic review aims to investigate the development of tidal volume size over time in mechanically ventilated patients in the operating theatre and intensive care unit from published literature and the influence on patient outcome.

**Literature search**We will search MEDLINE (via Pubmed), Web of Science and CENTRAL without restrictions on publication year using the search term *[‘tidal volume’ AND ‘mechanical ventilation’].*

**Patient population**We will include all studies reporting controlled mechanical ventilation in the operation room or the intensive care unit. Studies investigating mechanical ventilation outside these setting (e.g. out of hospital or the emergency department) will be excluded.

**Intervention(s)**Tidal volume of controlled mechanically ventilation

**Study types**Randomized controlled trials, prospective interventional studies, prospective and retrospective observational studies. Randomized controlled trials or interventional studies where tidal volume was part of the intervention will only be included if the tidal volume has been declared as “standard of care” at the time of the intervention.

**Inclusion criteria**- Controlled mechanical ventilation of adult intubated patients in the operating room or the intensive care unit  
- Studies reporting tidal volume either as ml per kilogram, ml per kilogram predicted body weight, ml per kilogram ideal body weight or absolute ml in combination body weight of patient population

**Exclusion criteria**- Studies investigating patients outside the operating room or the intensive care unit  
- Studies including patient population with more than 25% of patients suffering from acute lung injury or the acute respiratory distress syndrome, either defined by the AECC definition or the Berlin definition.  
- Interventional trials with tidal volume set due to the intervention and not defined as “standard of care” at the time of intervention   
- Studies investigating patients <18 years of age  
- Ventilation during cardiopulmonary resuscitation  
- Ventilation during one-lung ventilation  
- Non-invasive ventilation  
- Studies investigating weaning from the ventilator

**Primary outcome**Change in tidal volume size over time in the operating room and the intensive care unit

**Secondary outcomes**- Change in PEEP, Pmax, Pplat, Pmean, and FiO2 over time in the operating room and the intensive care unit  
- Association of changes in tidal volume size with development of acute respiratory distress syndrome and postoperative complications.

**Data extraction**Year of publication, first author, study title, study type, study period, patient age, number of patients, setting (ICU or OR), height, weight, number of patients with ARDS, indication for ventilation, male/female, study groups, inclusion-/exclusion criteria, duration of ventilation, type of intervention, duration of observation, development of ARDS, postoperative pulmonary complications, tidal volume, unit of tidal volume (ml, ml/kg PBW, ml/kg ABW, ml/kg IBW), PEEP, FiO2, Pmax, Pplat, Pmean, mode of ventilation.

**Strategy for data synthesis**All analyses will be made separately for the operating room and the intensive care unit. Multiple cohorts with different time periods in one study will be treated as separate studies. The year of study will be determined from the middle of the study period or submission date. When tidal volume is reported as absolute ml, tidal volume size per kg PBW will be calculated by estimating PBW from average weight and height as follows: PBW in kg = (50 x [fraction males] + 45.5 x [fraction females]) + 0.91 x (average group height in cm – 152.4). If only weight is available, tidal volume will be calculated as ml per kg ABW using the average weight.   
Alpha will be 0.05 with Bonferroni correction. All ventilation parameters as well as development of ARDS and postoperative pulmonary complications will be correlated with year of study using Pearson´s correlation and a linear regression analysis will be performed.

**Subgroup analyses**The primary analysis will be conducted separately for patients in the operating room and the intensive care unit. No further subgroup analysis will be conducted.

**Addendum to protocol of April 18th, 2018: Changes during review process as requested by reviewers**

Spearman´s correlation was used instead of Pearson´s. Additionally, non-linear relationship between ventilation parameters and year of study were assessed using LOESS lines for all analyses with more than 10 data points. Association between tidal volume size and Pmax was analysed.