

# Red blood cell transfusions and the risk of acute respiratory distress syndrome among the critically ill: a cohort study.

Zilberberg MD, Carter C, Lefebvre P, Raut M, Vekeman F, Duh MS, Shorr AF.  
Crit Care. 2007;11(3):R63.

**INTRODUCTION:** Recent data indicate that transfusion of packed red blood cells (pRBCs) may increase the risk for the development of acute respiratory distress syndrome (ARDS) in critically ill patients. Uncertainty remains regarding the strength of this relationship.

**METHODS:** To quantify the association between transfusions and intensive care unit (ICU)-onset ARDS, we performed a cohort study within Crit, a multicenter, prospective, observational study of transfusion practice in the ICU which enrolled 4,892 critically ill patients in 284 ICUs in the United States. Diagnostic criteria for ARDS were prospectively defined, and we focused on subjects without ARDS at admission. The development of ARDS in the ICU served as the primary endpoint.

**RESULTS:** Among the 4,730 patients without ARDS at admission, 246 (5.2%) developed ARDS in the ICU. At baseline, ARDS cases were younger, more likely to be in a surgical ICU, and more likely to be admitted with pneumonia or sepsis than controls without ARDS. Cases also were more likely to have a serum creatinine of greater than 2.0 mg/dl (23% versus 18%) and a serum albumin of less than or equal to 2.3 g/dl (54% versus 30%) and were more severely ill upon ICU admission as measured by either the APACHE II (Acute Physiology and Chronic Health Evaluation II) or SOFA (Sequential Organ Failure Assessment) score ( $p < 0.05$  for all). Sixty-seven percent and 42% of cases and controls, respectively, had exposure to pRBC transfusions ( $p < 0.05$ ), and the unadjusted odds ratio (OR) of developing ARDS in transfused patients was 2.74 (95% confidence interval [CI], 2.09 to 3.59;  $p < 0.0001$ ) compared to those never transfused. After age, baseline severity of illness, admitting diagnosis, and process-of care factors were adjusted for, the independent relationship between pRBC transfusions and ICU-onset ARDS remained significant (adjusted OR, 2.80; 95% CI, 1.90 to 4.12;  $p < 0.0001$ ).

**CONCLUSION:** Development of ARDS after ICU admission is common, occurring in approximately 5% of critically ill patients. Transfusion of pRBCs is independently associated with the development of ARDS in the ICU.