

# Variability and predictability of large-volume red blood cell transfusion in cardiac surgery: a multicenter study.

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**BACKGROUND:** In cardiac surgery, excessive blood loss requiring large-volume red blood cell (RBC) transfusion is a common occurrence that is associated with significant morbidity and mortality. The objectives of this study were to measure the interinstitution variation and predictability of large-volume RBC transfusion. **STUDY DESIGN AND METHODS:** Data were retrospectively collected on 3500 consecutive cardiac surgical patients at seven Canadian hospitals during 2004. The crude and risk-adjusted institutional odds ratios (ORs) for large-volume ( $\geq 5$  U) RBC transfusion were calculated with logistic regression. The predictive accuracy of an existing prediction rule for large-volume RBC transfusion was calculated for each institution. **RESULTS:** Large-volume RBC transfusion occurred in 538 (15%) patients. When compared to the reference hospital (median crude rate), the institutional unadjusted and adjusted ORs for large-volume RBC transfusion ranged from 0.29 to 1.26 and 0.14 to 1.15, respectively ( $p < 0.0001$  for interinstitution variation). The variation was lower, but still considerable, for excessive blood loss, defined as at least 5-U RBC transfusion or reexploration; the ORs ranged from 0.42 to 1.22 ( $p < 0.0001$ ). The prediction rule performed well at most sites; its pooled positive predictive value for excessive blood loss was 71 percent (range, 63%-89%), and its negative predictive value was 90 percent (range, 87%-93%). **CONCLUSIONS:** There is marked interinstitution variation in large-volume RBC transfusion in cardiac surgery that is not explained by patient- or surgery-related factors. Despite this variation, patients at high or low risk for large-volume RBC transfusion can be accurately identified by a prediction rule composed of readily available clinical variables.