Comparing Hospital Survival Rates for Cardiac Arrest Using a Risk-Standardized Model

Risk-Standardizing Survival for In-Hospital Cardiac Arrest to Facilitate Hospital Comparisons. Chan PS, Berg RA, Spertus JA, Schwamm LH, Bhatt DL, Fonarow GC, Heidenreich PA, Nallamothu BK, Tang F, Merchant RM. *Journal of the American College of Cardiology (JACC)*

Key Points:

1) In-hospital cardiac arrest survival varies widely across hospitals. Differences in survival may be due to patient case-mix or variations in care.

2) To facilitate comparisons of survival outcomes across hospitals in an equitable way (i.e., adjust for patient case-mix), we derived and validated a model to risk-standardize survival outcomes after in-hospital cardiac arrest.

3) An initial prediction model of 18 variables was reduced to 9 final variables. These factors included: age group; initial cardiac arrest rhythm; hospital location of arrest; the presence of hypotension (abnormally low blood pressure), sepsis, metastatic or hematologic malignancy, or hepatic insufficiency prior to cardiac arrest; or requirement of mechanical ventilation of continuous vasopressor infusion at the time of cardiac arrest.

4) The risk-standardization model had good discrimination (c-statistic of 0.734) and calibration statistics and was validated internally within the registry.

5) Risk-standardization re-classified many hospitals' performance. More than half of the hospitals in the study had at least a 10% positive or negative absolute change in percentile ranking after risk-standardization, and 23% of hospitals had a ≥20% absolute change in percentile ranking.

6) After risk-standardization, there remained significant variation in survival outcomes for in-hospital cardiac arrest among hospitals. This suggests that use of this model can support efforts to compare outcomes in resuscitation care across hospitals.

Dr. Chan is an internationally recognized leader in cardiac arrest and cardiovascular outcomes research. He has conducted a number of seminal studies examining the epidemiology, processes of care, and outcomes of in-hospital cardiac arrest. This work has laid the groundwork for ongoing hospital quality improvement and
national performance measure development for resuscitation care in hospitals. Dr. Chan has also conducted a number of innovative studies focused on improving the appropriate use of technology in a manner that is cost-efficient, optimizes patient outcomes, improves quality, and reduces disparities. This has included prominent studies on appropriate use of percutaneous coronary intervention; disparities in care by race, socioeconomics and insurance status; and risk-stratification of patients most likely to benefit from implantable cardioverter-defibrillators. Dr. Chan serves on multiple national committees for the American College of Cardiology and the American Heart Association on quality improvement, performance measures, clinical practice guidelines, and multicenter registries. He is the incoming 2014 Chair of Science for Get With The Guidelines Resuscitation and the 2013 American Heart Association Dickinson W. Richards Memorial Lecturer on resuscitation care.

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