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HAZARD REGRESSION MODELS OF EARLY MORTALITY IN TRAUMA CENTRES

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Background Factors affecting early hospital deaths after trauma may be different from factors affecting later hospital deaths, and the distribution of short and long prehospital times may vary among hospitals.

Objective We wished to explore whether hazard regression (HR) models might be more useful than logistic regression (LR) models for analysis of trauma mortality, especially when hospital effects at different time points are of interest.

Methods We obtained data for trauma centre patients in the 2008–2009 US National Trauma Data Bank (NTDB). Cases were

included if they had complete data for prehospital times, hospital times, survival outcome, age, vital signs, and severity scores. Subjects were excluded if pulseless on admission, transferred in or out of hospital, or Injury Severity Score < 9. We compared LR models predicting 8-h survival to HR models with survival censored at 8 h, using the same covariates and including an indicator for each hospital. HR models were then modified to allow time-varying hospital effects.

Results 85 327 patients in 161 hospitals met inclusion criteria. Crude hazards peaked initially, then steadily declined. LR and HR models estimated similar hospital effects when HRs were assumed constant. However, time-varying HRs revealed major fluctuations in hospital-specific effects at different times after injury.

Significance HR models with time-varying HRs reveal inconsistencies in hospital effects, data quality, and/or timing of early death among trauma centres. HR models could also be adapted for censored data such as might result from interhospital transfers or delayed declarations of death.