

## eMethods

### *Multiple imputation procedure*

We used a flexible multivariable imputation procedure of multiple chained regression equations (MICE), which generated values for all missing data using the observed data for all patients in the derivation cohort.(14) This approach assumed that the missing data mechanism was random and conditional on observed covariates. MICE may still lead to bias in the setting of missingness > 50%, but this bias is generally less than that resulting from complete case analysis (which assumes missing completely at random).(15) We used 5 cycles of regression switching to create each of 11 independent datasets. We included all model covariates and our primary outcome (30-day mortality) in the imputation variable set. During the imputation, we used predictive mean matching for non-normal, continuous variables with upper and lower bounds (e.g. GCS score, SaO<sub>2</sub>).(15) We modeled the EMS severity index with ordinal logistic regression, transport mode to hospital using multinomial logistic regression, all other dichotomous variables with logistic regression, and continuous variables with linear regression. We imputed data only among patients with complete data for fixed effects in our model (receiving hospital & BLS agency; n=160,287). These many-category variables resulted in excessive computational time when included in the imputation procedure.

Using imputed data, we re-ran our multivariable logistic regression models and extracted Z statistics from models generated using the STATA 11.0 macro: micombine, and aggregated them using Rubin's rules.(16)