Abstract:
Background: Assessment of prognosis in patients with heart failure (HF) helps guide treatment decisions and goals of care. Guidelines recommend the use of validated risk models. Yet, the application of population-based estimates to individual patients is problematic.

Methods: We conducted a retrospective cohort study between 2005-2008 from 3 large integrated health systems. Patients were included if they had a history of hospitalization with a primary discharge diagnosis of HF. Estimated probability of survival was calculated using the Seattle Heart Failure Model score (SHFM). Baseline covariates were collected from the electronic health record at or before cohort enrollment and missing covariates were imputed to the median. Actual survival was determined in follow up.

Results: Among 10,930 patients with HF, median age was 74 years. New York Heart Association functional class, lymphocyte percent, and uric acid were not available; all remaining SHFM covariates were available for 44.8% of patients. Model performance was consistent with other real-world HF risk modeling: c-statistic at 6 months=0.68, 1-year=0.66 (discrimination); 6-month SHFM predicted survival=94.4%, life-table actual=89.5%, and 1-year predicted=89.3%, actual=84.1% (calibration). The SHFM identified only 2 patients (0.02%) with a predicted mean survival <=6 months and only 5 patients (0.05%) with a predicted mean survival <=1 year; yet, 1,661 patients (15.2%) actually died in the year after cohort enrollment. SHFM 1-year median estimated survival was 85-95% for 7,272 patients (66.5%), and although a lower percentage of the cohort in this prediction range died compared to patients with worse SHFM scores, this score range captured more than half of the deaths (N=963).

Conclusions: Objective risk models help refine expectations for the future, but leave wide uncertainty for individual patients. Although major medical decisions (e.g. hospice, declination of pacemaker-defibrillators) are ideally targeted to patients with short life expectancy, risk models can rarely identify such patients prospectively.

Research Category: Outcomes Research