HSR&D

Risk Prediction Models for Hospital Readmission: A Systematic Review

EXECUTIVE SUMMARY

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PREFACE

Health Services Research & Development Service's (HSR&D's) Evidence-based Synthesis Program (ESP) was established to provide timely and accurate syntheses of targeted healthcare topics of particular importance to Veterans Affairs (VA) managers and policymakers, as they work to improve the health and healthcare of Veterans. The ESP disseminates these reports throughout VA.

HSR&D provides funding for four ESP Centers and each Center has an active VA affiliation. The ESP Centers generate evidence syntheses on important clinical practice topics, and these reports help:

- develop clinical policies informed by evidence,
- guide the implementation of effective services to improve patient outcomes and to support VA clinical practice guidelines and performance measures, and
- set the direction for future research to address gaps in clinical knowledge.

In 2009, the ESP Coordinating Center was created to expand the capacity of HSR&D Central Office and the four ESP sites by developing and maintaining program processes. In addition, the Center established a Steering Committee comprised of HSR&D field-based investigators, VA Patient Care Services, Office of Quality and Performance, and Veterans Integrated Service Networks (VISN) Clinical Management Officers. The Steering Committee provides program oversight, guides strategic planning, coordinates dissemination activities, and develops collaborations with VA leadership to identify new ESP topics of importance to Veterans and the VA healthcare system.

Comments on this evidence report are welcome and can be sent to Nicole Floyd, ESP Coordinating Center Program Manager, at nicole.floyd@va.gov.

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CONTEXT

Predicting hospital readmission risk is of great interest to identify which patients would benefit most from care transition interventions, as well as to risk-standardize readmission rates for purposes of hospital comparison.

OBJECTIVE

To summarize validated readmission risk prediction models, describe their performance, and assess suitability for clinical or administrative use.

METHODS

Data Sources: MEDLINE, CINAHL, and Cochrane Library through March 2011, EMBASE through August 2011, and hand search of reference lists.

Study Selection: Dual review to identify English language studies of prediction models tested with medical patients, with both derivation and validation cohorts.

Data extraction: Data were extracted on the population, setting, sample size, follow-up interval, readmission rate, model discrimination and calibration, type of data used, and timing of data collection.

RESULTS

Of 7,843 citations reviewed, 30 studies of 26 unique models met criteria. The most common outcome used was 30-day readmission; only one model specifically addressed preventable readmissions. Fourteen models relying on retrospective administrative data could be potentially used for standardization of readmission risk and hospital comparisons; of these, nine were tested in large US populations and had poor discriminative ability (c-statistics 0.55 – 0.65). Seven models could potentially be used to identify high-risk patients for intervention early during a hospitalization (c-statistics 0.56 – 0.72), and five could be used at hospital discharge (c-statistics 0.68 – 0.83). Six studies compared different models in the same population and two of these found that functional and social variables improved model discrimination. Though most models incorporated medical comorbidity and prior utilization variables, few examined variables associated with overall health and function, illness severity, or social determinants of health.

CONCLUSIONS

Most current readmission risk prediction models, whether designed for comparative or clinical purposes, perform poorly. Though in certain settings such models may prove useful, efforts to improve their performance are needed as use becomes more widespread.