

'Rothman Index' may help to lower repeat hospitalization risk

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A health risk score calculated automatically using routine data from hospital electronic medical records (EMR) systems can identify patients at high risk of unplanned hospital readmission, reports a study in the September issue of *Medical Care*.

The score, called the Rothman Index, may provide a useful tool for lowering the rate of avoidable repeat hospitalizations, according to the report by Elizabeth Bradley, PhD, of Yale School of Public Health and colleagues. They write, "Clinicians can use the Rothman index to target [hospital](#) programs and supports to [patients](#) at highest risk of readmission."

Routine Data Identify Patients at High Risk of Readmission

The researchers evaluated the Rothman Index as a "practical tool" for assessing readmission risk. The Rothman Index software uses information from the hospital EMR system to provide a continuously updated score indicating the likelihood of death or readmission within 30 days.

The score is calculated automatically using routine data on each patient's vital signs, routine nursing assessments, [skin condition](#), [heart rhythms](#), and laboratory tests. Lower Rothman Index scores (from a maximum of 100) indicate a higher risk of readmission.

Dr Bradley and colleagues evaluated the ability of the Rothman Index to predict hospital readmission, based on data from more than 2,700 patients hospitalized during 2011. (During this time, doctors and nurses did not have access to the Rothman Index scores.) Sixteen percent of the patients had an unplanned readmission within 30 days after [hospital discharge](#).

The Rothman Index was strongly associated with the risk of unplanned readmission. For patients in the highest-risk category—Rothman Index less than 70—readmission risk was more than 1 in 5. By comparison, for those in the lowest-risk category—Rothman Index 80 or higher—the risk was about 1 in 10.

After adjustment for other factors, patients in the highest versus lowest risk category were more than two and a half times as likely to be readmitted within 30 days of discharge. The Rothman Index predicted readmission across diagnoses and medical specialties.

Rothman Index Could Help Efforts to Lower Repeat Hospitalizations

Unplanned hospital admissions are a major quality and cost issue in the US healthcare system. About 20 percent of Medicare patients are readmitted to the hospital within 30 days, at an estimated cost of \$17 billion per year. Hospitals are looking for more effective ways of reducing readmissions—especially now that Medicare has begun reducing payments to hospitals with high readmission rates.

The Rothman index is especially valuable because it is calculated automatically from routine data, requiring no manual input from busy healthcare professionals. It was developed by brothers Michael and Steven Rothman in memory of their mother, who died unexpectedly four

days after hospital discharge following heart surgery.

During their mother's illness, the Rothman brothers were surprised to learn that the hospital's EMR system did not generate summary patient health measures that might have alerted doctors to unrecognized complications that were present at discharge. While neither of the brothers had medical training, both were computer scientists with experience in applying complex analytical tools to massive electronic databases.

The new study suggests that the Rothman Index could help reduce rates of unplanned readmission, identifying a group of patients two to three times more likely to be readmitted. Implemented into daily care, the Rothman Index could provide "a practical way for clinicians to identify patients who might be at higher risk for unplanned readmission and intervene specifically for these patients to try to avert unplanned [readmission](#)," Dr Bradley and coauthors write.

"We know the Rothman Index is associated with readmissions, but we do not know if it can be used to improve decision making at the bedside in terms of when patients are discharged," commented Dr Bradley, who is professor of public health at the Yale School of Public Health and faculty director at the Yale Global Health Leadership Institute.

"We also don't know if physicians would benefit from using it as part of determining what kinds of added supports at home and in the community might be arranged at discharge," Dr Bradley added. "Answering these questions will determine if the Rothman Index can be used prospectively by clinicians to reduce readmissions and adverse events post-hospitalization." Dr Bradley's coauthors were Olga Yakusheva, PhD, Leora I. Horwitz, MD, Heather Sipsma, PhD, and Jason Fletcher, PhD.

Provided by Wolters Kluwer Health

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