

CLINICAL PRACTICE

A Brief Risk-stratification Tool to Predict Repeat Emergency Department Visits and Hospitalizations in Older Patients Discharged from the Emergency Department

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Abstract

Objectives: To evaluate the predictive ability of a simple six-item triage risk screening tool (TRST) to identify elder emergency department (ED) patients at risk for ED revisits, hospitalization, or nursing home (NH) placement within 30 and 120 days following ED discharge. **Methods:** Prospective cohort study of 650 community-dwelling elders (age 65 years or older) presenting to two urban academic EDs. Subjects were prospectively evaluated with a simple six-item ED nursing TRST. Participants were interviewed 30 and 120 days post-ED index visit and the utilization of EDs, hospitals, or NHs was recorded. Main outcome measurement was the ability of the TRST to predict the composite endpoint of subsequent ED use, hospital admission, or NH admission at 30 and 120 days. Individual outcomes of ED use, hospitalization, and NH admissions were also examined. **Results:** Increasing cumulative TRST scores were associated with significant trends for ED use, hospital admission, and composite outcome at both 30 and 120 days

($p < 0.0001$ for all, except 30-day ED use, $p = 0.002$). A simple, unweighted five-item TRST ("lives alone" item removed after logistic regression modeling) with a cut-off score of 2 was the most parsimonious model for predicting composite outcome (AUC = 0.64) and hospitalization at 30 days (AUC = 0.72). Patients defined as high-risk by the TRST (score ≥ 2) were significantly more likely to require subsequent ED use (RR = 1.7; 95% CI = 1.2 to 2.3), hospital admission (RR = 3.3; 95% CI = 2.2 to 5.1), or the composite outcome (RR = 1.9; 95% CI 1.7 to 2.9) at both 30 days and 120 days than the low-risk cohort. **Conclusions:** Older ED patients with two or more risk factors on a simple triage screening tool were found to be at significantly increased risk for subsequent ED use, hospitalization, and nursing home admission. **Key words:** geriatric screening; emergency department; health care utilization; outcomes; risk assessment. *ACADEMIC EMERGENCY MEDICINE* 2003; 10:224-232.

Elders (age ≥ 65 years) comprise an increasing proportion of emergency department (ED) users.¹ A secondary analysis of the National Hospital Ambulatory Medical Care Survey (NHAMCS) reported that elders represent approximately 20% of all ED encoun-

ters,² and the highest rate of ED use when analyzed by age group is in those 75 years and older.³

Emergency department visits by elders have been characterized as a "sentinel event."^{4,5} Older ED patients are at an increased risk for hospital admissions, intensive care unit (ICU) admission, and return ED visits, when compared with their younger cohorts.^{1,6} Approximately one in four elders will have a subsequent ED return within 90 days following an index ED visit.⁷ Older patients also experience functional decline and decreased health-related quality of life following an ED visit.⁸ Short- and long-term predictors of ED revisit, hospitalization, or death among older patients discharged from the ED include poorer physical functioning and mental health, lack of supplemental insurance, comorbidities, and use of ambulance transport for the initial ED visit.⁹

Given the prevalence of ED visits and the increased risk for subsequent adverse outcomes, better and more comprehensive evaluations have been suggested for this group.^{10,11} While ED-based comprehensive case-finding programs have been shown to be feasible,^{12,13}

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A related commentary appears on page 271.

brief screening instruments may have more utility in the ED setting. However, little work has been reported on simple screening tools that could be used to identify older ED patients at risk for adverse outcomes. McCusker et al. developed a self-reported screening tool, the Identification of Seniors at Risk (ISAR), to identify older ED patients at increased risk for functional decline,¹⁴ and reported that it had moderate predictive ability for early (within 30 days) ED return visits.¹⁵ However, to our knowledge, this screening tool has not been evaluated in other ED settings.

The ED has been recognized as a potentially important site for identification of higher-risk older adults. Common psychosocial or functional issues are frequently either unrecognized or underevaluated in the course of an ED visit,^{16,17} leaving the older adult vulnerable to adverse functional outcomes (e.g., falls), noncompliance with medications or post-discharge instructions (e.g., due to cognitive impairment), or self-neglect or abuse. These events could lead to repeat ED visit, unnecessary or preventable hospital admission, or nursing home (NH) admission. Detection and risk stratification of patients at risk for adverse outcomes would allow targeted comprehensive geriatric assessment (CGA) and specific interventions to address unmet medical and social needs in this group. For these reasons, we developed a two-stage screening and assessment program for older ED patients that uses a simple ED nursing instrument followed by a CGA by a geriatric advanced practice nurse (APN).¹⁸ Our study objective was to evaluate the utility and predictive ability of a simple six-item triage risk screening tool (TRST) to identify elder ED patients at risk for ED revisits, hospitalization, or NH placement within 30 and 120 days following ED discharge. We also compared this tool with the APN categorization of older ED patients as potentially high or low risk for the same adverse health care outcomes.

METHODS

Study Design. This was a prospective cohort study that examined the predictive ability of a TRST to identify elder ED patients at risk for ED revisits, hospitalization, or NH placement within 30 and 120 days following an index ED visit. The institutional review boards at both institutions approved the study.

Study Setting and Population. This study was conducted at two urban, academic EDs: a 1,000-bed tertiary referral center with 40,000 visits/year and a 700-bed public hospital with 70,000 visits/year. Potential participants were community-dwelling elders (65 years or older) who visited one of the ED study sites from October 1999 through June 2000. Patients were eligible if they were going to be discharged home from the ED; resided within the geographic service area; had telephone access; and were able to hear, understand,

and speak English. Subjects with significant cognitive impairment were enrolled if they had a primary caregiver willing to serve as proxy respondent. Trained research assistants screened potential participants for study eligibility five days a week, including one evening or weekend shift chosen at random. Subjects were enrolled only once, at the first eligible visit when a research assistant was present.

Study Protocol. This was a planned secondary outcome analysis of a randomized clinical trial.¹⁹ All study participants were prospectively evaluated by ED staff nurses using a TRST (Figure 1). The risk factor items that were chosen had previously been reported to be predictive of adverse outcomes (repeat ED use, hospitalization, or NH placement) in older patients. The development of the screening tool used a two-step process of literature review and expert panel consensus, and has been previously described.¹⁸ Risk factors were assessed categorically (yes/no for the items cognitive impairment, difficulty walking/transferring, and professional recommendation; and yes/no/unable to determine for the remaining items: lives alone/no caregiver, polypharmacy, and recent ED use or hospitalization). The number of risk factors present were summed. For the randomized clinical trial, subjects were considered to be a high-risk cohort, a priori, if they had cognitive impairment alone, or the presence of two or more TRST risk factors. Block randomization was used to ensure equivalent numbers of subjects with low- and high-risk TRST scores.

The TRST was standardized and educational sessions were conducted for all nursing personnel prior to initiating the study. Throughout the enrollment period, educational updates were provided at both sites. For the purpose of studying reliability, TRST surveys were completed for 37 patients by two different surveyors. There was one discrepancy out of 222 questions (37 screens using the six TRST items). Kappa was 1.0 for all items except for a single discrepancy regarding professional recommendation (kappa = 0.94).

- History or evidence of cognitive impairment (poor recall or not oriented)
- Difficulty walking/transferring or recent falls
- Five or more medications
- ED use in previous 30 days or hospitalization in previous 90 days
- RN professional recommendation*

Figure 1. The triage risk screening tool (TRST). The "Lives alone or no available caregiver" item was removed from the final model. *Emergency department (ED) nurse (RN) concern for elder abuse/neglect, substance abuse, medication noncompliance, problems meeting instrumental activities of daily living, or other.

After obtaining informed consent, baseline data were collected using a structured questionnaire. The baseline interview included the Short Portable Mental Status Questionnaire (SPMSQ),²⁰ the SF-36,²¹ questions on the ability to perform activities of daily living (ADLs) and instrumental activities of daily living (IADLs), and questions on current use of community services. Additional information abstracted from the medical record included triage level, reason for the ED visit, the number of medications, utilization of the ED and the hospital 30 days prior to the ED visit, and whether there was a referral to a community agency or primary care provider upon discharge.

A randomized subset of patients also received a standardized CGA by an ED-based APN. The APN, who was blinded to each subject's TRST score, then categorized subjects as high- or low-risk according to their professional judgment. This APN intervention was found to have no effect in lowering the probability of composite outcome.¹⁹

Study Interviews. Trained research staff, blinded to TRST scores, APN evaluations, and hypotheses of the study, interviewed the participants at baseline, and 30 and 120 days after the index ED visit. Standardization of the questionnaires and consistency of ratings by research staff were verified by measurements of inter-rater reliability. Participants were interviewed by telephone by trained interviewers 30 and 120 days following the ED index visit, and the utilization of EDs, hospitals, or NHs was recorded.

Measures. The main outcome measure was the ability of the TRST to predict the composite endpoint of subsequent ED visit, hospital admission, or NH admission at 30 and 120 days. Subsequent use of the ED, hospital, or NH was obtained via telephone interviews and examination of financial and administrative databases at each hospital. A positive finding by either method was considered to be a positive outcome. The TRST score and individual outcomes of ED use, hospitalization, and NH admissions at 30 and 120 days were also examined. Nineteen (3%) subjects died within 120 days of their index ED visit. Outcome measures prior to death are included. In the subset of patients randomized to receive the APN assessment, a TRST classification of high or low risk (developed from logistic regression modeling based on occurrence of composite outcome) was compared with the APN risk classification.

Data Analysis. Health care utilization variables (subsequent ED visit not resulting in hospitalization, hospital admission, NH admission) were analyzed as dichotomous variables (no/yes). The TRST variables were also treated dichotomously as present (yes) or absent (no, unable to determine). The TRST variables were entered into a logistic regression model in

a variety of combinations and analyzed by model building to find the combination of variables with the best interpretability and utility for predicting the composite and individual health care utilization outcomes. Separate models for 30- and 120-day outcomes were derived. Since the two models were extremely similar, the 120-day outcome was chosen for model building. Models included Outcome ~ total TRST score (0–6); Outcome ~ CogImp + HomeAlone + ... (reweighted model); Outcome ~ total TRST score (0–5, sans home alone); Outcome ~ total TRST score (0–5, sans one other item, using all five iterations). Bayesian information criteria (BIC) comparison techniques were used to compare models.²² This comparison technique weighs the benefit of goodness of fit with the model's complexity. Receiver operating characteristic (ROC) curves were constructed and the area under the curve (AUC) was calculated. The predictive value of the TRST for the composite endpoint and individual health care utilization was also examined by calculating relative risks (RRs) for these outcome measures. Thirty-day and 120-day outcomes were examined using chi-square tests for categorical variables, Wilcoxon rank-sum for non-normally distributed variables, and t-tests for continuous variables. The Cochran-Armitage trend test was used to examine trends by outcomes and TRST scores. Interobserver agreement was determined for the subset of subjects with both TRST and APN risk classification. Statistical software used for analysis included S-PLUS 6.0 (Insightful, Inc., Seattle, WA) and SAS V8.0 (SAS Institute, Inc., Cary, NC). All statistical tests were two-tailed and a p-value less than 0.05 was considered to indicate statistical significance. Relative risk and kappa are reported with 95% confidence intervals (95% CIs).

RESULTS

There were 7,017 elder individuals who made 9,240 ED visits during the study period. Among these patients, 1,431 (20%) had more than one ED visit (range 2–18). A total of 2,815 (40%) of 7,017 subjects were screened for study eligibility, based on research personnel availability. Patients screened ($n = 2,815$) and not screened ($n = 4,202$) were not different in age ($p = 0.27$), gender ($p = 0.27$), or race ($p = 0.07$). Of those screened, 988 (35%) of 2,815 were eligible and 650 (66%) of the 988 subjects eligible were enrolled. Enrollees ($n = 650$) and those who were eligible but declined to participate ($n = 338$) were not different in age ($p = 0.55$), gender ($p = 0.94$), race ($p = 0.90$), or triage acuity level ($p = 0.09$).

Six hundred forty-seven subjects with complete TRST data were used for this analysis (three had missing TRST scores). Mean age of the entire sample was 74 years (± 6.9 SD); 59% were women and 39% were white. The characteristics of the participants

at the time of the index ED visit are shown in Table 1. Participants had average mental health and physical component scores on the SF-36 and were comparable to age-matched population norms. Ten percent and 20% of the respondents reported requiring help with at least one ADL and IADL, respectively.

The overall mean TRST score was 1.6 (± 1.4 SD), with a median of 1.0 (IQR, 0–2). The distribution of TRST score counts is shown in Table 2. The prevalence of individual TRST risk factors were: cognitive impairment, 8%; lives alone/no caregiver, 27%; difficulty walking/falls, 32%; recent ED use/hospitalization, 25%; polypharmacy, 41%; and nurse concern, 28%.

Twenty-six percent of the study subjects had the composite outcome (ED use, hospitalization, or NH admission) at 30 days, and 48% had the composite outcome at 120 days. Increasing cumulative TRST scores were associated with significant trends for ED use, hospital admission, and composite outcome at both 30 and 120 days ($p < 0.0001$ for all, except 30-day ED use, $p = 0.002$). Thirty- and 120-day outcomes by cumulative TRST score (using the unweighted five-item tool as described below) are shown in Figure 2.

Sensitivity and specificity of the TRST to predict 30- and 120-day composite outcomes are shown in Table 3. Logistic regression modeling was performed to determine whether the six TRST risk factors could be reweighted to increase the ability to predict the composite outcome. ROC curves indicated that the AUC, when reweighting the six TRST factors, was 0.647. Odds ratios to predict composite outcome at 120 days for the six individual TRST items are shown in Figure 3. The TRST item “lives alone/no caregiver” was negatively associated with the composite outcome, and was dropped from the final model. Logistic

TABLE 2. Distribution of the Triage Risk Screening Tool (TRST) Score Counts*

TRST Score	n (%)
0	179 (28)
1	182 (28)
2	135 (21)
3	72 (11)
4	53 (8)
5	22 (3)
6	4 (0.6)

*N = 647; three values are missing.

regression modeling revealed that a summed, unweighted five-item TRST (sans lives alone), with a cut-off score of 2, produced nearly as good a fit (AUC = 0.64) in predicting the composite outcome. For the individual outcome hospitalization, the AUC was 0.72 at 30 days and 0.65 at 120 days. BIC analysis revealed that this unweighted five-item scale was the optimal model (99.6% probability, when compared with the other models).

Using this parsimonious model, patients considered high-risk (TRST score of 2 or greater) were significantly more likely to have subsequent ED use, hospitalization, NH admission, or the composite outcome than the low-risk cohort, as shown in Table 4.

Three hundred ten subjects had both APN and TRST classifications of high- or low-risk recorded. The APN and TRST classifications had 70% agreement (kappa, 0.38; 95% CI = 0.28 to 0.49). Underclassification (APN high/TRST low) and overclassification (APN low/TRST high) occurred with similar frequencies (14.5% v 15.8%). Misclassifications occurred most frequently around the TRST cut-point of 2. Most discrepancies (classified as high-risk by the TRST and low-risk by the APN) occurred for TRST scores of 2–3 (55% agreement); there were few discrepancies for those with TRST scores of 4–6 (91% agreement) or 0–1 (74% agreement).

TABLE 1. Participant Characteristics at the Index Emergency Department Visit (N = 647)

Age—mean \pm SD	74.4 \pm 6.9 yr
Gender—female	385 (59%)
Race—white	253 (39%)
Education—mean \pm SD	11.3 \pm 3.7 yr
Receiving Medicaid	47 (14%)
SPMSQ*	
Score mean \pm SD	8.1 \pm 1.9
>4 errors	18 (2.8%)
SF-36†	
Standardized Physical Component Scale score—mean \pm SD	37.0 \pm 12.1
Standardized Mental Component Scale score—mean \pm SD	51.8 \pm 10.8
Current comorbidities—mean \pm SD	3.1 \pm 2.4
Current medications—mean \pm SD	4.5 \pm 3.3

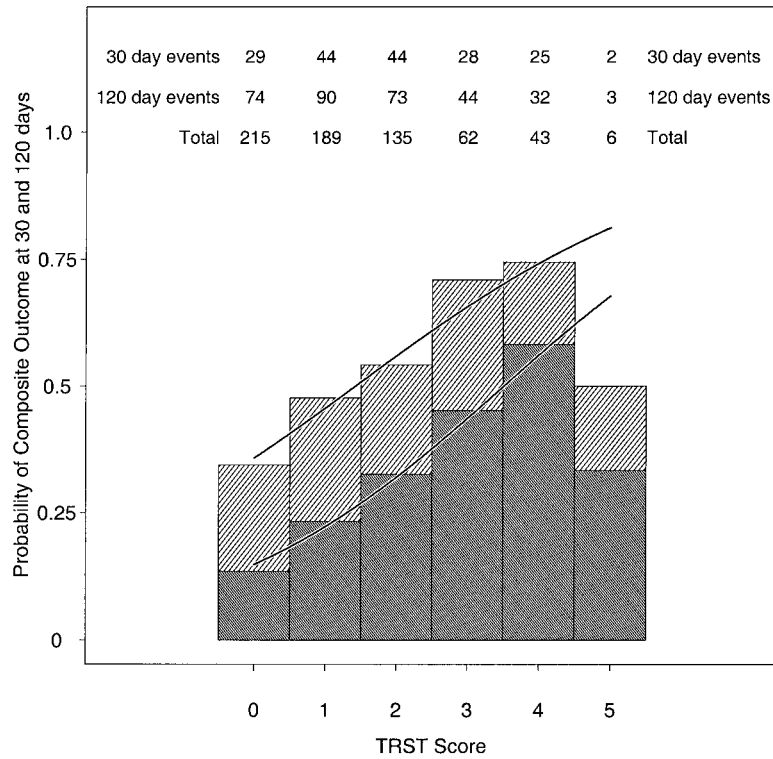
*SPMSQ = the Short Portable Mental Status Questionnaire.

†SF-36 = The Medical Outcomes Survey 36-Item Short-Form Health Survey.

DISCUSSION

In this study of community-dwelling, older ED patients, a simple six-item nursing screen was evaluated for its ability to identify elders who might be at risk for repeat ED visits, hospitalization, or NH admission. Older persons with summed TRST scores of 2 or greater were significantly more likely to return to the ED or require hospital admission during the follow-up period. These high-risk subjects had significant rates of ED revisits (23% and 47%) and hospital admission (23% and 38%) at 30 and 120 days, respectively. Relative risks were highest for subsequent hospitalization. Subjects considered high-risk were more than three times more likely than the low-risk cohort to be admitted within 30 days of their index visit. This increased risk of admission continued during the 120-day study period, with high-risk

Composite Outcome vs. TRST Score



ED Use vs. TRST Score

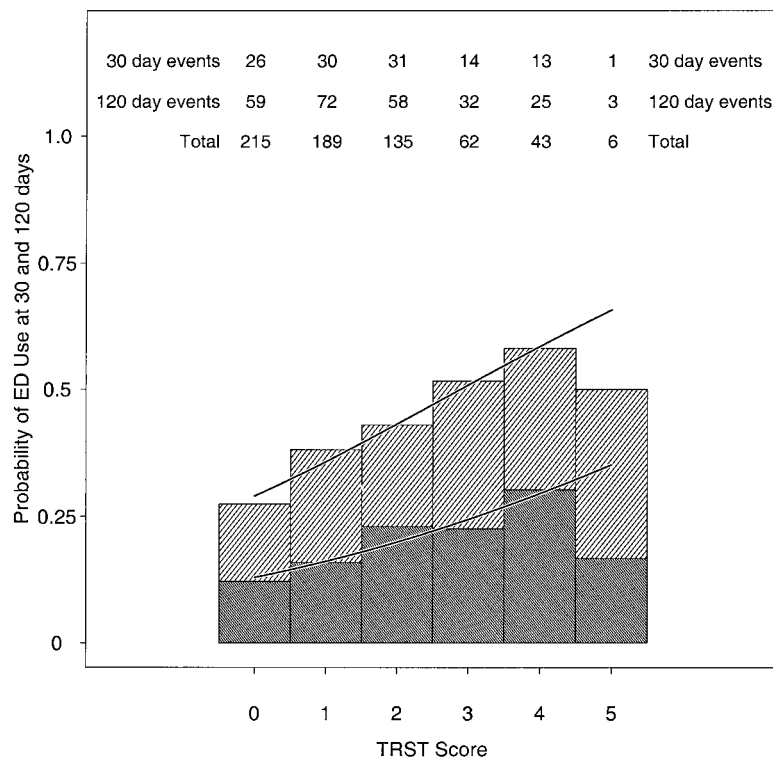


Figure 2. Outcomes by cumulative triage risk screening tool (TRST) score (unweighted five-item scale). ED = emergency department. (Continues on next page.)

Hospital Admission vs. TRST Score

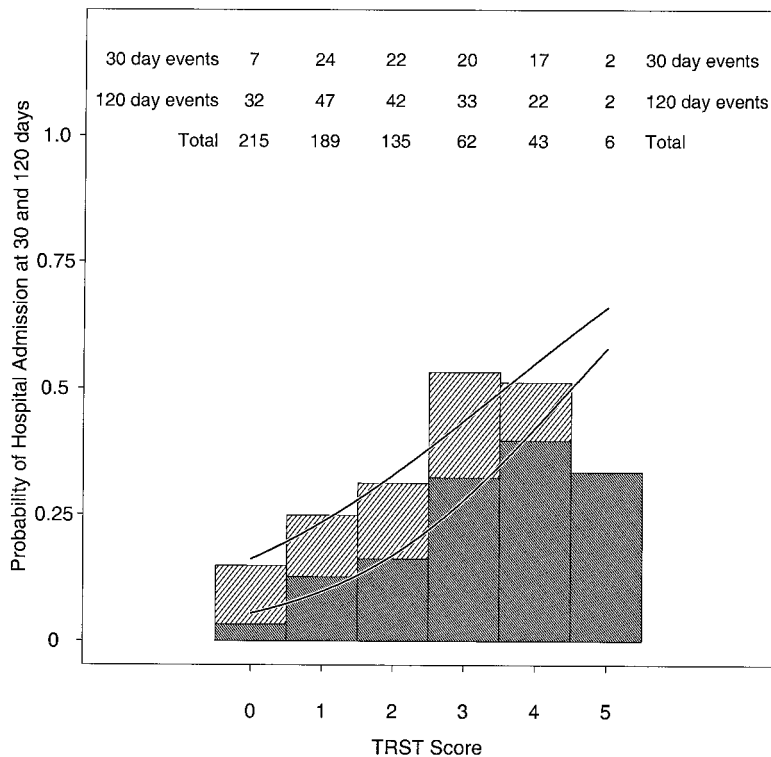


Figure 2 (cont.). Outcomes by cumulative triage risk screening tool (TRST) score (unweighted five-item scale).

elders having twice the risk of hospitalization. Relative risk for NH admission and the composite endpoints were also significantly higher for elders with positive TRST screens.

The TRST cut-off score was designed to be fairly sensitive in detecting at-risk elders and was initially weighted toward cognitive impairment. However, 99% of high-risk elders were positive for at least two TRST items and a simplified cut-off score of 2 would detect this group. Logistic regression revealed that difficulty walking, recent ED use, and taking five or more medications were all significant predictors of the composite outcome at 120 days. Point estimates of the odds ratios for cognitive impairment and professional nurse recommendation indicated that they were also positive risk factors, but alone were not statistically significant. It is interesting that the “lives

alone, lack of caregiver” risk factor was negatively associated with the composite outcome. It is possible that the ability to live alone is representative of a healthier, more independent group of elders who are less likely to utilize subsequent health care services.

Deleting the “lives alone or no caregiver” item and simply summing the unweighted TRST positive responses resulted in a much simpler-to-use five-item tool, with no decrease in predictive ability. Using a cutoff score of 2, this simplified five-item risk-stratification tool had moderate predictive ability for the composite outcome occurrence, with the best predictive value occurring for hospitalization within 30 days of the index ED visit.

McCusker and colleagues have also recently developed a patient self-reported screening tool to

TABLE 3. Sensitivity and Specificity of the Triage Risk Screening Tool (TRST) Scores for Composite Outcome

TRST Cutoff	30-day Composite Outcome			120-day Composite Outcome		
	Sensitivity	Specificity	Sum	Sensitivity	Specificity	Sum
≥0	1.00	0.00	1.00	1.00	0.00	1.00
≥1	0.85	0.32	1.18	0.79	0.34	1.13
≥2	0.64	0.63	1.27	0.55	0.66	1.21
≥3	0.39	0.82	1.22	0.31	0.83	1.14
≥4	0.26	0.93	1.18	0.19	0.94	1.13
≥5	0.08	0.97	1.05	0.05	0.97	1.02
≥6	0.01	1.00	1.01	0.01	0.99	1.00

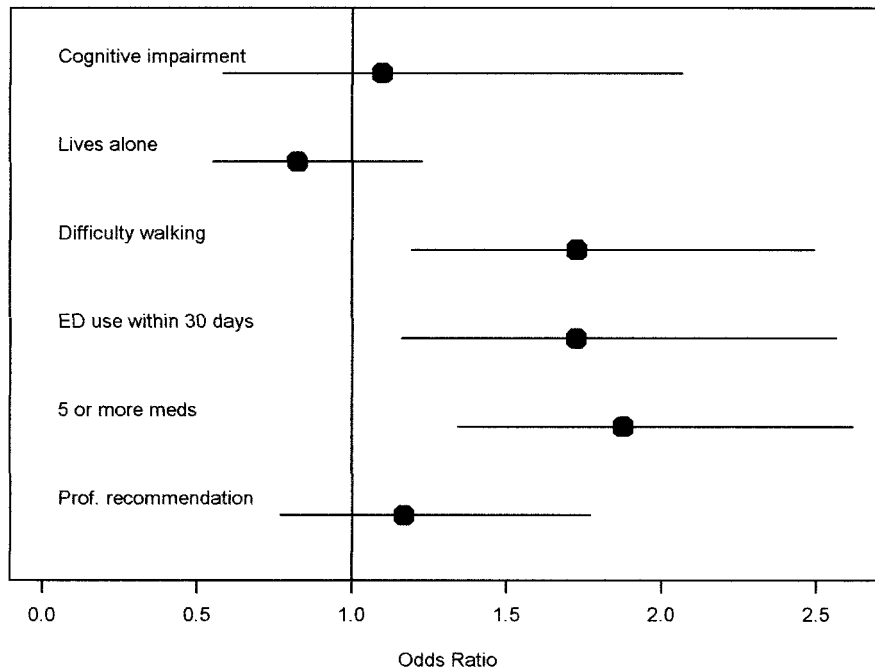


Figure 3. Results of the logistic regression fitting each of the six triage risk screening tool (TRST) items on composite outcome. Odds ratios and 95% confidence intervals are shown for individual items of the TRST for the composite outcome within 120 days. ED = emergency department.

identify older ED patients at increased risk for adverse health outcomes such as death, NH admission, or a clinically significant decrease in functional status. The screen consisted of six self-report questions that examined functional dependence (premorbid and acute change), recent hospitalization, impaired memory, impaired vision, and polymedication.¹⁴ A subsequent study examined the pattern and predictors of ED return visits in elder ED patients, and evaluated the predictive ability of this screening tool. They found that in the first month after an ED visit, return rates were highest (19%) and were often

TABLE 4. Outcomes by Triage Risk Screening Tool (TRST) Risk Status*

	Low-risk (N = 357)	High-risk (N = 290)	RR (95% CI)
Composite			
30-day	61 (17%)	111 (38%)	2.2 (1.7, 2.9)
120-day	141 (39%)	175 (60%)	1.5 (1.3, 1.8)
ED use			
30-day	49 (14%)	66 (23%)	1.7 (1.2, 2.3)
120-day	113 (31%)	136 (47%)	1.5 (1.2, 1.8)
Hospital admission			
30-day	25 (7%)	67 (23%)	3.3 (2.2, 5.1)
120-day	66 (18%)	112 (38%)	2.1 (1.6, 2.7)
Nursing home admission			
30-day	0 (0%)	11 (4%)†	—
120-day	3 (1%)	14 (6%)	6.2 (1.8, 21.5)

*High-risk denotes a TRST score of 2 or more; TRST scores are missing for three subjects.

† $p < 0.00001$.

for the same diagnosis. A combination of medical (presence of cardiovascular disease and depression) and social (lack of social support, and marital status) factors predicted both early and frequent returns to the ED. Multiple logistic regression modeling for predicting early and frequent return ED visits found moderate predictive ability (AUC of 0.63 and 0.68) for their screening tool.¹⁵

Caplan et al. prospectively evaluated patients 75 years and older to identify risk factors for hospitalization within four weeks of an ED visit. Seventeen percent of the study cohort was admitted during the follow-up period. Risk factors for admission in this study cohort included several functional deficits (ADLs: bathing, dressing, and climbing stairs; and IADLs: finance, shopping, and transport) and use of a community nurse (home nursing services).²³ Friedmann and colleagues also examined predictors for early ED revisit, hospital admission, and death in older ED patients discharged home. Sixteen percent of their study population experienced this primary composite outcome at 30 days and 27% at 90 days. Scoring in the lowest third of physical and mental health functioning, and lack of supplemental insurance predicted the composite outcome at 30 days, while poor physical functioning, comorbidity, and use of ambulance transport predicted 90-day outcomes.⁹

Our results are very comparable, with overall 30-day ED return rates of 18%, and 30-day admission rates of 14%. The ED revisit and admission rates for all subjects at 120 days were 38% and 27%, respectively. The composite outcome for the entire

unstratified sample was 26% and 49%, at 30 and 120 days, respectively. Importantly, older ED patients identified as high-risk by the TRST had significantly increased risks for all outcomes measured, with the highest RR noted during the initial 30-day period following the index ED visit.

Given the hectic, busy ED setting, our TRST items were designed to be quickly and easily assessed. The screen takes only 1 to 2 minutes to complete, and nursing personnel need minimal instruction in its use. The TRST has readily been accepted by the ED nursing personnel and has now been incorporated as a standardized age-appropriate triage assessment at both study sites. In a previous analysis of over 40,000 ED visits by older patients, TRSTs were completed on 72% of eligible patients.¹⁸ In this unselected ED population from four ED sites (two urban teaching hospitals, a community hospital, and a suburban health maintenance organization), approximately one in four home-going elders were categorized by the TRST as high-risk.

Comparison of the TRST risk categorization with the APN assessment showed fair agreement. The APN assessment was a lengthy (approximately 45 minutes), structured comprehensive geriatric evaluation, using several standardized instruments that assessed the participants' social characteristics, medical information (including medications), cognitive and physical functioning, alcohol use, and depression.¹⁸ As might be expected, discrepancies occurred most commonly around the TRST cut-point for high risk, and were much less common with low (0-1) or high (4-6) TRST scores.

LIMITATIONS

Our outcomes were limited to 120-day follow-up, and adverse outcomes occurring after this time might change the estimations of the TRST's predictive ability. Our results may not be generalizable to other settings. Our patients represent a primarily urban and African-American population. Attempts to limit selection bias included utilizing various days and times for study screening and enrollment. Our study population's demographics were very similar to the eligible but not screened subjects, and to those screened but not enrolled. However, it is possible that these groups may have differed in health care utilization outcomes. Additionally, the block randomization of our randomized controlled trial was designed to increase the proportion of elders considered to be at risk for the measured outcomes, and in an unselected population and different setting, the distribution of TRST scores and proportion of those considered to be high risk may be different. Although the APNs were blinded to the subjects' TRST scores, they were aware of the individual items that made up the TRST, and potential categorization biases cannot

be excluded. It is also possible that not all TRST items are equally valid. For example, cognitive impairment is often underrecognized and the 8% prevalence recorded by the nurse screen is probably low. A recent study of older (age >70 years) ED patients at one of the study sites found a 15% prevalence of cognitive impairment (dementia).¹⁷ In addition, self-reports may be less accurate in some high-risk patients, such as those with cognitive impairment and greater functional limitations. Further examination of the validity of the TRST, and its ability to predict health care outcomes (mortality, functional decline, and health-related quality of life) is currently under way.

Risk factors identified by the TRST that are potentially amenable to case management include polypharmacy, falls, cognitive impairment, and several of the nurses' professional concerns (neglect, substance abuse, and medication noncompliance). It is important to acknowledge that ED use and hospitalizations involving older patients may not be easily amenable to geriatric evaluation and management programs. One randomized controlled trial involving nurse case management of frail older people found that nurse-case-managed older adults were more likely to use the ED, and reported no significant difference in admission to hospital or length of stay.²⁴ Naylor et al. examined a comprehensive discharge planning protocol and home follow-up program, implemented by APNs, for hospitalized elders.²⁵ Although hospital readmissions and length of stay were decreased in the intervention group, there was no difference in post-discharge ED use. McCusker and colleagues have recently shown that a two-stage (ISAR screen and nursing assessment) intervention for older ED patients decreased the rate of subsequent functional decline.²⁶

Future studies of targeted geriatric case management in the ED setting should examine whether health care utilization, health-related quality of life, and functional status in this at-risk group could be positively influenced if these risk factors are addressed. Successful case-finding and intervention programs for this at-risk population will need to use brief, targeted interventions with proven effectiveness.

CONCLUSIONS

In this study of community-dwelling elders discharged home from an ED, patients with two or more risk factors on a simple triage screening tool were found to be at a significantly increased risk for subsequent ED use, hospitalization, or nursing home admission. This risk was highest in the first 30 days following the index ED visits. This brief screening tool had fair agreement with a comprehensive geriatric assessment by a geriatric advanced practice nurse in detecting elders who were believed to need further

interventions and are at-risk for recurrent ED visits, and hospital or nursing home admissions.

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