Please find below the results of your literature search request.

If you would like the full text of any of the abstracts included, or would like a further search completed on this topic, please let us know.

We’d appreciate feedback on your satisfaction with this literature search. Please visit [http://www.hello.nhs.uk/literature_search_feedback.asp](http://www.hello.nhs.uk/literature_search_feedback.asp) and complete the form.

Thank you

**Literature search results**

<table>
<thead>
<tr>
<th>Search completed for:</th>
<th>14th June 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search required by:</td>
<td>14th June 2013</td>
</tr>
<tr>
<td>Search completed on:</td>
<td>14th June 2013</td>
</tr>
<tr>
<td>Search completed by:</td>
<td>Richard Bridgen</td>
</tr>
</tbody>
</table>

**Search details**

Readmission scoring tools.

**Resources searched**

NHS Evidence; TRIP Database; Cochrane Library; AMED; BNI; CINAHL; EMBASE; HMIC; Health Business Elite; MEDLINE; PsychINFO; Google Scholar; Google Advanced Search

**Database search terms:** readmission*; readmit*; rehospitalis*; rehospitaliz*; READMISSION; hospital*; exp HOSPITALS; ACUTE CARE; "acute care"; "secondary care"; "trauma care"; acute*; exp TRAUMA; exp WOUNDS AND INJURIES; intensive; critical*; trauma*; emergenc*; accident*; casualt*; ICU; CCU; HCU; exp CRITICAL CARE; (rating OR scoring OR measur* OR assess* OR evaluat*) adj2 (batter* OR model* OR tool* OR checklist* OR instrument* OR scale*); SCALES; exp CLINICAL ASSESSMENT TOOLS; "scoring tool*"; tool*; risk* exp RISK ASSESSMENT; probability; possibility; potential; likelihood; SCORING SYSTEM

**Evidence search string(s):** (readmission OR readmissions) (hospital OR hospital) (acute OR trauma OR critical OR intensive OR emergency OR emergencies) (scores OR score OR scoring OR measurement OR rating OR assessment OR evaluation) (tool OR tools OR battery OR model OR models OR checklist OR checklists OR instrument OR instruments OR scale OR scales) (risk OR probability OR possibility OR potential)

**Google search string(s):** ~readmission ~hospital (~acute OR ~trauma OR ~critical OR ~intensive OR ~emergency) (~scores OR ~measurement OR ~rating OR ~assessment OR ~evaluation) (~tool OR ~checklist OR ~instrument OR ~scale) (~risk OR ~probability OR ~possibility OR ~likelihood)

**Summary**

There is some research looking at hospital readmission risk assessment scoring tools.
### Guidelines

**Rand Corporation**

*Preventing emergency readmissions to hospital: a scoping review* 2012

### Evidence-based reviews

**Agency for Healthcare Research and Quality**

*Expert Commentary: Eliminating Hospital Readmissions: “No Hospital Left Behind”?* 2012

Weiss and colleagues have developed and validated scales to measure patient readiness for hospital discharge and the quality of hospital discharge teaching. (14, 15) It might also be possible to adapt subscales from commonly used health assessments, such as the 36-Item Short Form Health Survey (SF-36). For example, application of an acute recall version of the SF-36 to patients with asthma seems to correlate well with short-term changes in disease severity.

**American Medical Association**

*Risk prediction models for hospital readmission: a systematic review* 2011

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

**Australian Resource Centre for Healthcare Innovations**

*A structured evidence-based literature review on discharge, referral and admission* 2010

van Walraven, Dhalla, Bell, Etchells, Stiell, Zarnke, Austin and Forster (2010). Derivation and validation of an index to predict early death or unplanned readmission after discharge from hospital to the community.

This paper presents an investigation into the creation and validation of an index to assist in the prevention of readmissions or deaths after discharge from hospital into the community. Within the study setting, of the 4812 participating patients, 385 died or were readmitted on an unplanned basis within 30 days after discharge. Scores using the LACE index ranged from 0 (2.0% expected risk of death or urgent readmission within 30 days) to 19. The LACE index was discriminative and very accurate at predicting outcome risk.

**Commonwealth Fund**

*Reducing hospital readmissions - lessons from top-performing hospitals* 2011

**Database of Abstracts of Reviews of Effects**

*A systematic review of comprehensive geriatric assessment to improve outcomes for frail older people being rapidly discharged from acute hospital: ‘interface geriatrics’* 2012

There was no clear evidence of a benefit for comprehensive geriatric assessment of frail older people being discharged from emergency departments or acute medical settings. However, few trials have been carried out and their overall quality was poor.

*Interventions to reduce hospital readmissions in the elderly: in-hospital or home care. A systematic review* 2011

Thirty-two clinical trials (16,389 participants) were included in the review: 25 randomised controlled trials and seven non-randomised studies. Trials either used in-hospital geriatric assessment during the hospital stay and comprehensive discharge planning or evaluated...
geriatric assessments with home-based follow-up. Fourteen trials fulfilled most or all SIGN quality criteria and 13 trials fulfilled some quality criteria. Five studies fulfilled few or no criteria. Follow-up ranged from one month to 18 months.

**In-hospital geriatric evaluation and discharge management (17 trials, 8,668 participants):** Three studies found significant benefits of the interventions in terms of reduced admissions. In one study there were benefits only for one month post-discharge with no differences observed between the intervention and usual care at two months follow-up. A negative effect of the interventions was found in one study. There no differences were observed in the remaining 13 studies.

**Geriatric assessment with home follow-up (15 trials, 7,701 participants):** Seven trials reported significant benefits of the interventions on readmissions at follow-up. Five studies found some benefits of the intervention at follow-up times of 30 days to six months post-discharge. Another trial found no difference between groups at three months follow-up but benefits of the intervention were observed at 18 months. One study that involved a home-based medication review found more admissions to hospital in the intervention group. The remaining studies found no differences between groups on readmission outcomes.

**Other reviews**

Predictors of hospital readmission: a systematic review 2010

This review identified no risk-standardized models for comparing hospital readmission performance or predicting readmission risk after stroke. Patient-level and system-level factors associated with readmission were inconsistent across studies. The current literature provides little guidance for the development of risk-standardized models suitable for the public reporting of hospital-level stroke readmission performance.

**Published research**

1. **Interraitm contact assessment in transitional care: A pilot study to investigate the usefulness of the assessment based on functional status of the patient population**

**Author(s)** Figueroa-Sierra M., Saint-Eloi M., Baker S., Suchak N.

**Citation:** Journal of the American Geriatrics Society, April 2013, vol./is. 61/(S218), 0002-8614 (April 2013)

**Publication Date:** April 2013

**Abstract:** BACKGROUND: Older patients are frequently transitioned between different health care settings. Transitioning these patients out of the hospital and into another setting successfully is of critical concern for patients, health care providers, and hospitals alike. Unsuccessful transitions from the hospital can quickly lead to unnecessary and costly readmissions. Older adults are especially vulnerable to experiencing a decline in functional status during hospitalization which may lead to an increased need for supportive care and services. PURPOSE: To conduct a pilot study that explores if using an inter-RAITM assessment tool could help identify patient's level of urgency for needing further assessment or services in a transition care center setting. If patients can be identified earlier in the transitional care setting, then appropriate services could be provided to decrease their risk for readmission. We also wanted to explore the relationship, if any, that functional status and race/ethnicity have on patients urgency needs for further assessment and services. METHODS: A random sample of adults 50 years and older receiving care at a transition center in northern Florida were recruited for this study (N=31). Face-to-face interviews were conducted using the interRAITM Contact Assessment (CA). The assessment included the following topics: 1) demographic information; 2) conditions; 3) severity of symptoms; 4) functional abilities; 5) hospital stays; 6) social history; 7) informal helpers; and 8) history of falls. RESULTS: The interRAITM CA was found useful in identifying patients who are in need of further indepth assessment and specialized services, but not necessarily supportive services. Patient's level of urgency for further assessment based on functional status was also identified by race and ethnicity, but we are unable to draw any conclusions about these relationships due to our small sample size. CONCLUSION: Older adults being transitioned between health care settings may have functional decline that can be identified by the interRAITM CA. Further work will determine
how to develop a patient-centered and site-specific assessment instrument that can lead to a reduction in preventable readmissions in the transitional care setting.

Source: EMBASE

2. A multidisciplinary approach to reducing recurrent hospital admissions for older patients

Author(s) Dubin L.J., Griffith D., Wiggins J.

Citation: Journal of the American Geriatrics Society, April 2013, vol./is. 61/(S172), 0002-8614 (April 2013)

Publication Date: April 2013

Abstract: Background: Our recent Medicare Demonstration Project at the University of Michigan Healthcare System (UMHS 2005-2009) focused on improving transitions of care between acute and ambulatory care, resulting in a $22 million cost savings. We subsequently launched a quality improvement program in 2011 that increased social work services for hospitalized older adults to improve care transitions. Model of Care: We added a full-time social worker (MSW) to the Geriatric Inpatient Consult Team (GICT) to offer an interdisciplinary approach to our service. After review of the daily re-admission census, the MSW also worked independently with selected non-GICT patients above age 60 who were readmitted to the medical-surgery service within 30 days of discharge to identify the psychosocial barriers that may have led to the readmission while also identifying systemic trends that could be improved upon hospitalwide. For each re-admitted patient, the inpatient MSW used a structured assessment tool to identify risk for additional hospital readmission such as number of prescribed medications, primary care visits between hospitalizations, support system, and mental health or cognitive diagnoses. If the MSW assessed patients to be at risk for re-hospitalization, the MSW provided targeted readmission-prevention services independent of the GICT including coordination of community resources, detailed notes for providers and direct case management with the outpatient MSW as necessary. Results: Between 3/1/11 and 8/31/12, more than 400 patients were screened by the inpatient MSW in the capacity of GICT or readmitted patient. More than 200 of these patients were subsequently seen by an outpatient MSW within our system for follow-up. Preliminary data shows that these shared patients experienced fewer readmission rates than those patients who did not have the benefit of MSW intervention. Patients without this collaboration experienced a 4% readmission rate within 30 days for the same DRG whereas patients involved in the collaboration experienced only a 2% readmission rate. Conclusions: Medicare data indicates that approximately 20% of older adults are readmitted within 30 days. As such, our study has shown the value of social work collaboration between the inpatient and outpatient settings to improve care transitions for our hospitalized patients.

Source: EMBASE

3. Adherence styles of schizophrenia patients identified by a latent class analysis of the Medication Adherence Rating Scale (MARS): A six-month follow-up study

Author(s) Jaeger S., Pfiffner C., Weiser P., Kilian R., Becker T., Langle G., Eschweiler G.W., Croissant D., Schepp W., Steinert T.

Citation: Psychiatry Research, December 2012, vol./is. 200/2-3(83-88), 0165-1781;1872-7123 (30 Dec 2012)

Publication Date: December 2012

Abstract: The purpose of this study was to examine patients' response profiles to the Medication Adherence Rating Scale (MARS) and to evaluate the potential of response styles as predictors of the future course of psychotic disorders in terms of rehospitalisation and maintenance of medication. A total of 371 psychiatric in-patients with schizophrenia or schizoaffective disorder who were taking part in a naturalistic long-term study completed a German version of the MARS. A Latent Class Analysis (LCA) was performed. Five latent classes of response styles could be identified: "moderately adherent", "critical
discontinuers", "good compliers", "careless and forgetful", and "compliant sceptics". Class membership was found to be related to the severity of symptoms, level of functioning, insight into illness, insight into necessity of treatment, treatment satisfaction and medication side effects. At a six-month follow-up appointment, significant differences between the classes persisted. Participants showing a "good compliers" response pattern had a significantly better prognosis in terms of rehospitalisation rate and maintenance of the original medication than "critical discontinuers". Evaluation of the MARS by studying response profiles provides informative results that reach beyond the results obtained by an evaluation by scores. Patients can be classified into adherence groups that are of predictive value for long-term patient outcome. 2012 Elsevier Ireland Ltd.

Source: EMBASE

4. Predicting readmissions: Poor performance of the LACE index in an older UK population

Author(s) Cotter P.E., Bhalla V.K., Wallis S.J., Biram R.W.S.

Citation: Age and Ageing, November 2012, vol./is. 41/6(784-789), 0002-0729;1468-2834 (November 2012)

Publication Date: November 2012

Abstract: Introduction: interventions to prevent hospital readmission depend on the identification of patients at risk. The LACE index predicts readmission (and death) and is in clinical use internationally. The LACE index was investigated in an older UK population. Methods: randomly selected alive-discharge episodes were reviewed. A LACE score was calculated for each patient and assessed using receiver operator characteristic (ROC) curves. A logistic regression model was constructed, compared with the LACE and validated in a separate population. Results: a total of 507 patients were included with a mean (SD) age of 85 (6.5) years; 17.8% were readmitted and 4.5% died within 30 days. The median LACE score of those readmitted compared with those who were not was 12.5 versus 12 (P = 0.13). The Lace index was only a fair predictor of both 30-day readmission and death with c-statistics of 0.55 and 0.70, respectively. Only the emergency department visit was an independent predictor of readmission, with a c-statistic of 0.61 for readmission. In a validation cohort of 507 cases, the c-statistic of the regression model was 0.57. Conclusion: the LACE index is a poor tool for predicting 30-day readmission in older UK inpatients. The absence of a simple predictive model may limit the benefit of readmission avoidance strategies. The Author 2012. Published by Oxford University Press on behalf of the British Geriatrics Society. All rights reserved.

Source: EMBASE

Available in print at Lincoln County Hospital Professional Library

Available in fulltext from Age & Ageing at the ULHT Library and Knowledge Services’ eJournal collection

5. A model to predict short-term death or readmission after intensive care unit discharge.

Author(s) Ouanes, Islem, Schwebel, Carole, Français, Adrien, Bruel, Cédric, Philippart, François, Vesin, Aurélien, Soufir, Lilia, Adrie, Christophe, Garrouste-Orgeas, Maîté, Timsit, Jean-François, Misset, Benoît

Citation: Journal of Critical Care, 01 August 2012, vol./is. 27/4(0-), 08839441

Publication Date: 01 August 2012

Abstract: Abstract: Objective: Early unplanned readmission to the intensive care unit (ICU) carries a poor prognosis, and post-ICU mortality may be related, in part, to premature ICU discharge. Our objectives were to identify independent risk factors for early post-ICU readmission or death and to construct a prediction model. Design: Retrospective analysis of a prospective database was done. Setting: Four ICUs of the French Outcomerea network participated. Patients: Patients were consecutive adults with ICU stay longer than 24 hours who were discharged alive to same-hospital wards without treatment-limitation decisions. Main results: Of 5014 admitted patients, 3462 met our inclusion criteria. Age was
60.6 ± 17.6 years, and admission Simplified Acute Physiology Score II (SAPS II) was 35.1 ± 15.1. The rate of death or ICU readmission within 7 days after ICU discharge was 3.0%. Independent risk factors for this outcome were age, SAPS II at ICU admission, use of a central venous catheter in the ICU, Sepsis-related Organ Failure Assessment and Systemic Inflammatory Response Syndrome scores before ICU discharge, and discharge at night. The predictive model based on these variables showed good calibration. Compared with SAPS II at admission or Stability and Workload Index for Transfer at discharge, discrimination was better with our model (area under receiver operating characteristics curve, 0.74; 95% confidence interval, 0.68-0.79). Conclusion: Among patients without treatment-limitation decisions and discharged alive from the ICU, 3.0% died or were readmitted within 7 days. Independent risk factors were indicators of patients’ severity and discharge at night. Our prediction model should be evaluated in other ICU populations.

Source: CINAHL

6. Can we use severity assessment tools to increase outpatient management of community-acquired pneumonia?

Author(s) Chalmers JD, Rutherford J

Citation: European Journal of Internal Medicine, July 2012, vol./is. 23/5(398-406), 0953-6205;1879-0828 (2012 Jul)

Publication Date: July 2012

Abstract: Outpatient management of community-acquired pneumonia (CAP) has several potential advantages, including significant cost-savings, a reduction in hospital-acquired infections and increased patient satisfaction. Despite the benefits, it is often difficult to identify which patients may be managed in the community without compromising patient safety. CAP severity scores, such as the pneumonia severity index (PSI) and the British Thoracic Society CURB65/CRB65 scores are designed to identify groups of patients at low risk of mortality who may be suitable for outpatient care. This review discusses the strengths and weaknesses of severity scores for use in determining site of care for patients with pneumonia. Use of the PSI in emergency departments has been shown to increase the proportion of patients treated in the community without increasing patient mortality or hospital readmissions. The CURB65 and CRB65 scores are less complex alternatives to the PSI that have been shown to perform similarly for prediction of 30-day mortality. All 3 scores identify populations at low risk of mortality who may be eligible for outpatient care. Nevertheless, a number of factors not included in severity scores may prevent discharge of these patients, including social factors, co-morbidities and severity markers not captured by severity scores. The limitations of severity scores are discussed along with recent attempts to improve predictive tools, with the development of new biomarkers and alternative scoring systems. Copyright 2011 European Federation of Internal Medicine. Published by Elsevier B.V. All rights reserved.

Source: Medline

7. The prediction of functional decline in older hospitalised patients

Author(s) Hoogerduijn J.G., Buurman B.M., Korevaar J.C., Grobbee D.E., De rooij S.E., Schuurmans M.J.

Citation: Age and Ageing, May 2012, vol./is. 41/3(381-387), 0002-0729;1468-2834 (May 2012)

Publication Date: May 2012

Abstract: Background: thirty to sixty per cent of older patients experience functional decline after hospitalisation, associated with an increase in dependence, readmission, nursing home placement and mortality. First step in prevention is the identification of patients at risk. Objective: to develop and validate a prediction model to assess the risk of functional decline in older hospitalised patients. Design: development study: cohort study (n = 492). Validation study: secondary data analysis of a cohort study (n = 484) in an independent population. Both with follow-up after 3 months. Functional decline was defined as a decline of at least one point on the Katz ADL index at follow-up compared with pre-admission status. Setting: development study: general internal medicine wards of two
university hospitals and one regional hospital. Validation study: general internal wards of an
university hospital. Subjects: patients >=65 years acutely admitted and hospitalised for at
least 48 h. Results: thirty-five per cent of all patients in the development cohort and 32% in
the validation cohort developed functional decline. A four-item model could accurately
predict functional decline with an AUC of 0.71. At threshold 2 sensitivity, specificity, positive
and negative predictive values were 87, 39, 43 and 85%, respectively. In the validation
study, this was, respectively, 0.68, 89, 41, 41 and 89%. Conclusion: pre-admission need for
assistance in instrumental activities of daily living, use of a walking device, need for
assistance in travelling and no education after age 14, are the items of a prediction model
to identify older patients at risk for functional decline following hospital admission. The
strength of the model is that it relies on four simple questions and this makes it easy to use
in clinical practice and easy to administer. The Author 2012. Published by Oxford University
Press on behalf of the British Geriatrics Society. All rights reserved.

Source: EMBASE
Available in print at Lincoln County Hospital Professional Library
Available in fulltext from Age and Ageing at Highwire Press
Available in fulltext from Age & Ageing at the ULHT Library and Knowledge Services'
eJournal collection

8. Prognostic stratification of elderly patients in the emergency department: a
comparison between the "Identification of Seniors at Risk" and the "Silver Code"

Author(s) Di Bari M., Salvi F., Roberts A.T., Balzi D., Lorenzetti B., Morichi V., Rossi L.,
Lattanzio F., Marchionni N.

Citation: The journals of gerontology. Series A, Biological sciences and medical sciences,
May 2012, vol./is. 67/5(544-550), 1758-535X (May 2012)

Publication Date: May 2012

Abstract: The increasing number of elderly patients accessing emergency departments
(EDs) requires use of validated assessment tools. We compared the Identification of
Seniors at Risk (ISAR), using direct patient evaluation, with the Silver Code (SC), based on
administrative data. Subjects aged 75+ years accessing a geriatric ED over an 8-month
period were enrolled. Outcomes were need for hospital admission and mortality at the
index ED access, ED return visit, hospitalization, and death at 6 months. Of 1,632
participants (mean age 84 +/− 5.5 years), 75% were ISAR positive, and the sample was
homogeneously distributed across the four SC risk categories (cutoffs of 0-3, 4-6, 7-10, and
11+). The two scores were mildly correlated (r = .350, p < .001) and had a similar area
under the receiver-operating characteristic curve in predicting hospital admission (ISAR:
0.65, SC: 0.63) and mortality (ISAR: 0.72, SC: 0.70). ISAR-positive subjects were at
greater risk of hospitalization and death (odds ratio 2.68 and 5.23, respectively, p < .001);
the risk increased across SC classes (p < .001). In the 6-month follow-up of discharged
patients, the tools predicted similarly ED return visit, hospital admission, and mortality. The
SC predicted these outcomes even in participants not hospitalized at the index ED access.
Prognostic stratification of elderly ED patients with the SC is comparable with that obtained
with direct patient evaluation. The SC, previously validated in hospitalized patients, predicts
ED readmissions and future hospitalizations even in patients discharged directly from the
ED.

Source: EMBASE

9. Hospital to home: a transition Program for frail older adults.

Author(s) Watkins, Lynn, Hall, Carol, Kring, Daria

Citation: Professional Case Management, 01 May 2012, vol./is. 17/3(117-125), 19328087

Publication Date: 01 May 2012

Abstract: Purpose of Study: This study describes a social-worker navigator transitional
care model for at-risk seniors being discharged from hospital to home. The model is
designed to prevent rehospitalizations so as to improve quality of life and patient outcomes.
This model is different from others with its focus on the psychosocial aspects of care transitions, medical needs, and individualized needs with the provision of nonreimbursable services. Primary Practice Setting: Care begins in the acute care hospital or inpatient rehabilitation facility and continues in the postdischarge home environment. Participants are connected to community services to support their independent living at home.

Methodology and Sample: Case managers, physicians, or others refer potential participants to the navigator. Criteria for inclusion include the following: age 65 years or older, Medicare and/or Medicaid recipient, living in the same county as the hospital, and having at least 2 of a list of 11 criteria that predict readmission. After the participant agrees to enroll, the navigator recommends in-home services at discharge. Within the first 72 hr, the navigator makes a home visit to evaluate the home environment, assess medical management, and make referrals for other services. Follow-up phone calls and other home visits are made by the navigator during the participant’s enrollment, which is from 30 days to 4 months.

Results: Hospital readmissions were decreased by 61% for this high-risk population. Cost savings by preventing readmissions correlated to a cost savings of $628,202 per year. The 36-Item Short-Form Health Survey showed statistically significant improvements in quality-of-life scores for both physical and mental health summary scales and for all 8 subscales (p < .004). Almost all (99%) of respondents were satisfied with the overall Hospital to Home program. Implications for Case Management Practice: The results of this study demonstrate the importance of extending social support and health education into the home after discharge from the hospital. Access to immediate in-home care services such as transportation, housekeeping, laundry, and light meal preparation allows patients not to experience gaps in care that could result in a readmission. The assigned navigator reinforces medical management and connects participants to appropriate community resources in order to remain safe at home.

Source: CINAHL

10. The prognostic value of the Modified Early Warning Score in critically ill patients: A prospective, observational study

Author(s) Reini K., Fredrikson M., Oscarsson A.

Citation: European Journal of Anaesthesiology, March 2012, vol./is. 29/3(152-157), 0265-0215;1365-2346 (March 2012)

Publication Date: March 2012

Abstract: Context: The Modified Early Warning Score is a validated assessment tool for detecting risk of deterioration in patients at risk on medical and surgical wards. Objective: To assess the prognostic ability of the Modified Early Warning Score in predicting outcome after critical care. Design: A prospective observational study. Setting: A tertiary care general ICU. Patients: Five hundred and eighteen patients aged at least 16 years admitted to the ICU at Linkoping University Hospital were included. Intervention: The Modified Early Warning Score was documented on arrival at the ICU and every hour for as long as the patient was breathing spontaneously, until discharge from the ICU. Main outcome measures: The primary endpoint was mortality in the ICU. Secondary endpoints were 30-day mortality, length of stay and readmission to the ICU. Results: Patients with a Modified Early Warning Score of at least six had significantly higher mortality in the ICU than those with a Modified Early Warning Score <6 (24 vs. 3.4%, P<0.001). A Modified Early Warning Score of at least six was an independent predictor of mortality in the ICU [odds ratio (OR) 5.5, 95% confidence interval (CI) 2.4-20.6]. The prognostic ability of the Modified Early Warning Score on admission to the ICU [area under the curve (AUC) 0.80, 95% CI 0.72-0.88] approached those of the Simplified Acute Physiology Score III (AUC 0.89, 95% CI 0.83-0.94) and the Sequential Organ Failure Assessment score on admission (AUC 0.91, 95% CI 0.86-0.97). A Modified Early Warning Score of at least six on admission was also an independent predictor of 30-day mortality (OR 4.3, 95% CI 2.3-8.1) and length of stay in the ICU (OR 2.3, 95% CI 1.4-3.8). In contrast, the Modified Early Warning Score on discharge from the ICU did not predict the need for readmission. Conclusion: This study shows that the Modified Early Warning Score is a useful predictor of mortality in the ICU, 30-day mortality and length of stay in the ICU. 2012 Copyright European Society of Anaesthesiology.

Source: EMBASE
11. Failure of the swift score to predict readmission to the icu
Author(s) Abu-Awwad R., Buran G.
Citation: Journal of Hospital Medicine, March 2012, vol./is. 7/(S88), 1553-5592 (March 2012)
Publication Date: March 2012
Abstract: Background: Despite initial recovery from critical illness requiring intensive care unit (ICU) admission, many patients remain at risk of subsequent deterioration and unplanned readmission to the ICU. Readmitted patients have higher mortality rates and significantly greater lengths of stay. Scoring systems designed to measure the severity of illness for patients admitted to the ICU have been used to predict the risk of readmission to the ICU, but are often too complex to be practical. Recently, the Stability and Workload Index For Transfer (SWIFT) has been reported to predict unplanned ICU readmission. The aim of this study is to validate the SWIFT score as a useful tool to predict readmissions to the ICU. Methods: Consecutive adults discharged from the ICU of two hospitals between January 2009 and June 2011 were studied retrospectively. Patients at Hospital A, a large tertiary care hospital, were limited to medical critical care discharges. At Hospital B, a 250 bed community hospital, a mixture of medical and surgical ICU discharges were examined. The dependent variables were: source of the ICU admission, ICU length of stay, latest PaO2 to FiO2 ratio, PaCO2, and Glasgow Coma Scale prior to discharge. Each of the five SWIFT predictor variables was assigned points as in the original study. The total score was used to predict the 7-day risk of ICU readmission or unexpected death. Logistic regression was used to construct receiver operating characteristic (ROC) curves. Area under the ROC curve (AUROC) was used to judge predictive power of the SWIFT tool. Results: Complete information was available for 5290 cases from Hospital A and 1089 cases from Hospital B. At Hospital A, 352 (6.7%) were readmitted or died unexpectedly within seven days. At Hospital B, 61 (5.6%) suffered the primary event. For Hospital A, logistic regression was highly significant (p<0.0001) but calibrated poorly (H-L chi sq. p=0.0025). For Hospital B, the model was also significant (p=0.0007) and calibrated well (H-L chi sq. p=0.92). The AUROC for Hospital A was 0.66 and for Hospital B was only 0.60. Using the cut-off score of 15 as in the original study, the sensitivity, specificity, PPV and NPV were 40%, 80%, 12%, 95% respectively at Hospital A and 23%, 89%, 11% and 95% respectively at Hospital B. Conclusions: Given the relatively low sensitivity and AUROC, SWIFT is a weak tool for identifying ICU patients at high risk of readmission. Despite the promising results shown in the original study, the SWIFT score does not appear generalizable to other hospitals. Scoring systems that predict the risk of ICU readmission that are simple enough to use at the bedside and show good ability to identify patients at risk remain the goal. Developing practical scoring systems to predict ICU readmission should be pursued by other studies in the future.
Source: EMBASE

12. Prospective Comparison of 6 Comorbidity Indices as Predictors of 1-Year Post-Hospital Discharge Institutionalization, Readmission, and Mortality in Elderly Individuals.
Author(s) Zekry, Dina, Loures Valle, Bernardo Hermont, Graf, Cristophe, Michel, Jean-Pierre, Gold, Gabriel, Krause, Karl-Heinz, Herrmann, François R.
Citation: Journal of the American Medical Directors Association, 01 March 2012, vol./is. 13/3(272-278), 15258610
Publication Date: 01 March 2012
Abstract: Abstract: Background: Older patients often suffer from multiple comorbid conditions. Few comorbidity indices are valid and reliable in the elderly and were rarely compared. Objective: To compare the performance, relevance, and ability of 6 widely used and validated comorbidity indices—Charlson Comorbidity Index, Cumulative Illness Rating Scale–Geriatrics, Index of Coexistent Diseases, Kaplan, Geriatric Index of Comorbidity (GIC), and Chronic Disease Score—to predict adverse outcomes after discharge (1-year risk of rehospitalization, institutionalization, and death). Design, setting, and participants: Prospective study with 1-year follow-up, between January 2004 and December 2005 in 444
elderly patients (mean age, 85; 74% female) discharged from acute geriatric hospital, Geneva University Hospitals. Results: In univariate analyses, Cumulative Illness Rating Scale–Geriatrics and GIC were the predictors with the largest coefficient of determination for mortality with (R² > 2 of 9.3%, respectively 8.8%). GIC was also the only significant predictor of institutionalization (R² = 6.0%). Higher risk of readmission was significantly associated with GIC (R² > 2 of 14.0%), Cumulative Illness Rating Scale–Geriatrics (R² > 2 of 5.6%), Charlson Comorbidity Index (R² > 2 of 3.1%), and Chronic Disease Score (R² > 2 of 1.7).

Conclusions: Understanding how to efficiently predict these adverse outcomes in hospitalized elders is important for a variety of clinical and policy reasons. GIC and Cumulative Illness Rating Scale–Geriatrics may improve hospital discharge planning in a geriatric hospital treating very old patients with acute disease.

Source: CINAHL

13. Prognostic significance of the short physical performance battery in older patients discharged from acute care hospitals

Author(s) Corsonello A., Lattanzio F., Pedone C., Garasto S., Laino I., Bustacchini S., Pranno L., Mazzei B., Passarino G., Incalzi R.A.

Citation: Rejuvenation Research, February 2012, vol./is. 15/1(41-48), 1549-1684;1557-8577 (01 Feb 2012)

Publication Date: February 2012

Abstract: We investigated the prognostic role of the Short Physical Performance Battery (SPPB) in elderly patients discharged from the acute care hospital. Our series consisted of 506 patients aged 70 years or more enrolled in a multicenter collaborative observational study. We considered three main outcomes: 1-year survival after discharge, functional decline, and hospitalization during follow-up. Independent predictors/correlates of the outcomes were investigated by Cox regression or logistic regression analysis when appropriate. The diagnostic accuracy of SPPB in relation to study outcomes was investigated by receiver operating characteristic (ROC) curve. SPPB score was associated with reduced mortality (hazard ratio [HR]=0.86, 95% confidence interval [CI] 0.78-0.95). When the analysis was adjusted for functional status at discharge, such an association was still near significant only for SPPB values >8 (HR=0.51; 95% CI 0.30-1.05). An SPPB score <5 could identify patients who died during follow-up with fair sensitivity (0.66), specificity (0.62), and area under the ROC curve (0.66). SPPB also qualified as independent correlate of functional decline (odds ratio [OR]=0.82; 95% CI 0.70-0.96), but not of rehospitalization or combined end-point death or rehospitalization. An SPPB score <5 could identify patients experiencing functional decline during follow-up with lower sensitivity (0.60), but higher specificity (0.69), and area under the ROC curve (0.69) with respect to mortality. In conclusion, SPPB can be considered a valid instrument to identify patients at major risk of functional decline and death after discharge from acute care hospital. However, it could more efficiently target patients at risk of functional decline than those at risk of death. 2012, Mary Ann Liebert, Inc.

Source: EMBASE


Author(s) Lemke KW, Weiner JP, Clark JM

Citation: Medical Care, 01 February 2012, vol./is. 50/2(131-139), 00257079

Publication Date: 01 February 2012

Abstract: BACKGROUND: : Hospitalizations are costly for health insurers and society. OBJECTIVES: : To develop and validate a predictive model for acute care hospitalization from administrative claims for a population including all age groups. RESEARCH DESIGN: : We constructed a retrospective cohort study using a US health plan claims database, including annual person-level files with demographic markers, and morbidity and utilization measures. We developed and validated the model using separate data. PARTICIPANTS: : The validation sample included 4.7 million persons enrolled for at least 6 months in 2006 and 1 or more months in 2007. MEASURES: : Risk factors and outcome variables were
obtained from administrative claims data using the Adjusted Clinical Group (ACG) system. Utilization variables were added, and models were fitted with multivariate logistic regression. RESULTS: A 3.2% of patients had a hospitalization during a 1-year period, and 20% of patients who had been hospitalized during the previous year were rehospitalized. Effect sizes of risk factors were modest with odds ratios <1.5. Odds ratios were greater than 1.5 for age >=80 years, 3+ prior hospitalizations, 3+ emergency room visits, 20 ACG morbidity categories, and 40 diseases including high impact neoplasms, bipolar disorder, cerebral palsy, chromosomal anomalies, cystic fibrosis, and hemolytic anemia. Model performance of ACG hospitalization models was good (AUC=0.80) and superior to a prior hospitalization model (AUC=0.75) and a Charlson comorbidity hospitalization model (AUC=0.78). CONCLUSIONS: A validated population-based predictive model for hospital risk estimates individual risk for future hospitalization. The model could be useful to health plans and care managers.

Source: CINAHL

15. Comparison of two clinical scoring systems in risk stratification of non-ST elevation acute coronary syndrome patients in predicting 30-day outcomes

Author(s) Rawlings C., Oglesby K., Turner J., Sen A.

Citation: Emergency Medicine Journal, January 2012, vol./is. 29/1(40-42), 1472-0205;1472-0213 (January 2012)

Publication Date: January 2012

Abstract: Background: Non-ST elevation acute coronary syndromes (NSTEACS) confer a broad range of risk of adverse outcomes following presentation to an emergency department. This study compares the Thrombolysis in Myocardial Infarction (TIMI) risk scoring system with the used but untested, Cheshire, Merseyside and North Wales Cardiac Network (CMNW) NSTEACS risk stratification system in predicting the adverse outcomes of re-admission to hospital with either a NSTEACS or death at 30 days post presentation. Method: Once a diagnosis of NSTEACS was made, patients were risk scored, then case notes were retrieved 30 days later. Primary adverse outcome of death and secondary adverse outcome of NSTEACS at 30 days was analysed using a ROC curve. Results: 104 patients were included in the study diagnosed as having NSTEACS. Of these patients, 11 (11%) were initially diagnosed as having unstable angina (UA) (troponin I negative, <0.07), 43 (41%) non-ST elevation myocardial infarction Group 1 (troponin I 0.07-0.49) and 50 (48%) had non-ST elevation myocardial infarction Group 2 (troponin I >=0.50). For death at 30 days, the CMNW risk c-statistic is 0.845 (95% CI 0.728 to 0.962, asymptotic significance 0.02) and TIMI 0.670 (CI 0.493 to 0.847, asymptotic significance 0.25). NSTEACS at 30 days (including NSTEMI and UA), the CMNW risk c-statistic is 0.466 (95% CI 0.345 to 0.586, asymptotic significance 0.616), TIMI 0.418 (CI 0.281 to 0.555, asymptotic significance 0.231). Conclusions: The CMNW score categorised more patients as higher risk, who suffered death at 30 days than the TIMI score.

Source: EMBASE


Author(s) Holyday M, Daniells S, Bare M, Caplan GA, Petocz P, Bolin T

Citation: Journal of Nutrition, Health & Aging, 2012, vol./is. 16/6(562-8), 1279-7707;1760-4788 (2012)

Publication Date: 2012

Abstract: OBJECTIVES: High rates of malnutrition have been reported in the older hospitalized patient population. This is recognised to impact on patient outcomes and health costs. This study aimed to assess the impact of nutrition screening and intervention on these parameters.DESIGN: Randomised controlled prospective study.SETTING: The study was performed in the acute geriatric medicine wards of the Prince of Wales Hospital, Sydney Australia.PARTICIPANTS: All patients admitted to these wards under a geriatrician with an expected length of stay of at least 72 hours were considered for the study.INTERVENTION: Patients were screened on admission for malnutrition using the
Mini Nutritional Assessment (MNA) tool and randomly assigned to control or intervention groups. Intervention patients were immediately commenced on a malnutrition care plan (MCP). Control patients were only commenced on a MCP if referred by clinical staff.

MEASUREMENTS: Length of stay (LOS), weight change and frequency of readmission to hospital were compared between the groups.

RESULTS: 143 patients were screened. 119 were identified as malnourished (MN) or at risk of malnutrition (AR). Overall LOS was not different between the two groups (control v. intervention: 13.4 +/- 1.3 days v. 12.5 +/- 1.2 days, p=0.64). However there was a significant decrease in LOS in the MN (control v. intervention: 19.5 +/- 3 days v. 10.6 +/- 1.6 days, p=0.013) and a trend to reduced readmissions. There was no difference in weight change over admission between the groups. Without screening, clinical staff identified only a small proportion of malnourished patients (35% of MN and 20% of AR).

CONCLUSIONS: Malnutrition in the older hospital population is common. Malnutrition screening on hospital admission facilitated targeted nutrition intervention, however length of stay and re-presentations were only reduced in older malnourished patients with an MNA score less than 17.

Source: Medline

17. Development and validation of the HOPE prognostic index on 24-month posthospital mortality and rehospitalization: Italian National Research Center on Aging (INRCA)

Author(s) Abbatecola A.M., Spazzafumo L., Corsonello A., Sirolla C., Bustacchini S., Guffanti E.

Citation: Rejuvenation Research, December 2011, vol./is. 14/6(605-613), 1549-1684;1557-8577 (01 Dec 2011)

Publication Date: December 2011

Abstract: Background: A fast and simple tool is needed to test for the risk of mortality and rehospitalization in older patients. Objective: The aim of this study was to construct and validate a prognostic index using specific items from the Comprehensive Geriatric Assessment (CGA) in a large population of older hospitalized adults. Method: This was a prospective study of a 24-month follow-up period, between 2005 to 2008 in 3,043 elderly patients (mean age, 81 +/- 6) discharged from three acute geriatric wards in the Marche region of Italy. Baseline predictors of demographics and 25 items from the CGA regarding functional and cognitive status, depression, co-morbidity, social isolation, and quality of life were used to build a summary score, the Hospitalized Older Patient Examination (HOPE) Index. The HOPE index was developed in 1,533 patients and validated in 1,510 consecutively hospitalized patients. Outcome measures were 24-month mortality and rehospitalization. Results: Three risk categories of HOPE based on the best sensitivity and specificity for mortality and rehospitalization were: Low (<=4), moderate (4-8), and high (>=8). Categorizing data across the HOPE index, mortality ranged from 7.9% to 14.5% in the development cohort and 6.2% to 14.0% in the validation cohort, whereas rehospitalization ranged from 68.3% to 79.4% and 69.8% to 79.8%, respectively. Kaplan-Meier survival curves demonstrated that risk for mortality increased with a worsening across the HOPE index (p<0.001). In the development and validation cohorts, a close agreement was found for HOPE on mortality and rehospitalization with a receiver operating characteristic (ROC) of 0.69 (95% confidence interval [CI] 0.61-0.74) vs. 0.67 (95% CI 0.57-0.70) and rehospitalization of 0.62 (95% CI 0.58-0.66) vs. 0.60 (95% CI 0.56-0.63), respectively. In the development and validation cohorts, Cox proportional hazard models showed that a high HOPE index predicted risks of 2.38 (1.34-4.23) and 2.86 (1.24-6.61) on mortality and 1.27 (1.09-1.44) and 1.37 (1.10-1.64) on rehospitalization, respectively. Conclusions: HOPE may be useful for long-term clinical planning, discharge, and follow-up. Copyright 2011, Mary Ann Liebert, Inc. 2011.

Source: EMBASE

18. Evidence-based Risk Factors for Adverse Health Outcomes in Older Patients after Discharge Home and Assessment Tools: A Systematic Review.

Author(s) Preyde, Michèle, Brassard, Kristie

Citation: Journal of Evidence-Based Social Work, 01 October 2011, vol./is. 8/5(445-468).
Abstract: The current health care system is discharging elderly patients “quicker” and “sicker” from acute care facilities. Consequently, hospital readmission is common; however, readmission may be only one aspect of adverse outcomes of importance to social work discharge planners. The early recognition of risk factors might ensure a successful transition from the hospital to the home. A systematic review was conducted to identify factors associated with adverse outcomes in older patients discharged from hospital to home. Using a content analysis, factors were characterized in five domains: demographic factors, patient characteristics, medical and biological factors, social factors, and discharge factors. The most frequently reported risks were depression, poor cognition, comorbidities, length of hospital stay, prior hospital admission, functional status, patient age, multiple medications, and lack of social support. A systematic search identified four discharge assessment tools for use with the general population of elderly patients. Practice and research implications are offered.

Source: CINAHL

19. Does frax score predict hospital outcomes in the elderly emergency department patients?

Author(s) Kanthala A.R., Lee J.A., Bodhit A.N., Nayfield S.K., Stead L.G.

Citation: Annals of Emergency Medicine, October 2011, vol./is. 58/4 SUPPL. 1(S310), 0196-0644 (October 2011)

Abstract: Background & Study Objective: Fracture Risk Assessment Tool (FRAX) is a 10-year predictive risk of osteoporotic fracture in seniors aged 65 and above. FRAX was developed by World Health Organization in 2008. A previous study done at our institute using FRAX score identified that over 50% of elderly white women presenting to the emergency department (ED) are candidates for clinical treatment to reduce risk of fracture. Whether the FRAX score predicts any hospital outcomes among seniors presenting to the ED has not been established. We tried to study if FRAX score predicts hospital outcomes in the elderly ED patients. Methods: Our institute's administrative database was used to identify seniors aged 65 years and over presenting to the ED from August 2008 to September 2009. A total of 5377 senior ED visits were identified. A retrospective medical record review was done by research fellows, coordinators, residents and a board certified emergency physician to collect data on demographics, co-morbidities, admission-readmission rates, Morse fall risk scale scores, hospital length of stay (HLOS), intensive care unit LOS (ICU LOS) and 1-year mortality rate from index ED visit. Regression models such as standard least squares and nominal logistic regression analysis were used for continuous and nominal variables respectively using JMP 8 statistical software. Results: 347 (7%) randomized study sample was selected for analysis. The median age of the study sample was 74 years (IQR=68-81). Females were 210 (61%) with Caucasians 266 (77%), African Americans 65 (19%) and others (4%). Logistic regression analysis showed that the 10-year osteoporotic fracture risk (FRAX score) is a positive predictor for 1-year mortality rate from index ED visit in females (p= 0.004) controlling for Morse fall risk scale score, hospital admission rate, HLOS, ICU LOS, 30-day readmission rates, previous history of fracture within an year and 1-year mortality rate. In contrast for males, 30-day readmission rate (p= 0.046) was weak predictor of 1-year mortality from index ED visit controlling for all the factors mentioned above. A standard least square regression model showed that older age for females was positively correlated to higher 10-year probability risk of osteoporotic fractures (p = <0.001) and females with no Morse fall risk had lower FRAX score. (p= 0.033) when controlled for age, race, Morse fall risk score, Hospital Length of stay [HLOS], ICU LOS, 30-day readmission rate, 1-year mortality rate and number of co-morbidities. On the contrast for males, only age was a positively correlated to FRAX score. (p=<0.0001). Conclusion: FRAX score which can be easily done in the ED not only predicts 10-year probability of osteoporotic risk fracture but may also predict 1-year mortality rate in females and 30-day readmission rate in males. It has a positive correlation to age in both sexes but negative correlation to Morse fall risk scale. FRAX for seniors in the ED may help predict readmission and mortality rates. Further studies are
needed to validate this score for predicting hospital outcomes in ED seniors.

**Source:** EMBASE

Available in fulltext from *Annals of Emergency Medicine* at the ULHT Library and Knowledge Services’ eJournal collection

---

20. **The performance of automated case-mix adjustment regression model building methods in a health outcome prediction setting.**

**Author(s):** Jen MH, Bottle A, Kirkwood G, Johnston R, Aylin P

**Citation:** Health Care Management Science, September 2011, vol./is. 14/3(267-78), 1386-9620;1386-9620 (2011 Sep)

**Publication Date:** September 2011

**Abstract:** We have previously described a system for monitoring a number of healthcare outcomes using case-mix adjustment models. It is desirable to automate the model fitting process in such a system if monitoring covers a large number of outcome measures or subgroup analyses. Our aim was to compare the performance of three different variable selection strategies: “manual”, “automated” backward elimination and re-categorisation, and including all variables at once, irrespective of their apparent importance, with automated re-categorisation. Logistic regression models for predicting in-hospital mortality and emergency readmission within 28 days were fitted to an administrative database for 78 diagnosis groups and 126 procedures from 1996 to 2006 for National Health Services hospital trusts in England. The performance of models was assessed with Receiver Operating Characteristic (ROC) c statistics, (measuring discrimination) and Brier score (assessing the average of the predictive accuracy). Overall, discrimination was similar for diagnoses and procedures and consistently better for mortality than for emergency readmission. Brier scores were generally low overall (showing higher accuracy) and were lower for procedures than diagnoses, with a few exceptions for emergency readmission within 28 days. Among the three variable selection strategies, the automated procedure had similar performance to the manual method in almost all cases except low-risk groups with few outcome events. For the rapid generation of multiple case-mix models we suggest applying automated modelling to reduce the time required, in particular when examining different outcomes of large numbers of procedures and diseases in routinely collected administrative health data.

**Source:** Medline

Available in fulltext from *Health Care Management Science* at EBSCOhost

---

21. **Predicting 30 day readmissions with administrative data**

**Author(s):** Showalter J.W., Swallow N., Rafferty C.

**Citation:** Journal of General Internal Medicine, May 2011, vol./is. 26/(S199-S200), 0884-8734 (May 2011)

**Publication Date:** May 2011

**Abstract:** BACKGROUND: Readmissions within 30 days of hospital discharge have been shown to be frequent and costly. Published studies that have successfully reduced 30 day readmissions involve time and labor intensive interventions; many institutions may not have adequate resources to apply similar interventions to all admitted patients. Development of a risk assessment tool that identifies patients at highest risk of readmission could help institutions to focus interventions on the highest risk patients. Previously published risk assessment tools are limited because their use requires direct patient contact, large amounts of clinical data, and they cannot be done at the time of admission. The objective of this study is to create a risk assessment tool for 30 day readmissions which uses easily obtainable administrative data, requires no patient contact, can be done at the time of admission, and performs better than published risk assessment tools. METHODS: An expert system (rule based computer learning program) was created using data from all adult patients discharged from the Penn State Hershey Medical Center Internal Medicine service between November 1, 2008 and October 31, 2009. The expert system was developed from subjects randomly assigned to a training data set and was validated
against the remaining subjects (testing data set). The expert system was then further validated against an independent data set that included all patients discharged from the Internal Medicine service between November 1, 2009 and October 31, 2010. The primary outcome was all-cause 30 day readmissions to any service at our institution and the secondary outcome was all-cause 30 day readmissions to the Internal Medicine service. Four input variables were used to develop the expert system: 1. number of diagnoses billed, 2. presence of an outpatient clinic visit, 3. presence of an inpatient admission and 4. presence of an Emergency Department visit. All were restricted to the year prior to the date of inpatient admission and to data from our institution. The decision making process of the expert system was based on certainty factor analysis. Certainty factor analysis refers to a mathematical method of handling uncertainty, originally designed for medical decision making. Using the training data set, certainty factors for utilization were determined by calculating the readmission rates for the eight unique patterns of utilizing outpatient, inpatient and Emergency Department services. Certainty factors for number of diagnoses billed were determined for subjects with zero, 1-10 and greater than 10 diagnoses billed, also based on the training data set. A composite certainty factor for readmission (CFR) was then calculated based on those numbers for all subjects. Threshold values of CFR to predict subjects with a high risk of readmission were calculated using receiver operator characteristic (ROC) curve analysis. RESULTS: The total study population consisted of 5,191 subjects with 1,244 in the training, 1,244 in the testing and 2,743 in the independent validation set. There was no statistical difference between the three data sets with regard to age, sex or race. The independent validation set had a significantly (p-value <0.01) increased rate of readmissions (14.8%) as compared to the training (12.8%) and testing (11.8%) sets. Using a threshold CFR value of 0.352 the system was able to identify patients at high risk for readmission. Readmission rates for patients with a CFR above the threshold value were greater than 30 percent for all data sets. In the independent validation set, 9.8 percent of patients were above the threshold. This high risk group accounted for 27.1 percent of readmissions to the Internal Medicine service. Additionally, subjects in the independent validation set with a CFR below 0.2 had a readmission rate to the Internal Medicine service of only 5.4 percent. CONCLUSION: Using only administrative data which is readily available at the time of admission, our expert system was able to identify a group of patients who had a greater than 30 percent chance of readmission. The size of the group identified, 9.8% of the total population, is almost twice as large as other published clinical risk assessment tools. Identifying this high risk group early in their clinical course allows them to be the focus of interventions shown to be effective, and may result in an even larger reduction in readmissions than previously observed. Further study of this expert system will include adapting it for use at other institutions and validating it within their patient populations.

Source: EMBASE

Available in fulltext from JGIM: Journal of General Internal Medicine at EBSCOhost

Available in fulltext from Journal of General Internal Medicine at National Library of Medicine

22. A Scoring System to Predict Readmission of Patients With Acute Pancreatitis to the Hospital Within Thirty Days of Discharge


Citation: Clinical Gastroenterology and Hepatology, February 2011, vol./is. 9/2(175-180), 1542-3565 (February 2011)

Publication Date: February 2011

Abstract: Background & Aims: Reducing rapid readmission of patients after discharge could improve quality of treatment and reduce costs. Little is known about clinical predictors of early readmission for acute pancreatitis (AP). We developed a strategy to identify and stratify patients with AP at risk for readmission within 30 days of discharge. Methods: We derived and validated a model in a cohort of patients hospitalized with AP from June 2005-October 2009. Early readmission was defined as admission to the hospital or reevaluation in the emergency department within 30 days of discharge. The cohort was divided into a derivation cohort (admitted June 2005-December 2007, n = 248) and a validation cohort (admitted January 2008-October 2009, n = 198). A weighted scoring system was
developed using logistic regression for the prediction of early readmission. Accuracy was assessed by area under the receiver-operator characteristic (ROC) curve analysis. Results: Of the total patients, 21% (92/446) had early readmission. Multivariable analysis identified the following discharge characteristics as independent risk factors for early readmission: gastrointestinal symptoms, eating less than a solid diet, pancreatic necrosis, treatment with antibiotics, and pain (P < .05). Weighted risk scores stratified patients into groups of low, moderate, and high risk for early readmission: 4%, 15%, and 87%, respectively, in the derivation cohort and 5%, 18%, and 68%, respectively, in the validation cohort. Area under the ROC curve demonstrated an accurate prediction (c-statistic = 0.83). Conclusions: We created a scoring system that accurately predicts which patients with AP have high and low risk of readmission within 30 days of discharge. 2011 AGA Institute.

Source: EMBASE

23. Predictive value of the Short Physical Performance Battery following hospitalization in older patients.

Author(s) Volpato, Stefano, Cavaleri, Margherita, Sioulis, Fotini, Guerra, Gianluca, Maraldi, Cinzia, Zuliani, Giovanni, Fellin, Renato, Guralnik, Jack M

Citation: Journals of Gerontology Series A: Biological Sciences & Medical Sciences, 01 January 2011, vol./is. 66/1(89-96), 10795006

Publication Date: 01 January 2011

Abstract: BACKGROUND: Hospitalization represents a stressful and potentially hazardous event for older persons. We evaluated the value of the Short Physical Performance Battery (SPPB) in predicting rates of functional decline, rehospitalization, and death in older acutely ill patients in the year after discharge from the hospital. METHODS: Prospective cohort study of 87 patients aged 65 years and older who were able to walk and with a Mini-Mental State Examination score >= 18 and admitted to the hospital with a clinical diagnosis of congestive heart failure, pneumonia, chronic obstructive pulmonary disease, or minor stroke. Patients were evaluated with the SPPB at hospital admission, were reevaluated the day of hospital discharge, and 1 month later. Subsequently, they were followed every 3 months by telephone interviews to ascertain functional decline, new hospitalizations, and vital status. RESULTS: After adjustment for potential confounders, including self-report activity of daily living and comorbidity, the SPPB score at discharge was inversely correlated with the rate of decline in activity of daily living performance over the follow-up (p < .05). In a multivariable discrete-time survival analysis, patients with poor SPPB scores at hospital discharge (0-4) had a greater risk of rehospitalization or death (odds ratio: 5.38, 95% confidence interval: 1.82-15.9) compared with those with better SPPB scores (8-12). Patients with early decline in SPPB score after discharge also had steeper increase in activity of daily living difficulty and higher risk of rehospitalization or death over the next year. CONCLUSIONS: In older acutely ill patients who have been hospitalized, the SPPB provides important prognostic information. Lower extremity performance-based functional assessment might identify older patients at high risk of poor outcomes after hospital discharge.

Source: CINAHL

24. An automated model to identify heart failure patients at risk for 30-day readmission or death using electronic medical record data.

Author(s) Amarasingham R, Moore BJ, Tabak YP, Drazner MH, Clark CA, Zhang S, Reed WG, Swanson TS, Ma Y, Halm EA

Citation: Medical Care, 01 November 2010, vol./is. 48/11(981-988), 00257079

Publication Date: 01 November 2010

Abstract: BACKGROUND:: A real-time electronic predictive model that identifies hospitalized heart failure (HF) patients at high risk for readmission or death may be valuable to clinicians and hospitals who care for these patients. METHODS:: An automated predictive model for 30-day readmission and death was derived and validated from clinical and nonclinical risk factors present on admission in 1372 HF hospitalizations to a major urban hospital between January 2007 and August 2008. Data were extracted from an
The performance of the electronic model was compared with mortality and readmission models developed by the Center for Medicaid and Medicare Services (CMS models) and a HF mortality model derived from the Acute Decompensated Heart Failure Registry (ADHERE model). RESULTS:: The 30-day mortality and readmission rates were 3.1% and 24.1% respectively. The electronic model demonstrated good discrimination for 30 day mortality (C statistic 0.86) and readmission (C statistic 0.72) and performed as well, or better than, the ADHERE model and CMS models for both outcomes (C statistic ranges: 0.72-0.73 and 0.56-0.66 for mortality and readmissions respectively; P < 0.05 in all comparisons). Markers of social instability and lower socioeconomic status improved readmission prediction in the electronic model (C statistic 0.72 vs. 0.61, P < 0.05). CONCLUSIONS:: Clinical and social factors available within hours of hospital presentation and extractable from an EMR predicted mortality and readmission at 30 days. Incorporating complex social factors increased the model's accuracy, suggesting that such factors could enhance risk adjustment models designed to compare hospital readmission rates.

Source: CINAHL

25. Ward mortality after ICU discharge: A multicenter validation of the Sabadell score


Citation: Intensive Care Medicine, July 2010, vol./is. 36/7(1196-1201), 0342-4642;1432-1238 (July 2010)

Publication Date: July 2010

Abstract: Background: Tools for predicting post-ICU patients' outcomes are scarce. A single-center study showed that the Sabadell score classified patients into four groups with clear-cut differences in ward mortality. Objective and design: To validate the Sabadell score using a prospective multicenter approach. Setting: Thirty-one ICUs in Spain. Patients and methods: All patients admitted in the 3-month study period. We recorded variables at ICU admission (age, sex, severity of illness, and do-not-resuscitate orders), during the ICU stay (ICU-specific treatments, ICU-acquired infection, and acute renal failure), and at ICU discharge (Sabadell score). Statistical analyses included one-way ANOVA and multiple regression analysis with ward mortality as the dependent variable. Results: We admitted 4,132 patients (mean age 61.5 +/- 16.7 years) with mean predicted mortality of 23.8 +/- 22.7%; 545 patients (13%) died in the ICU and 3,587 (87%) were discharged to the ward. Overall ward mortality was 6.7%; ward mortality was 1.5% (36/2,422) in patients with score 0 (good prognosis), 9% (64/725) in patients with score 1 (long-term poor prognosis), 23% (79/341) in patients with score 2 (short-term poor prognosis), and 64% (63/99) in patients with score 3 (expected hospital death). Variables associated with ward mortality in the multivariate analysis were predicted risk of death (OR 1.016), ICU readmission (OR 5.9), Sabadell score 1 (OR 4.7), Sabadell score 2 (OR 15.7), and Sabadell score 3 (OR 107.2). Conclusion: We confirm the ability of the Sabadell score at ICU discharge to define four groups of patients with very different likelihoods of hospital survival. 2010 Copyright jointly held by Springer and ESICM.

Source: EMBASE

Available in fulltext from Intensive Care Medicine at EBSCOhost

26. AcuteCare for Elders (ACE) tracker and e-Geriatrician: methods to disseminate ACE concepts to hospitals with no geriatricians on staff

Author(s) Malone M.L., Vollbrecht M., Stephenson J., Burke L., Pagel P., Goodwin J.S.

Citation: Journal of the American Geriatrics Society, January 2010, vol./is. 58/1(161-167), 1532-5415 (Jan 2010)

Publication Date: January 2010

Abstract: This article describes an innovative method to disseminate the Acute Care for Elders (ACE) model of care for hospitalized older patients implemented at 11 community hospitals in Wisconsin. The ACE Tracker is a computer-generated checklist of all older
patients in a facility that takes information from multiple areas of the electronic medical record to identify the older patients' risk factors for functional decline and poor outcomes. The ACE Tracker report was validated against in-person observation of the older patients and found to be accurate. Interdisciplinary teams on medical-surgical units use this summary report to review each patient's plan of care and to efficiently assess the patients who are vulnerable to poor hospital outcomes. The ACE Tracker is also used during regular consultation provided through teleconferencing between an off-site geriatrician (e-Geriatrician) and the local ACE team. The effect of the ACE Tracker and e-Geriatrician models was assessed by measuring use of urinary catheters, physical restraints, high-risk medications, and social service evaluation at a single hospital for the 6 months before and after implementation of the models. There were significant improvements in urinary catheter and physical therapy referrals but no significant changes in the other outcomes. There was no change in the length of stay or in the rate of hospital readmission within 30 days.

Source: EMBASE
Available in fulltext from Journal of the American Geriatrics Society at EBSCOhost

27. Factors affecting unplanned readmissions from community hospitals to acute hospitals: a prospective observational study.

Author(s) Leong IY, Chan SP, Tan BY, Sitoh YY, Ang YH, Merchant R, Kanagasabai K, Lee PS, Pang WS

Citation: Annals of the Academy of Medicine, Singapore, February 2009, vol./is. 38/2(113-20), 0304-4602;0304-4602 (2009 Feb)

Publication Date: February 2009

Abstract: INTRODUCTION: While the readmission rate from community hospitals is known, the factors affecting it are not. Our aim was to determine the factors predicting unplanned readmissions from community hospitals (CHs) to acute hospitals (AHs). MATERIALS AND METHODS: This was an observational prospective cohort study, involving 842 patients requiring post-acute rehabilitation in 2 CHs admitted from 3 AHs in Singapore. We studied the role of the Cumulative Illness Rating Scale (CIRS) organ impairment scores, the Mini-mental State Examination (MMSE) score, the Shah modified Barthel Index (BI) score, and the triceps skin fold thickness (TSFT) in predicting the rate of unplanned readmissions (UR), early unplanned readmissions (EUPR) and late unplanned readmissions (LUPR). We developed a clinical prediction rule to determine the risk of UR and EUPR. RESULTS: The rates of EUPR and LUPR were 7.6% and 10.3% respectively. The factors that predicted UR were the CIRS-heart score, the CIRS-haemopoietic score, the CIRS-endocrine / metabolic score and the BI on admission. The MMSE was predictive of EUPR. The TSFT and CIRS-liver score were predictive of LUPR. Upon receiver operator characteristics analysis, the clinical prediction rules for the prediction of EUPR and UR had areas under the curve of 0.745 and 0.733 respectively. The likelihood ratios of the clinical prediction rules for EUPR and UR ranged from 0.42 to 5.69 and 0.34 to 3.16 respectively. CONCLUSIONS: Patients who have UR can be identified by the admission BI, the MMSE, the TSFT and CIRS scores in the cardiac, haemopoietic, liver and endocrine/metabolic systems.

Source: Medline

Google Scholar

From 1st 50 results…

Risk prediction models for hospital readmission
D Kansagara, H Englander, A Salanitro... - JAMA: the journal of ..., 2011 - Am Med Assoc... Additional research is needed to assess the true preventability of readmissions in US health... patients, as well as to identify patients at greater risk of avoidable readmission. ... Portland Veterans Affairs Medical Center, Mailcode RD71, 3710 SW US Veterans Hospital Rd, Portland... Cited by 82 Related articles All 25 versions Cite
Efficiency and applicability of comprehensive geriatric assessment in the emergency department: a systematic review.


Subject Heading (MeSH) terms: "Frail Elderly", "Health Services for Aged", "Community Health Nursing", "Emergency Service", "Hospital", "Geriatric Assessment ...

CGA in ED is efficient for decreasing functional decline, ED readmission and possibly nursing home admission ...

Cited by 16 Related articles All 6 versions Cite

Inability of providers to predict unplanned readmissions

N Allaudeen, JL Schnipper, RM Wachter... - Journal of general ... , 2011 - Springer

... Of the remaining 159 patients, 52 patients (32.7%) were readmitted. ... Title Inability of Providers to Predict Unplanned Readmissions Journal of General Internal Medicine Volume 26, Issue 7, pp 771-776 Cover ... Topics: Internal Medicine. Keywords: readmission; unplanned; ...

Cited by 19 Related articles All 7 versions Cite

An improved medical admissions risk system using multivariable fractional polynomial logistic regression modelling

B Silke, J Kellett, T Rooney, K Bennett, D O'Riordan - QJM, 2010 - Oxford Univ Press

... However, in our database some patients were readmitted up to 50 times. ... in a large teaching hospital has been associated with considerable improvements in numerous healthcare quality indicators ... has now been used to develop and validate a powerful in-hospital mortality risk ...

Cited by 25 Related articles All 6 versions Cite

... assessment instruments in the acute hospital setting: A comparison of the Minimum Geriatric Screening Tools (MGST) and the interRAI Acute Care (interRAI AC)

NIH Wellens, M Deschodt, J Flamaing, P Moons... - The journal of nutrition, ..., 2011 - Springer

... this would imply that healthcare organisations might replace their (often home-made) first-generation cga ... the risk of functional decline in older patients admitted to the hospital: a comparison of ... M, Braes t, Flamaing J, Milisen K (2007) screening for risk of readmission of patients ...

Cited by 7 Related articles All 8 versions Cite

The PROTECT in-hospital risk model: 7-day outcome in patients hospitalized with acute heart failure and renal dysfunction

CM O'Connor, RJ Mentz, G Cotter... - ... journal of heart ..., 2012 - eurjhf.oxfordjournals.org

... worsening heart failure (WHF) predicts a significant proportion of post-discharge readmissions and mortality. ... in the absence of any criterion for treatment failure (death or readmission for HF ... The PROTECT in-hospital risk model demonstrates the role of impaired metabolic status ...

Cited by 7 Related articles All 8 versions Cite

Measuring and preventing potentially avoidable hospital readmissions: a review of the literature.

CH Yam, EL Wong, FW Chan, FY Wong... - Hong Kong medical ..., 2010 - europepmc.org

... for studying hospital readmissions have been recommended: (a) identify hospital admissions and ... up were the main types of interventions to address potentially avoidable readmissions. CONCLUSIONS: A standard instrument to identify avoidable readmission is important in ...

Cited by 7 Related articles All 3 versions Cite

More

Comparison of the responsiveness of the FIM and the interRAI post acute care assessment instrument in rehabilitation of older adults
lead to system benefits including preventing the use of unnecessary health services and hospital readmissions. Older adults, and their patients tend to be admitted from acute care settings. Rehabilitation for elderly people with a history of recurrent non-elective hospital admissions.

**Validity of the malnutrition screening tool for older adults at high risk of hospital readmission.**

ML Wu, MD Courtney... - Journal of ..., 2012 - ncbi.nlm.nih.gov


**Screening for risk of unplanned readmission in older patients admitted to hospital: predictive accuracy of three instruments**

T Braes, P Moons, P Lipkens, W Sterckx... - Aging clinical and ..., 2010 - cat.inist.fr

Background and aims: Hospital readmission after discharge is an important clinical and health policy issue. Unplanned readmissions were registered by telephone follow-up 14, 30 and 90 days post... Results: Unplanned readmission rates were 6.8%, 14.7% and 23.5% after 14, 30, and...

**LACE+ index: extension of a validated index to predict early death or urgent readmission after hospital discharge using administrative data**

C van Walraven, J Wong, A Forster - Open Medicine, 2012 - openmedicine.ca

After discharge to the community, 6.8% of the patients died or were urgently readmitted within 30 days. As a result, the rate of urgent readmissions was higher in the original study than in... a diagnostic score based on case-mix groups to predict 30-day death or urgent readmission...

**Predictive model for emergency hospital admission and 6-month readmission.**

S Lopez-Aguila, JC Contel, J Farré... - The American journal of ..., 2011 - ajmc.com

Emergency admission in the 2 years prior to readmission was also higher in the readmitted population (Table 4... Hospital readmissions during home care: a pilot study... Derivation and validation of an index to predict early death or unplanned readmission after discharge from...

**Screening for frailty in elderly emergency department patients by using the Identification of Seniors At Risk (ISAR)**

F Salvi, V Morichi, A Grilli, L Lancioni... - The journal of nutrition, ..., 2012 - Springer

SpMSQ) and no proxy, those too ill to answer the iSar questions or trauma patients were... Screening for risk of readmission of patients aged 65 years and above after the discharge from... of the triage risk stratification tool to identify older persons at risk for hospital admission and...

**Google Advanced Search**

From 1st 50 results...

Simple Index Predicts Risk of Death, Hospital Readmission

www.medpagetoday.com/HospitalBasedMedicine/RiskManagement/18741

Mar 1, 2010 – Explain that the index, known as LACE, focuses on length of stay in the...

"Readmission to hospital and death are adverse patient outcomes..."
A number of hospital-based models to predict risk of short-term readmission (within ... The percentage of inpatients identified as high risk (that is, at a risk score ... New model predicts hospital readmission risk - Science Daily
www.sciencedaily.com/releases/2013/03/130325183947.htm
New Model Predicts Hospital Readmission Risk. Mar. 25, 2013 — Hospital readmissions are a costly problem for patients and for the United States health care ...

Tools for physicians to reduce hospital readmissions - amednews.com
www.amednews.com/article/20130401/opinion/1304099854/4/
Apr 1, 2013 – Tools for physicians to reduce hospital readmissions ... for Medicare beneficiaries for heart failure, acute myocardial infarction and pneumonia. ... safe care transitions: Conduct a comprehensive health assessment for the patient; establish care ...

Score Predicts Preventable Readmissions - MedPage Today
www.medpagetoday.com/HospitalBasedMedicine/GeneralHospitalPractice...
Mar 25, 2013 – The HOSPITAL score -- based on hemoglobin and sodium levels at discharge, ... the best way to use certain resource-intensive but effective interventions is to target ... A few other readmission prediction tools have been developed for general ...

Hospital-wide- (All-condition) 30-Day Readmission Measure
https://www.cms.gov/.../Assessment/.../MMSHospital-WideAll-ConditionR...
by L Horwitz - Cited by 4 - Related articles
Aug 10, 2011 – 1.2 Hospital-wide Readmission as a Quality Indicator. ..... acute care hospital that is a scheduled part of the patient's plan of care. Planned .... summary score, derived from the results of seven different models, one for each of the following ...

Preventing Avoidable Readmissions | Agency for Healthcare ...
www.ahrq.gov/qual/imppptdis.htm
Feb 15, 2011 – The Agency for Healthcare Research and Quality offers information and tools for clinicians and patients to make the hospital discharge process safer and to prevent avoidable readmissions. ... links to AHRQ's resources for preventing avoidable readmissions or trips to the emergency room. ... Measurement & Reporting Tools.

Development of a predictive model to identify inpatients at risk of re ...
bmjopen.bmj.com/content/2/4/e001667.full
by J Billings - 2012 - Related articles
Aug 10, 2012 – Preventing readmissions to hospital is important for patients, and recent policy .... Whether there had been an emergency hospital discharge in the past 30 days. ... The PPV for the model for all patients with a risk score above 0.50 (risk bands ...

Building a Predictive Model for 30-Day Inpatient Readmission Using ...
by K Lemke - Related articles
Oct 31, 2012 – used to target the delivery of resource-intensive care transition interventions among the patients at ... readmission rates to facilitate hospital comparisons and make ..... formulation resulted in NOTE: Model assessment is not available with the ...

Use of Modified LACE Tool to Predict and Prevent Hospital ...
www.raadplan.com/.../Use_of_Modified_LACE_Tool_to_Predict_and_P...
Aug 8, 2011 – Tool that scores a patient on four variables with a final score predictive of readmission ... Predictive of readmissions with patient population at Chinese hospital. .... Mrs. Q presented with abdominal pain to the Emergency Room today, June 9th.

QualityNet - Hospital-wide Readmission Measure
www.qualitynet.org/dcs/ContentServer?c=Page&pagename...cid...
Aug 9, 2012 – For each hospital, the HWR measure estimates a risk-standardized readmission rate (RSRR) based on unplanned readmissions to any acute care hospital, ...

A Scoring System to Predict Readmission of Patients With Acute ...
Predictive Analytics: Models to Cut Readmissions | Curaspan Health
connect.curaspan.com › Knowledge Exchange › Article Archive
Sep 5, 2012 – NorthShore’s predictive analytics test model segmented patients into quartiles. ... a tool that calculates a readmission risk score based on length of stay (LOS), acute ... ACE, Lyons says, “gives the hospital tremendous advantage in identifying ...

InfoViewer: Seven-question tool aims to prevent - ACEP
www.acep.org/MobileArticle.aspx?parentfeedid=2&feed_id...742
Mar 25, 2013 – The HOSPITAL score assesses factors that independently contribute to readmission: hemoglobin at discharge; discharge from an oncology service; sodium level ...

Long Term Care | RARE Campaign
www.rarereadmissions.org/resources/ltc.html
Nov 10, 2011 – This tool calculates rates for 30-day readmission, hospital admissions, transfers to emergency only, and transfers resulting in observation stay only. This tool also ...

The HOSPITAL Score: A Potential to Help Avoid 30-Day Readmissions
knowledge.com/.../the-hospital-score-a-potential-to-help-avoid-30-day-...
May 15, 2013 – The HOSPITAL Score: A Potential to Help Avoid 30-Day Readmissions ... validate a prediction model to help avoid 30-day hospital re-admissions in medical patients ... 30-day readmission in medical patients and who may need more intensive ...

Risk prediction models for hospital readmission: a ... - HSR&D
www.hsrd.research.va.gov/for_researchers/cyber.../esp-121311.pdf
Dec 16, 2011 – “Hospital readmissions are frequent and costly events which…can ... Discharged alive from acute care hospital. • Did not ... 3) risk assessment model. – 4) don’t ...

Prediction model assesses patients at risk for 30-day readmissions
www.healthcarebusinesstech.com/risk-prediction-model-assesses-patient-...
Cached
Mar 27, 2013 – Just think how much you could lower your readmission rate if you had a tool to ... The good news is researchers from Brigham and Women’s Hospital have ... So if a patient scores high, then the physicians knows that patient needs intensive ...

Researchers develop new tool to eliminate 30-day hospital ...
www.eurekaler.org/pub_releases/2013-03/imc-rdn030713.php
Mar 9, 2013 – Researchers develop new tool to eliminate 30-day hospital readmissions in ... The tool, known as the IMRS-HF, was adapted from the Intermountain Risk Score at Intermountain Medical Center to predict mortality rates in trauma patients.

Health IT tool to reduce hospital readmissions identifies vulnerable ...
medcitynews.com/.../health-it-to-reduce-hospital-readmissions-identifies-...
May 14, 2012 – A healthcare IT program to cut hospital readmissions in the runup to ... It uses a scoring system to identify patients who should be referred for post-acute services ...

Researchers design tool to cut hospital readmissions - Canada.com
www.canada.com/Researchers...tool-hospital-readmissions/.../story.html
Aug 4, 2010 – While no data exist about the financial cost of hospital readmissions to the ... The made-in-Ottawa risk-assessment tool aims to identify high-risk patients who need ... access to a family doctor and so are regular users of the emergency room.

New scoring system could identify patients at risk of readmission ...
https://www.heritage-healthcare.com/new-scoring-system-could-identify-...
Cached
Mar 28, 2013 – Researchers have developed a scoring system to determine which hospital ...
... are at highest risk of readmission within 30 days of discharge, potentially helping acute and ... “This easy-to-use model enables physicians to prospectively identify ...