

Curated List of interRAI Publications in the area of Acute Care (AC)

This list of annotated citations for interRAI articles and publications pertaining to Acute Care (AC) has been curated by interRAI experts in the area of Acute Care.

Abtan, R., et al. (2018). "The effect of informal caregiver support on utilization of acute health services among home care clients: a prospective observational study." *BMC Health Serv Res* 18(1): 73.

BACKGROUND: Emergency department visits and hospitalizations (EDVH) place a large burden on patients and the health care system. The presence of informal caregivers may be beneficial for reducing EDVH among patients with specific diagnoses. Our objective was to determine whether the presence of an informal caregiver was associated with the occurrence of an EDVH among clients 50 years of age or older. **METHODS:** Using a database accessed through the Toronto Central Community Care Access Centre (CCAC), we identified 479 adults over 50 years of age who received home care in Toronto, Canada. Exposure variables were extracted from the interRAI health assessment form completed at the time of admission to the CCAC. EDVH data were linked to provincial records through the CCAC database. Data on emergency room visits were included for up to 6 months after time of admission to home care. Multiple logistic regression analysis was used to identify factors associated with the occurrence of an EDVH. **RESULTS:** Approximately half of all clients had an EDVH within 180 days of admission to CCAC home care. No significant association was found between the presence of an informal caregiver and the occurrence of an EDVH. Significant factors associated with an EDVH included: Participants having a poor perception of their health (adjusted OR = 1.68, 95% CI: 1.11-2.56), severe cardiac disorders (adjusted OR = 1.54, 95% CI: 1.04-2.29), and pulmonary diseases (adjusted OR = 1.99, 95% CI: 1.16-3.47). **CONCLUSIONS:** The presence of an informal caregiver was not significantly associated with the occurrence of an EDVH. Future research should examine the potential associations between length of hospital stay or quality of life and the presence of an informal caregiver. In general, our work contributes to a growing body of literature that is increasingly concerned with the health of our aging population, and more specifically, health service use by elderly patients, which may have implications for health care providers.

Balokova, A., et al. (2014). "Use of benzodiazepines and association with falls in older people admitted to hospital: a prospective cohort study." *Drugs & aging* 31(4): 299-310.

BACKGROUND: Hypnotics are commonly prescribed for anxiety and sleep problems. Changes in pharmacokinetics and pharmacodynamics of benzodiazepines (BZDs) during ageing may increase their potential to cause adverse outcomes. **OBJECTIVE:** This study aimed to investigate the use of BZDs in acute care settings and explore their association with falls. **METHODS:** A prospective cohort study was undertaken of patients aged over 70 years consecutively admitted to 11 acute care hospitals in Australia. Data were collected using the interRAI Acute Care assessment tool. Falls were recorded prospectively (in hospital) and retrospectively (in the 90 days prior to admission). **RESULTS:** Of 1,412 patients, 146 (10.3 %) were taking BZDs at admission and 155 (11.3 %) at discharge. Incidence rates of in-hospital fallers for users and non-users of BZDs were not statistically different [incidence rate ratio 1.03, 95 % confidence interval (CI) 0.58-1.82]. There was also no significant association between benzodiazepine use at admission and history of falls in the previous 90 days compared with non-users. However, patients on diazepam were significantly more likely to have a history of falls than all other benzodiazepine users (70.8 vs. 36.1 %; $p = 0.002$), particularly when compared with oxazepam users (70.8 vs. 25.0 %; $p < 0.001$). Adjusting for confounders, use of diazepam at admission was positively associated with a history of falls compared with all other benzodiazepine users (odds ratio 3.0; 95 % CI 1.1-8.5; $p = 0.036$). **CONCLUSIONS:** Different BZDs may vary in their propensity to predispose to falls, with diazepam having the strongest association. The selection of particular BZDs for older patients should be carefully evaluated.

Berg K, et al. (2017). interRAI Post-Acute Care and Rehabilitation (PAC-Rehab) Assessment Form and User's Manual Version 9.3. Washington, DC, interRAI.

Brand, C. A., et al. (2011). "Development of quality indicators for monitoring outcomes of frail elderly hospitalised in acute care health settings: study protocol." *BMC Health Serv Res* 11: 281.

BACKGROUND: Frail older people admitted to acute care hospitals are at risk of a range of adverse outcomes, including geriatric syndromes, although targeted care strategies can improve health outcomes for these patients. It is therefore important to assess inter-hospital variation in performance in order to plan and resource improvement programs. Clinical quality outcome indicators provide a mechanism for identifying variation in performance over time

and between hospitals, however to date there has been no routine use of such indicators in acute care settings. A barrier to using quality indicators is lack of access to routinely collected clinical data. The interRAI Acute Care (AC) assessment system supports comprehensive geriatric assessment of older people within routine daily practice in hospital and includes process and outcome data pertaining to geriatric syndromes. This paper reports the study protocol for the development of aged care quality indicators for acute care hospitals. METHODS/DESIGN: The study will be conducted in three phases: 1. Development of a preliminary inclusive set of quality indicators set based on a literature review and expert panel consultation, 2. A prospective field study including recruitment of 480 patients aged 70 years or older across 9 Australian hospitals. Each patient will be assessed on admission and discharge using the interRAI AC, and will undergo daily monitoring to observe outcomes. Medical records will be independently audited, and 3. Analysis and compilation of a definitive quality indicator set, including two anonymous voting rounds for quality indicator inclusion by the expert panel. DISCUSSION: The approach to quality indicators proposed in this protocol has four distinct advantages over previous efforts: the quality indicators focus on outcomes; they can be collected as part of a routinely applied clinical information and decision support system; the clinical data will be robust and will contribute to better understanding variations in hospital care of older patients; The quality indicators will have international relevance as they will be built on the interRAI assessment instrument, an internationally recognised clinical system.

Brink, P., et al. (2006). "Factors associated with pressure ulcers in palliative home care." *J Palliat Med* 9(6): 1369-1375.

BACKGROUND: Studies have identified factors associated with pressure ulcers in many health care settings including acute care, complex continuing care, long-term care, and home care. OBJECTIVE: The purpose of this study was to identify factors associated with pressure ulcers among palliative home care clients. Identifying associations specific to each setting is important for ulcer prevention and has implications for clients overall well-being and quality of life. METHODS: The study included all palliative home care clients diagnosed with terminal cancer from one palliative home care agency in Ontario. Information on health was gathered using the interRAI instrument for palliative care. RESULTS: The study found male gender, the inability to lie flat because of shortness of breath, catheter, or ostomy care, and a reduced ability to perform activities of daily living to be associated with pressure ulcers. SIGNIFICANCE OF RESULTS: In some instances, treatment and prevention of pressure ulcers is the primary goal of care. However, pressure ulcers are also suggestive of deterioration and considered as a part of the disease trajectory. Sometimes the primary goal of care of treatment and prevention is displaced by a greater need for comfort.

Comans, T. A., et al. (2016). "The increase in healthcare costs associated with frailty in older people discharged to a post-acute transition care program." *Age Ageing* 45(2): 317-320.

BACKGROUND: older people are high users of healthcare resources. The frailty index can predict negative health outcomes; however, the amount of extra resources required has not been quantified. OBJECTIVE: to quantify the impact of frailty on healthcare expenditure and resource utilisation in a patient cohort who entered a community-based post-acute program and compare this to a cohort entering residential care. METHODS: the interRAI home care assessment was used to construct a frailty index in three frailty levels. Costs and resource use were collected alongside a prospective observational cohort study of patients. A generalized linear model was constructed to estimate the additional cost of frailty and the cost of alternative residential care for those with high frailty. RESULTS: participants (n = 272) had an average age of 79, frailty levels were low in 20%, intermediate in 50% and high in 30% of the cohort. Having an intermediate or high level of frailty increased the likelihood of re-hospitalisation and was associated with 22 and 43% higher healthcare costs over 6 months compared with low frailty. It was less costly to remain living at home than enter residential care unless >62% of subsequent hospitalisations in 6 months could be prevented. CONCLUSIONS: the frailty index can potentially be used as a tool to estimate the increase in healthcare resources required for different levels of frailty. This information may be useful for quantifying the amount to invest in programs to reduce frailty in the community.

Costa, A., J. Hirdes, S. Ariño-Blasco, K. Berg, V. Boscart, C. Carpenter, N. Curtin-Telegdi, M. Emond, L. Gray, G. Heckman, P. Jonsson, M. Leyenaar, M. Martin-Khan, D. Melady, S. Sinha, K. Singler, F. Sjostrand, W. Swoboda, and N. Wellens (2017). interRAI Emergency Department (ED) Assessment System Manual: for use with the interRAI ED Screener (EDS) and ED Contact Assessment (ED-CA). . Washington, DC, interRAI.

Costa, A. P., et al. (2014). "Geriatric syndromes predict postdischarge outcomes among older emergency department patients: findings from the interRAI Multinational Emergency Department Study." *Academic emergency medicine : official journal of the Society for Academic Emergency Medicine* 21(4): 422-433.

OBJECTIVES: Identifying older emergency department (ED) patients with clinical features associated with adverse postdischarge outcomes may lead to improved clinical reasoning and better targeting for preventative interventions. Previous studies have used single-country samples to identify limited sets of determinants for a limited number of proxy outcomes. The objective of this study was to identify and compare geriatric syndromes that influence the probability of postdischarge outcomes among older ED patients from a multinational context. **METHODS:** A multinational prospective cohort study of ED patients aged 75 years or older was conducted. A total of 13 ED sites from Australia, Belgium, Canada, Germany, Iceland, India, and Sweden participated. Patients who were expected to die within 24 hours or did not speak the native language were excluded. Of the 2,475 patients approached for inclusion, 2,282 (92.2%) were enrolled. Patients were assessed at ED admission with the interRAI ED Contact Assessment, a geriatric ED assessment. Outcomes were examined for patients admitted to a hospital ward (62.9%, n=1,436) or discharged to a community setting (34.0%, n=775) after an ED visit. Overall, 3% of patients were lost to follow-up. Hospital length of stay (LOS) and discharge to higher level of care was recorded for patients admitted to a hospital ward. Any ED or hospital use within 28 days of discharge was recorded for patients discharged to a community setting. Unadjusted and adjusted odds ratios (ORs) were used to describe determinants using standard and multilevel logistic regression. **RESULTS:** A multi-country model including living alone (OR=1.78, p</=0.01), informal caregiver distress (OR=1.69, p=0.02), deficits in ambulation (OR=1.94, p</=0.01), poor self-report (OR = 1.84, p</=0.01), and traumatic injury (OR=2.18, p</=0.01) best described older patients at risk of longer hospital lengths of stay. A model including recent ED visits (OR=2.10, p</=0.01), baseline functional impairment (OR=1.68, p</=0.01), and anhedonia (OR=1.73, p</=0.01) best described older patients at risk of proximate repeat hospital use. A sufficiently accurate and generalizable model to describe the risk of discharge to higher levels of care among admitted patients was not achieved. **CONCLUSIONS:** Despite markedly different health care systems, the probability of long hospital lengths of stay and repeat hospital use among older ED patients is detectable at the multinational level with moderate accuracy. This study demonstrates the potential utility of incorporating common geriatric clinical features in routine clinical examination and disposition planning for older patients in EDs.

Danila, O., et al. (2014). "Prevalence of neurological conditions across the continuum of care based on interRAI assessments." *BMC Health Serv Res* 14: 29.

BACKGROUND: Although multiple studies have estimated the prevalence of neurological conditions in the general Canadian population, limited research exists regarding the proportion affected with these conditions in non-acute health care settings in Canada. Data from standardized clinical assessments based on the interRAI suite of instruments were used to estimate the prevalence of eight neurological conditions across the continuum of care including Alzheimer's disease, Parkinson's disease, epilepsy, traumatic brain injury, multiple sclerosis, cerebral palsy, Huntington's disease, and amyotrophic lateral sclerosis. **METHODS:** Cohorts of individuals receiving care in nursing homes (N=103,820), home care (N=91,021), complex continuing care (N=10,581), and psychiatric hospitals (N=23,119) in Canada were drawn based on their most recent interRAI assessment within each sector for a six-month period in 2010. These data were linked to the Discharge Abstract Database and National Ambulatory Care Reporting System data sets to develop five different case definition scenarios for estimating prevalence. **RESULTS:** The conditions with the highest estimated prevalences in these care settings in Canada were Alzheimer's disease and related dementias, Parkinson's disease, epilepsy, and traumatic brain injury. However, there were notable cross-sector differences in the prevalence of each condition, and regional variations. Prevalence estimates based on acute hospital administrative data alone were substantially lower for all conditions evaluated. **CONCLUSIONS:** The proportion of persons with neurological conditions in non-acute health care settings in Canada is substantially higher than is generally reported for the general population. It is essential for these care settings to have the expertise and resources to respond effectively to the strengths, preferences, and needs of the growing population of persons with neurological conditions. The use of hospital or emergency department records alone is likely to substantially underestimate the true prevalence of neurological conditions across the continuum of care. However, interRAI assessment records provide a helpful source of information for obtaining these estimates in nursing home, home care, and mental health settings.

Devriendt, E., et al. (2013). "The interRAI Acute Care instrument incorporated in an eHealth system for standardized and web-based geriatric assessment: strengths, weaknesses, opportunities and threats in the acute hospital setting." *BMC geriatrics* 13: 90.

BACKGROUND: The interRAI Acute Care instrument is a multidimensional geriatric assessment system intended to determine a hospitalized older persons' medical, psychosocial and functional capacity and needs. Its objective is to develop an overall plan for treatment and long-term follow-up based on a common set of standardized items that can be used in various care settings. A Belgian web-based software system (BeIRAI-software) was developed to enable clinicians to interpret the output and to communicate the patients' data across wards and care organizations. The

purpose of the study is to evaluate the (dis)advantages of the implementation of the interRAI Acute Care instrument as a comprehensive geriatric assessment instrument in an acute hospital context. **METHODS:** In a cross-sectional multicenter study on four geriatric wards in three acute hospitals, trained clinical staff (nurses, occupational therapists, social workers, and geriatricians) assessed 410 inpatients in routine clinical practice. The BelRAI-system was evaluated by focus groups, observations, and questionnaires. The Strengths, Weaknesses, Opportunities and Threats were mapped (SWOT-analysis) and validated by the participants. **RESULTS:** The primary strengths of the BelRAI-system were a structured overview of the patients' condition early after admission and the promotion of multidisciplinary assessment. Our study was a first attempt to transfer standardized data between home care organizations, nursing homes and hospitals and a way to centralize medical, allied health professionals and nursing data. With the BelRAI-software, privacy of data is guaranteed. Weaknesses are the time-consuming character of the process and the overlap with other assessment instruments or (electronic) registration forms. There is room for improving the user-friendliness and the efficiency of the software, which needs hospital-specific adaptations. Opportunities are a timely and systematic problem detection and continuity of care. An actual shortage of funding of personnel to coordinate the assessment process is the most important threat. **CONCLUSION:** The BelRAI-software allows standardized transmural information transfer and the centralization of medical, allied health professionals and nursing data. It is strictly secured and follows strict privacy regulations, allowing hospitals to optimize (transmural) communication and interaction. However, weaknesses and threats exist and must be tackled in order to promote large scale implementation.

Glenny, C., et al. (2010). "Comparison of the responsiveness of the FIM and the interRAI post acute care assessment instrument in rehabilitation of older adults." *Arch Phys Med Rehabil* 91(7): 1038-1043.

OBJECTIVE: To compare the responsiveness of 2 major systems developed for rehabilitation settings--the FIM and the interRAI Post Acute Care (PAC) assessment--in older patients. **DESIGN:** Trained raters assessed patients with both tools at admission and discharge. **SETTING:** Musculoskeletal (MSK) and geriatric rehabilitation units (GRUs) in 2 rehabilitation hospitals. **PARTICIPANTS:** Older adults receiving rehabilitation (N=208; mean age +/- SD, 78.5+/-9.3; 67% women). **INTERVENTIONS:** Not applicable. **MAIN OUTCOME MEASURES:** Responsiveness was evaluated using effect size (ES) and standardized response mean (SRM). **RESULTS:** ES and SRM were somewhat higher for the FIM motor (GRU ES=1.68, SRM=1.31; MSK ES=2.12, SRM=2.25) than the PAC (GRU ES=1.64, SRM=1.29; MSK ES=1.57, SRM=1.89) in both patient groups. Both tools were more responsive in MSKs than GRUs. This may reflect the greater frailty and clinical complexity of GRU patients. **CONCLUSIONS:** Both the FIM motor and the PAC were able to detect clinically relevant improvement in functional ability in older rehabilitation inpatients.

Glenny, C., et al. (2012). "Underestimating physical function gains: comparing FIM motor subscale and interRAI post acute care activities of daily living scale." *Arch Phys Med Rehabil* 93(6): 1000-1008.

OBJECTIVE: To investigate the construct validity of the activities of daily living (ADLs) sections of 2 major systems developed to measure functional ability in rehabilitation settings. Health assessment systems can inform care planning as well as policy decision-making on service effectiveness. Frailty, comorbidity, and heterogeneity make it difficult to accurately measure health outcomes for older adults. Objective investigation of the value of geriatric rehabilitation services requires assessment systems that are comprehensive, reliable, valid, and sensitive to clinically relevant changes in older patients. **DESIGN:** Trained health care workers assessed patients with both tools at admission and discharge. We used Rasch analysis to compare the instruments' dimensionality, item difficulty, item fit, differential item function, and number of response options. **SETTING:** Musculoskeletal and geriatric rehabilitation units in 2 Ontario hospitals. **PARTICIPANTS:** Older adults receiving rehabilitation (N=209; mean age +/- SD, 78.5+/-9.3; 67% women). **INTERVENTIONS:** Not applicable. **MAIN OUTCOME MEASURES:** FIM and the interRAI Post Acute Care Assessment (interRAI PAC). **RESULTS:** For both the FIM motor and the interRAI PAC ADLs items, the difficulty level of the items was much lower than the participant's level of ability, resulting in a large ceiling effect. Also, on both scales, less actual change in functional ability was required to move between the midlevel response options. **CONCLUSIONS:** Both scales have limited ability to discriminate between subjects with higher functional ability, which indicates that they may underestimate the effectiveness of inpatient rehabilitation for this group of patients when used alone.

Gordon, E. H., et al. (2018). "The male-female health-survival paradox in hospitalised older adults." *Maturitas* 107: 13-18.

Abstract Objectives To determine whether the 'male-female health-survival paradox' is present in older hospitalised adults and to examine whether sex differences in the 'lethality' of acute medical conditions influence the relationship between sex and mortality. **Study design and outcome measures** This study was a secondary analysis of prospective cohort data collected from 1418 Australian inpatients aged 70 years and over. Frailty was measured using a 39-variable Frailty Index (FI-AC). Analyses examined the relationship between sex, age, FI-AC and 28-day mortality.

Survival models were adjusted for 'lethality' of acute conditions (high versus low mortality risk). Results The FI-AC had a normal distribution in both sexes (female mean = 0.34 (± 0.13); male mean = 0.31 (± 0.15)). When adjusted for age, females had similar FI-AC scores to males (β coefficient = 0.014, 95% confidence interval (CI) = 0.00-0.028, $p = 0.056$). There were 80 deaths in the sample, with females facing a significantly lower mortality risk than males of the same FI-AC and age (HR = 0.39, 95% CI = 0.25–0.63, $p < 0.001$). Females were less likely than males to be admitted with a high-risk acute condition. Even so, this did not significantly reduce their survival advantage (HR = 0.46, 95% CI = 0.29-0.73, $p = 0.001$). Conclusion The male-female health-survival paradox was not demonstrated in this study of older inpatients. Whilst females faced a significantly lower risk of near-term mortality, the sexes were found to have similar levels of frailty on admission to hospital. The sex mortality gap was not explained by sex differences in the 'lethality' of acute medical conditions.

Gray L, et al. (2017). interRAI Acute Care (AC) Assessment Form and User's Manual. Washington, DC, interRAI.

Gray L, et al. (2017). interRAI Acute Care for Comprehensive Geriatric Assessment (AC-CGA) Form and User's Manual. Washington, DC, interRAI.

Gray, L., et al. (2010). interRAI Acute Care (AC) Assessment Form and User's Manual. Washington, DC, interRAI.

Gray, L., et al. (2013). interRAI Clinical and Management Applications Manual: For Use with the interRAI Acute Care Assessment Instrument. Version 9.1. Washington, DC, interRAI.

Gray, L. and R. Wootton (2008). "Comprehensive geriatric assessment 'online'." Australas J Ageing 27(4): 205-208.

This paper describes a system designed to enable comprehensive geriatric assessment to be performed at distant locations. A structured assessment incorporating the interRAI Acute Care assessment tool is administered by a specifically trained nurse assessor onsite. Data are entered and processed by web-based software that incorporates a clinical decision support system. It enables a geriatrician to review and report the assessment online. The assessment and report can be viewed by authorised clinicians inside and outside the hospital via the Internet. The system can also be used to support in person geriatric consultation and whole of episode ward-based geriatric care. Preliminary evaluation suggests the system to be reliable, safe, efficient and appealing to clinicians.

Gray, L. C., et al. (2018). "Development and Testing of the interRAI Acute Care: A Standardized Assessment Administered by Nurses for Patients Admitted to Acute Care." Health Serv Insights 11: 1178632918818836.

Background: Underpinning standards for developing comprehensive care in hospital is the need to identify, early in the admission process, functional and psychosocial issues which affect patient outcomes. Despite the value of comprehensive assessment of patients on admission, the process is often sub-optimal due to a lack of standardized assessment practices. This project aimed to develop a concise, integrated assessment for patients admitted to acute care and test its psychometric properties. Methods: Two international expert panels of clinicians and health scientists collaborated to establish design parameters. Using clinical observations and a variety of derivative applications sourced from the interRAI research collaborative repository, the panels constructed a draft instrument to examine feasibility, resource requirements, and inter-rater reliability. Field testing was conducted in Australia and Canada. Next, the system was revised to its final form, the interRAI Acute Care, after feedback and review from international interRAI members. Results: Constructed using 56 items, the interRAI Acute Care required a median of 15 minutes to complete. Inter-rater reliability tested on 130 paired assessments was substantial to almost perfect for 78% of the clinical items and moderate for the remaining 22% of items. A subset of 30 items from the admission assessment comprised the discharge assessment. Discussion: The interRAI Acute Care has been shown to be an efficient nursing assessment instrument with good psychometric properties. Implementation in a digital environment will enable documentation and care planning to comply with standards for quality of care in the general adult hospital population.

Gray, L. C., et al. (2009). "Sharing clinical information across care settings: the birth of an integrated assessment system." BMC Health Serv Res 9: 71.

BACKGROUND: Population ageing, the emergence of chronic illness, and the shift away from institutional care challenge conventional approaches to assessment systems which traditionally are problem and setting specific. METHODS: From 2002, the interRAI research collaborative undertook development of a suite of assessment tools to support assessment and care planning of persons with chronic illness, frailty, disability, or mental health problems

across care settings. The suite constitutes an early example of a "third generation" assessment system. RESULTS: The rationale and development strategy for the suite is described, together with a description of potential applications. To date, ten instruments comprise the suite, each comprising "core" items shared among the majority of instruments and "optional" items that are specific to particular care settings or situations. CONCLUSION: This comprehensive suite offers the opportunity for integrated multi-domain assessment, enabling electronic clinical records, data transfer, ease of interpretation and streamlined training.

Gray, L. C., et al. (2008). "Standardizing assessment of elderly people in acute care: the interRAI Acute Care instrument." *J Am Geriatr Soc* 56(3): 536-541.

OBJECTIVES: To examine the frequency distributions and interrater reliability of individual items of the interRAI Acute Care instrument. DESIGN: Observational study of a representative sample of older inpatients; duplicate assessments conducted on a subsample by independent assessors to examine interrater reliability. SETTING: Acute medical, acute geriatric and orthopedic units in 13 hospitals in nine countries. PARTICIPANTS: Five hundred thirty-three patients aged 70 and older (mean age 82.4, range 70-102) with an anticipated stay of 48 hours or longer of whom 161 received duplicate assessments. MEASUREMENTS: Sixty-two clinical items across 11 domains. Premorbid (3-day observation period before onset of the acute illness) and admission (the first 24 hours of hospital stay) assessments were conducted. RESULTS: The frequency of deficits exceeded 30% for most items, ranging from 1% for physically abusive behavior to 86% for the need for support in activities of daily living after discharge. Common deficits were in cognitive skills for daily decision-making (38% premorbid, 54% at admission), personal hygiene (37%, 65%), and walking (39%, 71%). Interrater reliability was substantial in the premorbid period (average kappa=0.61) and admission period (average kappa=0.66). Of the 69 items tested, less than moderate agreement (kappa<0.4) was recorded for six (9%), moderate agreement (kappa=0.41-0.6) for 14 (20%), substantial agreement (kappa=0.61-0.8) for 40 (58%), and almost perfect agreement (kappa>0.8) for nine (13%). CONCLUSION: Initial assessment of the psychometric properties of the interRAI Acute Care instrument provided evidence that item selection and interrater reliability are appropriate for clinical application. Further studies are required to examine the validity of embedded scales, diagnostic algorithms, and clinical protocols.

Gray, L. C., et al. (2016). "Telemedicine for Specialist Geriatric Care in Small Rural Hospitals: Preliminary Data." *J Am Geriatr Soc* 64(6): 1347-1351.

Small rural hospitals admit and manage older adults who, in city hospitals, would usually be offered geriatrician-supported comprehensive geriatric assessment and coordinated subacute care if required. Distance and diseconomies of scale prohibit access to the conventional in-person approach. A telegeriatric service model involving a geriatrician consulting remotely using wireless, mobile, high-definition videoconferencing; a trained host nurse at the rural site; structured geriatric assessment configured on a web-based clinical decision support system; routine weekly virtual rounds; and support from a local multidisciplinary team was established to overcome these barriers. This was a prospective observational study to examine the feasibility and sustainability of the model. Patient characteristics were recorded using the interRAI Acute Care assessment system. Usage patterns were derived from health service data sets and a service statistics database. Patients had characteristics that are consistent with characteristics of individuals typically referred for geriatric assessment. Overall, 53% of patients had cognitive impairment, 75% had limitations with activities of daily living, and the average Frailty Index was 0.44 +/- 0.12. Stable patterns of consultation occurred within 6 months of start-up and continued uninterrupted for the remainder of the 24-month observation period. The estimated overall rate of initial consultation was 1.83 cases per occupied bed per year and 2.66 review cases per occupied bed per year. The findings indicate that the model was feasible and was sustained throughout and beyond the study period. This telegeriatric service model appears suitable for use in small rural hospitals.

Gregorevic, K., et al. (2018). "Validation of the health assets index in the Australian inpatient setting: a multicentre prospective cohort protocol study." *BMJ Open* 8(5): e021135.

INTRODUCTION: It is well known that frail older adults are at increased risk for mortality and functional decline on admission to hospital. Systematic review demonstrates that health assets are associated with improved outcomes for hospitalised older adults. The health assets index (HAI) has been developed to measure health assets in the hospital setting. A protocol has been developed to determine the predictive validity of the HAI for frail older adults. METHODS AND ANALYSIS: The HAI was developed based on a systematic review and secondary analysis of the interRAI-Acute Care (interRAI-AC) dataset. A pilot study was undertaken to refine the tool. The validation study will be a multicentre prospective cohort. Participants will be adults aged 70 years and older with an unplanned admission to hospital. Frailty, illness severity and demographic data will also be recorded. The primary outcomes are mortality at 28 days postdischarge and functional decline at the time of discharge from hospital. The primary hypothesis is that a higher

score on the HAI will mitigate the effects of frailty for hospitalised older adults. The secondary outcomes to be recorded are length of stay, readmission at 28 days and functional status at 28 days postdischarge. The correlation between HAI and frailty will be explored. A multivariate analysis will be undertaken to determine the relationship between the HAI and the outcomes of interest. ETHICS AND DISSEMINATION: Ethical approval has been obtained from Austin Health Human High Risk Ethics Committee. The results will be disseminated in peer-reviewed journals and research conferences. This study will determine whether the HAI has predictive validity for mortality and functional decline for hospitalised, frail older adults.

Gregorevic, K. J., et al. (2018). "Do health assets have a protective effect for hospitalized frail older adults?" *Qjm* 111(11): 785-789.

Background: Although increasing frailty is predictive of increased mortality and length of stay for hospitalized older adults, this approach ignores health assets that individuals can utilize to recover following hospital admission. **Aim:** To examine whether health assets mitigate the effect of frailty on outcomes for older adults admitted to hospital. **Design:** Patients of 1418 aged ≥ 70 years admitted to 11 hospitals in Australia were evaluated at admission using the interRAI assessment system for Acute Care, which surveys a large number of domains, including cognition, communication, mood and behaviour, activities of daily living, continence, nutrition, skin condition, falls and medical diagnosis. **Methods:** The data set was interrogated for potential health assets and a multiple logistic regression adjusted for frailty index, age and gender as covariates was performed for the outcomes mortality, length of stay, re-admission and new need for residential care. **Results:** Inpatient mortality was 3% and 4.5% of patients died within 28 days of discharge. Median length of stay was 7 days (IQR 4-11). In multivariate analysis that includes frailty, being able to walk further [OR 0.08 (0.01-0.63)], ability to leave the house [OR 0.35 (0.17-0.74)] and living alone [OR 0.28 (0.10-0.79)] were protective against mortality. The presence of a support person was associated with a decreased length of stay [OR 0.14 (0.08-0.25)]. **Conclusion:** The inclusion of health assets in predictive models can improve prognostication and highlights potential interventions to improve outcomes for hospitalized older adults.

Grue, E. V., et al. (2009). "Prevalence of vision, hearing, and combined vision and hearing impairments in patients with hip fractures." *J Clin Nurs* 18(21): 3037-3049.

AIMS AND OBJECTIVES: To examine the prevalence of hearing and vision impairments in 65+ year-old patients with hip fractures. **BACKGROUND:** Many older people believe sensory problems are inevitable and thus avoid medical assessment and assistance. Furthermore, health professionals often overlook sensory problems, though it is known that sensory impairments can increase the risk of falling and sustaining hip fractures. **DESIGN:** A prospective, observational study. **METHODS:** We admitted 544 consecutive patients to an orthogeriatric ward from October 2004-July 2006; 332 were screened for study inclusion with the Resident Assessment Instrument for Acute Care (InterRAI-AC) and a questionnaire (KAS-Screen). We conducted patient interviews, objective assessments, explored hospital records and interviewed the family and staff. Impairments were defined as problems with seeing, reading regular print or hearing normal speech. **RESULTS:** Sixteen per cent of the patients had no sensory impairments, 15.4% had vision impairments, 38.6% had hearing impairments and 30.1% had combined sensory impairments. Among the impaired, 80.6% were female, the mean age was 84.3 years (SD 6.8), 79.9% were living alone, 48.0% had cognitive impairments, 89.6% had impaired activities of daily living, 70.6% had impaired instrument activities in daily living, 51.0% had bladder incontinence and 26.8% were underweight. Comorbidity and polypharmacy were common. Delirium was detected in 17.9% on day three after surgery. Results showed the prevalence of combined sensory impairments was: 32.8% none; 52.2% moderate/severe; and 15.1% severe. **CONCLUSION:** Patients with hip fractures frequently have hearing, vision and combined impairments. **RELEVANCE TO CLINICAL PRACTICE:** We recommend routine screening for sensory impairments in patients with hip fractures. Most sensory problems can be treated or relieved with environmental adjustments. Patients should be encouraged to seek treatment and training for adapting to sensory deficiencies. This approach may reduce the number of falls and improve the ability to sustain independent living.

Hirdes, J. P., et al. (2008). "Reliability of the interRAI suite of assessment instruments: a 12-country study of an integrated health information system." *BMC Health Serv Res* 8: 277.

BACKGROUND: A multi-domain suite of instruments has been developed by the interRAI research collaborative to support assessment and care planning in mental health, aged care and disability services. Each assessment instrument comprises items common to other instruments and specialized items exclusive to that instrument. This study examined the reliability of the items from five instruments supporting home care, long term care, mental health, palliative care and post-acute care. **METHODS:** Paired assessments on 783 individuals across 12 nations were completed within 72 hours of each other by trained assessors who were blinded to the others' assessment. Reliability was tested using weighted kappa coefficients. **RESULTS:** The overall kappa mean value for 161 items which are

common to 2 or more instruments was 0.75. The kappa mean value for specialized items varied among instruments from 0.63 to 0.73. Over 60% of items scored greater than 0.70. CONCLUSION: The vast majority of items exceeded standard cut-offs for acceptable reliability, with only modest variation among instruments. The overall performance of these instruments showed that the interRAI suite has substantial reliability according to conventional cut-offs for interpreting the kappa statistic. The results indicate that interRAI items retain reliability when used across care settings, paving the way for cross domain application of the instruments as part of an integrated health information system.

Hopcroft, P., et al. (2014). "Prescribing for older people discharged from the acute sector to residential aged-care facilities." *Intern Med J* 44(10): 1034-1037.

For frail older people, admission to hospital is an opportunity to review the indications for specific medications. This research investigates prescribing for 206 older people discharged into residential aged care facilities from 11 acute care hospitals in Australia. Patients had multiple comorbidities (mean 6), high levels of dependency, and were prescribed a mean of 7.2 regular medications at admission to hospital and 8.1 medications on discharge, with hyperpolypharmacy (≥ 10 drugs) increasing from 24.3% to 32.5%. Many drugs were preventive medications whose time until benefit was likely to exceed the expected lifespan. In summary, frail patients continue to be exposed to extensive polypharmacy and medications with uncertain risk-benefit ratio.

Hubbard, R. E., et al. (2015). "Derivation of a frailty index from the interRAI acute care instrument." *BMC Geriatr* 15: 27.

BACKGROUND: A better understanding of the health status of older inpatients could underpin the delivery of more individualised, appropriate health care. METHODS: 1418 patients aged ≥ 70 years admitted to 11 hospitals in Australia were evaluated at admission using the interRAI assessment system for Acute Care. This instrument surveys a large number of domains, including cognition, communication, mood and behaviour, activities of daily living, continence, nutrition, skin condition, falls, and medical diagnosis. RESULTS: Variables across multiple domains were selected as health deficits. Dichotomous data were coded as symptom absent (0 deficit) or present (1 deficit). Ordinal scales were recoded as 0, 0.5 or 1 deficit based on face validity and the distribution of data. Individual deficit scores were summed and divided by the total number considered (56) to yield a Frailty index (FI-AC) with theoretical range 0-1. The index was normally distributed, with a mean score of 0.32 (± 0.14), interquartile range 0.22 to 0.41. The 99% limit to deficit accumulation was 0.69, below the theoretical maximum of 1.0. In logistic regression analysis including age, gender and FI-AC as covariates, each 0.1 increase in the FI-AC increased the likelihood of inpatient mortality twofold (OR: 2.05 [95% CI 1.70-2.48]). CONCLUSIONS: Quantification of frailty status at hospital admission can be incorporated into an existing assessment system, which serves other clinical and administrative purposes. This could optimise clinical utility and minimise costs. The variables used to derive the FI-AC are common to all interRAI instruments, and could be used to precisely measure frailty across the spectrum of health care.

Hubbard, R. E., et al. (2017). "Frailty status at admission to hospital predicts multiple adverse outcomes." *Age Ageing* 46(5): 801-806.

Aims: frailty is proposed as a summative measure of health status and marker of individual vulnerability. We aimed to investigate the discriminative capacity of a frailty index (FI) derived from interRAI Comprehensive Geriatric Assessment for Acute Care (AC) in relation to multiple adverse inpatient outcomes. Methods: in this prospective cohort study, an FI was derived for 1,418 patients ≥ 70 years across 11 hospitals in Australia. The interRAI-AC was administered at admission and discharge by trained nurses, who also screened patients daily for geriatric syndromes. Results: in adjusted logistic regression models an increase of 0.1 in FI was significantly associated with increased likelihood of length of stay >28 days (odds ratio [OR]: 1.29 [1.10-1.52]), new discharge to residential aged care (OR: 1.31 [1.10-1.57]), in-hospital falls (OR: 1.29 [1.10-1.50]), delirium (OR: 2.34 [2.08-2.63]), pressure ulcer incidence (OR: 1.51 [1.23-1.87]) and inpatient mortality (OR: 2.01 [1.66-2.42]). For each of these adverse outcomes, the cut-point at which optimal sensitivity and specificity occurred was for an FI > 0.40 . Specificity was higher than sensitivity with positive predictive values of 7-52% and negative predictive values of 88-98%. FI-AC was not significantly associated with readmissions to hospital. Conclusions: the interRAI-AC can be used to derive a single score that predicts multiple adverse outcomes in older inpatients. A score of ≤ 0.40 can well discriminate patients who are unlikely to die or experience a geriatric syndrome. Whether the FI-AC can result in management decisions that improve outcomes requires further study.

Hubbard, R. E., et al. (2015). "Polypharmacy among inpatients aged 70 years or older in Australia." *Med J Aust* 202(7): 373-377.

OBJECTIVES: To investigate medication changes for older patients admitted to hospital and to explore associations

between patient characteristics and polypharmacy. DESIGN: Prospective cohort study. PARTICIPANTS AND SETTING: Patients aged 70 years or older admitted to general medical units of 11 acute care hospitals in two Australian states between July 2005 and May 2010. All patients were assessed using the interRAI assessment system for acute care. MAIN OUTCOME MEASURES: Measures of physical, cognitive and psychosocial functioning; and number of regular prescribed medications categorised into three groups: non-polypharmacy (0-4 drugs), polypharmacy (5-9 drugs) and hyperpolypharmacy (≥ 10 drugs). RESULTS: Of 1220 patients who were recruited for the study, medication records at admission were available for 1216. Mean age was 81.3 years (SD, 6.8 years), and 659 patients (54.2%) were women. For the 1187 patients with complete medication records on admission and discharge, there was a small but statistically significant increase in mean number of regular medications per day between admission and discharge (7.1 v 7.6), while the prevalence of medications such as statins (459 [38.7%] v 457 [38.5%] patients), opioid analgesics (155 [13.1%] v 166 [14.0%] patients), antipsychotics (59 [5.0%] v 65 [5.5%] patients) and benzodiazepines (122 [10.3%] v 135 [11.4%] patients) did not change significantly. Being in a higher polypharmacy category was significantly associated with increase in comorbidities (odds ratio [OR], 1.27; 95% CI, 1.20-1.34), presence of pain (OR, 1.31; 1.05-1.64), dyspnoea (OR, 1.64; 1.30-2.07) and dependence in terms of instrumental activities of daily living (OR, 1.70; 1.20-2.41). Hyperpolypharmacy was observed in 290/1216 patients (23.8%) at admission and 336/1187 patients (28.3%) on discharge, and the proportion of preventive medication in the hyperpolypharmacy category at both points in time remained high (1209/3371 [35.9%] at admission v 1508/4117 [36.6%] at discharge). CONCLUSIONS: Polypharmacy is common among older people admitted to general medical units of Australian hospitals, with no clinically meaningful change to the number or classification (symptom control, prevention or both) of drugs made by treating physicians.

Ilango, S., et al. (2017). "Prescribing in the Oldest Old Inpatients: A Retrospective Analysis of Patients Referred for Specialist Geriatric Consultation." *Intern Med J*.

INTRODUCTION: While medications may prolong life and prevent morbidity in older people, adverse effects of polypharmacy are increasingly recognised. As patients age and become frail, prescribing may be expected to focus more on symptom control and minimise potentially harmful preventive medication use that confer little benefit within a short lifespan. Whether prescribing practice shifts to one of symptom control among the oldest old admitted to hospital remains unclear. METHODS: Retrospective analysis of all patients aged ≥ 85 years referred for comprehensive geriatric assessment at a tertiary care hospital between May 2006 and December 2014 for whom all prescribed medications were documented. Medication use was assessed according to age group (85-89; 90-94; ≥ 95) and categories of frailty index (FI) calculated for patients based on 52 deficits (fitter; moderately frail; frail; severely frail). RESULTS: 783 inpatients were assessed of mean (SD) age 89.0 (3.4) and mean FI 0.45 (SD 0.14) with a median of eight co-morbidities (IQR 6-10) and who were prescribed a mean of 8.3 (SD 3.8) regular medications per day. Polypharmacy (5 to 9 medications per day) was observed in 406 patients (51.9%) and hyper-polypharmacy (≥ 10 medications per day) in 268 patients (34.2%). While there was a significant decrease in number of prescribed medications as age increased, there were no differences across age groups or frailty categories in proportions of medications used for prevention versus symptom control. CONCLUSION: Polypharmacy is prevalent in oldest old inpatients and prescribing patterns according to prevention versus symptom control appear unaffected by age and frailty status.

Kucikiene, O., et al. (2009). "[Assessment of urinary incontinence in the elderly using the InterRAI-AC instrument]." *Medicina (Kaunas)* 45(5): 365-371.

UNLABELLED: The aim of this study was to identify and evaluate the prevalence of urinary incontinence and risk factors that influenced it among inpatients treated in the departments of internal medicine. MATERIAL AND METHODS: A total of 151 inpatients were questioned using a standardized geriatric questionnaire (InterRAI-Acute Care). Inpatients aged 65 years and more and who gave written informed consent were enrolled into the study. The mean age of the inpatients was 78+/-0.6 years. There were 58.9% of women and 41.06% of men. RESULTS: Urinary incontinence was significantly influenced by the age of the inpatients. Inpatients with urinary incontinence were 3 years older on the average as compared to those without urinary continence ($P < 0.025$). Women were more frequently affected than men (74.2% vs. 48.4%). A significant association between urinary and fecal incontinence and memory problems, movement disorders, delirium, dependence in daily activities, falls was established. The odds of having double incontinence were increased by dementia (OR=20.9; 95% CI 2.3-186) and residual effects of a stroke (OR=3.5; 95% CI 1.2-9.6). The prevalence of urinary incontinence decreased from 63.6% before hospitalization to 39.7% after hospitalization. According to standard medical documentation, urinary incontinence was diagnosed in 3.3% of cases, while using the interRAI-AC questionnaire, it was documented in 63.6% of cases. CONCLUSIONS: The prevalence of urinary incontinence increases in the elderly; therefore, it has to be investigated and treated. Memory problems, delirium, dependence in daily activities, movement disorders, and falls are directly related to the risk of

urinary, fecal, and double incontinence among elderly inpatients. Double incontinence was significantly influenced by dementia (20.9 times) and residual effects of a stroke (3.5 times). Underdiagnosis of urinary and fecal incontinence in inpatients burdens the possibility of providing aid for elderly patients with this disorder.

Lattanzio, F., et al. (2010). "Health care for older people in Italy: The U.L.I.S.S.E. Project (Un link informatico sui servizi sanitari esistenti per l'anziano - a computerized network on health care services for older people)." *J Nutr Health Aging* 14(3): 238-242.

OBJECTIVES: The U.L.I.S.S.E. study is aimed at describing older patients who are cared for in hospitals, home care or nursing homes in Italy. **DESIGN:** The U.L.I.S.S.E. study is an observational multicenter prospective 1-year study. **SETTING:** Overall, 23 acute geriatric or internal medicine hospital units, 11 home care services and 31 nursing homes participated in the study. **MEASUREMENTS:** The patient's evaluation was performed using comprehensive geriatric assessment instruments, i.e. the interRAI Minimum Data Set, while data on service characteristics were recorded using ad-hoc designed questionnaires. **RESULTS:** The older subjects who are in need of acute and long term care in Italy have similar characteristics: their mean age is higher than 80 years, they have a high level of disability in ADL, an important multimorbidity, and are treated with several drugs. The prevalence of cognitive impairment is particularly high in nursing homes, where almost 70% of residents suffer from it and 40% have severe cognitive impairment. On the other hand, there is a shortage of health care services, which are heterogeneous and fragmented. **CONCLUSIONS:** Health care services for older people in Italy are currently inadequate to manage the complexity of the older patients. An important effort should be undertaken to create a more integrated health care system.

Martin-Khan, M. G., et al. (2017). "Reliability of an Online Geriatric Assessment Procedure Using the interRAI Acute Care Assessment System." *J Am Geriatr Soc*.

OBJECTIVES: To determine whether geriatric triage decisions made using a comprehensive geriatric assessment (CGA) performed online are less reliable than face-to-face (FTF) decisions. **DESIGN:** Multisite noninferiority prospective cohort study. Two specialist geriatricians assessed individuals sequentially referred for an acute care geriatric consultation. Participants were allocated to one FTF assessment and an additional assessment (FTF or online (OL)), creating two groups-two FTF (FTF-FTF, n = 81) or online and FTF (OL-FTF, n = 85). **SETTING:** Three acute care public hospitals in two Australian states. **PARTICIPANTS:** Admitted individuals referred for CGA. **INTERVENTION:** Nurse-administered CGA, based on the interRAI Acute Care assessment system accessed online and other online clinical data such as pathology results and imaging enabling geriatricians to review participants' information and provide input into their care from a distance. **MEASUREMENTS:** The primary decision subjected to this analysis was referral for permanent residential care. Geriatricians also recorded recommendations for referrals and variations for medication management and judgment regarding prognosis at discharge and after 3 months. **RESULTS:** Overall percentage agreement was 88% (n = 71) for the FTF-FTF group and 91% (n = 77) for the OL-FTF group. The difference in agreement between the FTF-FTF and OL-FTF groups was -3%, indicating that there was no difference between the methods of assessment. Judgements made regarding diagnoses of geriatric syndromes, medication management, and prognosis (with regard to hospital outcome and location at 3 months) were found to be equally reliable in each mode of consultation. **CONCLUSION:** Geriatric assessment performed online using a nurse-administered structured CGA system was no less reliable than conventional assessment in making clinical triage decisions.

McDermott-Scales, L., et al. (2013). "The National Single Assessment Tool (SAT) a pilot study in older persons care-survey results." *Ir Med J* 106(7): 214-216.

Following a consultation and review process, the interRAI suite of assessment tools was chosen as the most suitable instrument for assessment of the care needs of older people in Ireland. We used previously validated questionnaires to examine the usability, practicality and acceptability of these tools to professionals, carers and clients in rural and urban acute, long-term care and community settings. Of the 45 professionals, 42-44 (93-98%) agreed or strongly agreed with 14 of 15 positive statements regarding the acceptability, clinical value and ease of use of the interRAI tools; 39 (87%) felt the terminology was consistent and familiar, although 35 (78%) felt some areas would require further explanation. Responses from carers (n = 15) and clients (n = 68) were similarly overwhelmingly positive regarding the experience of being assessed using these tools. These results support the clinical utility and practicality of using this approach to assess older people in Irish clinical practice.

Morris, J. N., et al. (2018). "Developing quality indicators for in-patient post-acute care." *BMC Geriatr* 18(1): 161.

BACKGROUND: This paper describes an integrated series of functional, clinical, and discharge post-acute care (PAC) quality indicators (QIs) and an examination of the distribution of the QIs in skilled nursing facilities (SNF) across the US. The indicators use items available in interRAI based assessments including the MDS 3.0 and are designed for use in in-patient post-acute environments that use the assessments. **METHODS:** Data Source: MDS 3.0 computerized

assessments mandated for all patients admitted to US skilled nursing facilities (SNF) in 2012. In total, 2,380,213 patients were admitted to SNFs for post-acute care. Definition of the QI numerator, denominator and covariate structures were based on MDS assessment items. A regression strategy modeling the "discharge to the community" PAC QI as the dependent variable was used to identify how to bring together a subset of seven candidate PAC QIs for inclusion in a summary scale. Finally, the distributional property of the summary scale (the PAC QI Summary Scale) across all facilities was explored. RESULTS: The risk-adjusted PAC QIs include indicators of improved status, including measures of early, middle, and late-loss functional performance, as well as measures of walking and changed clinical status and an overall summary functional scale. Many but not all patients demonstrated improvement from baseline to follow-up. However, there was substantial inter-state variation in the summary QI scores across the SNFs. CONCLUSIONS: The set of PAC QIs consist of five functional, two discharge and eight clinical measures, and one summary scale. All QIs can be derived from multiple interRAI assessment tools, including the MDS 2.0, interRAI-LTCF, MDS 3.0, and the interRAI-PAC-Rehab. These measures are appropriate for wide distribution in and out of the United States, allowing comparison and discussion of practices associated with better outcomes.

Morris, J. N., et al. (2014). "Predicting risk of hospital and emergency department use for home care elderly persons through a secondary analysis of cross-national data." BMC Health Serv Res 14: 519.

BACKGROUND: Older adults remain the highest utilization group with unplanned visits to emergency departments and hospital admissions. Many have considered what leads to this high utilization and the answers provided have depended upon the independent measures available in the datasets used. This project was designed to further understanding of the reasons for older adult ED visits and admissions to acute care hospitals. METHODS: A secondary analysis of data from a cross-national sample of community residing elderly, 60 years of age or older, and most of whom received services from a local home-care program was conducted. The assessment instrument used in this study is the interRAI HC (home care), designed for use in assessing elderly home care recipients. The model specification stage of the study identified the baseline independent variables that do and do not predict the follow-up measure of hospitalization and ED use. Stepwise logistic regression was used next to identify characteristics that best identified elders who subsequently entered a hospital or visited an ED. The items generated from the final multivariate logistic equation using the interRAI home care measures comprise the interRAI Hospital-ED Risk Index. RESULTS: Independent measures in three key domains of clinical complications, disease diagnoses and specialized treatments were related to subsequent hospitalization or ED use. Among the eighteen clinical complication measures with higher, meaningful odds ratios are pneumonia, urinary tract infection, fever, chest pain, diarrhea, unintended weight loss, a variety of skin conditions, and subject self-reported poor health. Disease diagnoses with a meaningful relationship with hospital/ED use include coronary artery disease, congestive heart failure, cancer, emphysema and renal failure. Specialized treatments with the highest odds ratios were blood transfusion, IV infusion, wound treatment, radiation and dialysis. Two measures, Alzheimer's disease and day care appear to have a protective effect for hospitalization/ED use with lower odds ratios. CONCLUSIONS: Examination into "preventable" hospitalizations and re-hospitalizations for older adults who have the highest rates of utilization are occurring beneath an umbrella of assuring the highest quality of care and controlling costs. The interRAI Hospitalization-ED Risk Index offers an effective approach to predicting hospitalization utilization among community dwelling older adults.

Noro, A., et al. (2011). "Method for Assigning Priority Levels in Acute Care (MAPLe-AC) predicts outcomes of acute hospital care of older persons--a cross-national validation." BMC medical informatics and decision making 11: 39.

BACKGROUND: Although numerous risk factors for adverse outcomes for older persons after an acute hospital stay have been identified, a decision making tool combining all available information in a clinically meaningful way would be helpful for daily hospital practice. The purpose of this study was to evaluate the ability of the Method for Assigning Priority Levels for Acute Care (MAPLe-AC) to predict adverse outcomes in acute care for older people and to assess its usability as a decision making tool for discharge planning. METHODS: Data from a prospective multicenter study in five Nordic acute care hospitals with information from admission to a one year follow-up of older acute care patients were compared with a prospective study of acute care patients from admission to discharge in eight hospitals in Canada. The interRAI Acute Care assessment instrument (v1.1) was used for data collection. Data were collected during the first 24 hours in hospital, including pre-morbid and admission information, and at day 7 or at discharge, whichever came first. Based on this information a crosswalk was developed from the original MAPLe algorithm for home care settings to acute care (MAPLe-AC). The sample included persons 75 years or older who were admitted to acute internal medical services in one hospital in each of the five Nordic countries (n = 763) or to acute hospital care either internal medical or combined medical-surgical services in eight hospitals in Ontario, Canada (n = 393). The outcome measures considered were discharge to home, discharge to institution or death. Outcomes in a 1-year follow-up in the Nordic hospitals were: living at home, living in an institution or death, and survival. Logistic regression

with ROC curves and Cox regression analyses were used in the analyses. RESULTS: Low and mild priority levels of MAPLe-AC predicted discharge home and high and very high priority levels predicted adverse outcome at discharge both in the Nordic and Canadian data sets, and one-year outcomes in the Nordic data set. The predictive accuracy (AUC's) of MAPLe-AC's was higher for discharge outcome than one year outcome, and for discharge home in Canadian hospitals but for adverse outcome in Nordic hospitals. High and very high priority levels in MAPLe-AC were also predictive of days to death adjusted for diagnoses in survival models. CONCLUSION: MAPLe-AC is a valid algorithm based on risk factors that predict outcomes of acute hospital care. It could be a helpful tool for early discharge planning although further testing for active use in clinical practice is still needed.

Peel, N. M., et al. (2019). "Prevalence and Impact of Functional and Psychosocial Problems in Hospitalized Adults: A Prospective Cohort Study." *J Am Med Dir Assoc*: aheadofprint.

OBJECTIVES: Underpinning standards for delivering comprehensive care in hospital is the need to identify issues contributing to patient complexity and risk of harm. The study aimed to investigate the prevalence of functional and psychosocial problems in hospitalized adults, to compare prevalence rates across age groups, and to assess their impact on discharge outcomes. DESIGN, SETTING, AND PARTICIPANTS: A prospective cohort study was conducted in 4 hospitals in Australia during September 2015 to June 2016, recruiting patients aged 18 and over. MEASURES: Research nurses assessed patients at admission using the interRAI Acute Care instrument, which includes algorithms for diagnostic and risk screening and measuring problem severity. Length of stay and discharge outcome were recorded from medical records. RESULTS: The median age of the study population (n = 910) was 66 (range 18-99 years), and 47.7% were female. Although 64.6% of patients aged ≥ 70 years had at least 1 classic geriatric syndrome (cognitive impairment, dependency in activities of daily living, history of falls, or incontinence), similar problems were prevalent in younger cohorts (34.6% in those aged < 50 and 38.9% in those aged 50-69 years). Of 17 health issues assessed across multiple domains, only 26 patients (2.9%) had no problems. Independent of age, gender, and Comorbidity Index, having a greater number of problems was significantly associated with an adverse discharge outcome, odds ratio 1.19 (95% confidence interval (CI) 1.09-1.29); for each additional problem, the length of stay increased by 6.7% (95% CI 4.3%-9.2%). CONCLUSIONS/IMPLICATIONS: The high prevalence of functional and psychosocial problems across the age range of patients indicates that universal screening and assessment is warranted for all adult patients to aid in care planning to meet patient needs both in acute care and post discharge.

Peel, N. M., et al. (2013). "Impact of post-acute transition care for frail older people: a prospective study." *Journal of Frailty and Aging* 2(3): 165-171.

Objectives: To describe the characteristics and outcomes of frail older people in a post-acute transitional care program and to compare the recovery trajectories of patients with high and low care needs to determine who benefits from transition care. Design: Prospective observational cohort. Participants and Setting: 351 patients admitted to community-based transition care in two Australian states during an 11 month recruitment period. Intervention: Transition care provides a package of services including personal care, physiotherapy and occupational therapy, nursing care and case management post discharge from hospital. It is targeted at frail older people who, in the absence of an alternative, would otherwise be eligible for admission to residential aged care. Measurements: A comprehensive geriatric assessment using the interRAI Home Care instrument was conducted at transition care admission and discharge. Primary outcomes included changes in functional ability during transition care, living status at discharge and six months follow-up, and hospital re-admissions over the follow-up period. For comparison of outcomes, the cohort was divided into two groups based on risk factors for admission to high or low-level residential aged care. Results: There were no significant differences between groups on outcomes, with over 85% of the cohort living in the community at follow-up. More than 80% of the cohort showed functional improvement or maintenance of independence during transition care, with no significant differences between the groups. Conclusions: Post-acute programs should not be targeted solely at fitter older people: those who are frail also have the potential to gain from community-based rehabilitation.

Peel, N. M., et al. (2018). "Validation of a Falls Risk Screening Tool Derived From InterRAI Acute Care Assessment." *J Patient Saf*: aheadofprint.

OBJECTIVES: This study aimed to develop and validate a falls risk screening tool derived from interRAI Acute Care (AC) Assessment. METHODS: For derivation and validation, two prospective cohorts were recruited from AC hospitals in Australia. The derivation cohort comprised 1418 patients from 11 hospitals. In the validation cohort, 393 patients were recruited from four hospitals. The interRAI AC tool was used to collect comprehensive geriatric assessment data at admission. In-hospital falls were documented from medical records. A falls risk score was calculated using logistic regression. Predictive ability was compared with St. Thomas Risk Assessment Tool In Falling elderly (STRATIFY), using area under curve (AUC). The validation cohort provided external validity. RESULTS: Complete data in the derivation

cohort were available for 1288 patients (91%), with 75 (5.8%) having an in-hospital fall. The derived interRAI AC falls risk score (range = 0-6) had significantly better predictive ability (AUC = 0.70, 95% confidence interval [CI] = 0.63-0.76) compared with St. Thomas Risk Assessment Tool In Falling elderly (AUC = 0.64, 95% CI = 0.58-0.70) (P = 0.033). At a cut point of three, 54 of 75 falls were correctly predicted by the falls risk score derived from interRAI AC (sensitivity = 0.72 [95% CI = 0.60-0.82] and specificity = 0.60 [95% CI = 0.57-0.62]). The falls risk score performed similarly in the validation cohort. CONCLUSIONS: The falls risk tool developed from interRAI AC is a valid measure to screen for in-hospital falls. Reduction in assessment burden without loss of fidelity can be achieved through integrating the risk screener within the interRAI hospital system, which automatically triggers protocols for falls prevention based on identified risk.

Peel, N. M., et al. (2014). "Gait speed as a predictor of outcomes in post-acute transitional care for older people." *Geriatrics and Gerontology International* 14(4): 906-910.

AIMS: Gait speed has been advocated as a marker of vulnerability, but its discriminatory utility and predictive ability in frail older people in a post-acute community-based rehabilitation program has not been extensively investigated. The aims of this research were to examine whether there was a meaningful improvement in gait speed in post-acute care patients, and to determine whether gait speed predicted outcomes at 6-month follow up. METHODS: In a prospective cohort study, 351 older persons admitted to a transition care program were comprehensively assessed using the interRAI Home Care instrument. This included a timed 4-m walk at admission and discharge. A telephone interview 6 months after admission determined functional independence, living status and readmissions to hospital. RESULTS: Mean (SD) gait speed was 0.34 m/s (0.21 m/s) at admission and 0.54 m/s (0.33 m/s) at discharge. The improvement in gait speed over the program was significant (P < 0.001), and represents a clinically meaningful change. At 6 months postadmission to transition care, a majority of patients (86.9%) were living in the community and 40.5% had at least one readmission to hospital. Higher gait speed at admission was associated with increased likelihood of living in the community (OR 1.34, P = 0.015) and being functionally independent (OR 1.19 P = 0.017) at follow up, as well as a reduced risk of hospital readmissions (OR 1.18, P = 0.006). CONCLUSIONS: Gait speed is an inexpensive, feasible and objective measure of physical performance in frail older people. It could be a useful tool in community-based transition care settings to predict outcomes. *Geriatr Gerontol Int* 2014; :-

Peel, N. M., et al. (2016). "Promoting Activity in Geriatric Rehabilitation: A Randomized Controlled Trial of Accelerometry." *PLoS One* 11(8): e0160906.

BACKGROUND: Low activity levels in inpatient rehabilitation are associated with adverse outcomes. The study aimed to test whether activity levels can be increased by the provision of monitored activity data to patients and clinicians in the context of explicit goal setting. METHODS: A randomized controlled trial in three sites in Australia included 255 inpatients aged 60 and older who had a rehabilitation goal to become ambulant. The primary outcome was patients' walking time measured by accelerometers during the rehabilitation admission. Walking times from accelerometry were made available daily to treating therapists and intervention participants to motivate patients to improve incidental activity levels and reach set goals. For the control group, 'usual care' was followed, including the setting of mobility goals; however, for this group, neither staff nor patients received data on walking times to aid the setting of daily walking time targets. RESULTS: The median daily walking time in the intervention group increased from 10.3 minutes at baseline to 32.1 minutes at day 28, compared with an increase from 9.5 to 26.5 minutes per day in the control group. Subjects in the intervention group had significantly higher non-therapy walking time by about 7 minutes [mean (95% CI): 24.6 (21.7, 27.4)] compared to those in the control group [mean(95% CI): 17.3 (14.4, 20.3)] (p = 0.001). CONCLUSIONS: Daily feedback to patients and therapists using an accelerometer increased walking times during rehabilitation admissions. The results of this study suggest objective monitoring of activity levels could provide clinicians with information on clinically important, mobility-related activities to assist goal setting. TRIAL REGISTRATION: Australian New Zealand Clinical Trials Registry ACTRN12611000034932 <http://www.ANZCTR.org.au/>.

Poudel, A., et al. (2014). "Potentially inappropriate prescribing in older patients discharged from acute care hospitals to residential aged care facilities." *Ann Pharmacother* 48(11): 1425-1433.

BACKGROUND: The frequency of prescribing potentially inappropriate medications (PIMs) in older patients remains high despite evidence of adverse outcomes from their use. Little is known about whether admission to hospital has any effect on appropriateness of prescribing. OBJECTIVES: This study aimed to identify the prevalence and nature of PIMs and explore the association of risk factors for receiving a PIM. METHODS: This was a prospective study of 206 patients discharged to residential aged care facilities from acute care. All patients were at least 70 years old and were admitted between July 2005 and May 2010; their admission and discharge medications were evaluated. RESULTS: Mean patient age was 84.8 +/- 6.7 years; the majority (57%) were older than 85 years, and mean (SD) Frailty Index was 0.42 (0.15). At least 1 PIM was identified in 112 (54.4%) patients on admission and 102 (49.5%) patients on

discharge. Of all medications prescribed at admission (1728), 10.8% were PIMs, and at discharge, of 1759 medications, 9.6% were PIMs. Of the total 187 PIMs on admission, 56 (30%) were stopped and 131 were continued; 32 new PIMs were introduced. Of the potential risk factors considered, in-hospital cognitive decline and frailty status were the only significant predictors of PIMs. CONCLUSIONS: Although admission to hospital is an opportunity to review the indications for specific medications, a high prevalence of inappropriate drug use was observed. The only associations with PIM use were the frailty status and in-hospital cognitive decline. Additional studies are needed to further evaluate this association.

Poudeh, A., et al. (2016). "Adverse Outcomes in Relation to Polypharmacy in Robust and Frail Older Hospital Patients." *J Am Med Dir Assoc* 17(8): 767.e769-767.e713.

OBJECTIVE: To explore the relationship between polypharmacy and adverse outcomes among older hospital inpatients stratified according to their frailty status. **DESIGN AND SETTING:** A prospective study of 1418 patients, aged 70 and older, admitted to 11 hospitals across Australia. **MEASUREMENTS:** The interRAI Acute Care (AC) assessment tool was used for all data collection, including the derivation of a frailty index calculated using the deficit accumulation method. Polypharmacy was categorized into 3 groups based on the number of regular drugs prescribed. Recorded adverse health outcomes were falls, delirium, functional and cognitive decline, discharge to a higher level of care and in-hospital mortality. **RESULTS:** Patients had a mean (SD) age of 81 (6.8) years and 55% were women. Polypharmacy (5-9 drugs per day) was observed in 48.2% (n = 684) and hyper-polypharmacy (≥ 10 drugs) in 35.0% (n = 497). Severe cognitive impairment was significantly associated with nonpolypharmacy compared with polypharmacy and hyper-polypharmacy groups combined (P = .004). In total, 591 (42.5%) patients experienced at least 1 adverse outcome. The only adverse outcome associated with polypharmacy was delirium. Within each polypharmacy category, frailty was associated with adverse outcomes and the lowest overall incidence was among robust patients prescribed 10 or more drugs. **CONCLUSION:** While polypharmacy may be a useful signal for medication review, in this study it was not an independent predictor of adverse outcomes for older inpatients. Assessing the frailty status of patients better appraised risk. Extensive de-prescribing in all older inpatients may not be an intervention that directly improves outcomes.

Rios, S., et al. (2017). "Antipsychotics and dementia in Canada: a retrospective cross-sectional study of four health sectors." *BMC Geriatr* 17(1): 244.

BACKGROUND: Antipsychotic medications are not recommended for the management of symptoms of dementia, particularly among persons with no behavioral or psychological symptoms. We examine patterns of antipsychotic medication use among persons with dementia across health sectors in Canada, with a focus on factors related to use among those without behavioral or psychotic symptoms. **METHODS:** Using a retrospective cross-sectional design, this study examines antipsychotic use among adults aged 65 or older with dementia in home care (HC), complex continuing care (CCC), long-term care (LTC), and among alternate level care patients in acute hospitals (ALC). Using clinical data from January 1, 2009 to December 31, 2014, the prevalence of antipsychotic medication use was estimated by the presence of behavioral and psychotic symptoms. Logistic regression was used to identify sector specific factors associated with antipsychotic use in the absence of behavioral and psychotic symptoms. **RESULTS:** The total prevalence of antipsychotic use among older adults with dementia was 19% in HC, 42% in ALC, 35% in CCC, and 37% in LTC. This prevalence ranged from 39% (HC) to 70% (ALC) for those with both behavioral and psychotic symptoms and from 12% (HC) to 32% (ALC) among those with no symptoms. The regression models identified a number of variables were related to antipsychotic use in the absence of behavior or psychotic symptoms, such as bipolar disorder (OR = 5.63 in CCC; OR = 5.52 in LTC), anxious complaints (OR = 1.54 in LTC to 2.01 in CCC), and wandering (OR = 1.83 in ALC). **CONCLUSIONS:** Potentially inappropriate use of antipsychotic medications is prevalent among older adults with dementia across health sectors. The variations in prevalence observed from community to facility based care suggests that system issues may exist in appropriately managing persons with dementia.

Runganga, M., et al. (2014). "Multiple medication use in older patients in post-acute transitional care: a prospective cohort study." *Clin Interv Aging* 9: 1453-1462.

BACKGROUND: Older adults with a range of comorbidities are often prescribed multiple medications, which may impact on their function and cognition and increase the potential for drug interactions and adverse events. **AIMS:** This study investigated the extent of polypharmacy and potentially inappropriate medications in patients receiving post-discharge transitional home care and explored the associations of polypharmacy with patient characteristics, functional outcomes, and frailty. **METHODS:** A prospective observational study was conducted of 351 patients discharged home from hospital with support from six Transition Care Program (TCP) sites in two states of Australia. A comprehensive geriatric assessment was conducted at TCP admission and discharge using the interRAI Home Care assessment tool, with frailty measured using an index of 57 accumulated deficits. Medications from hospital discharge

summaries were coded using the World Health Organization Anatomical Therapeutic Chemical Classification System. RESULTS: Polypharmacy (5-9 drugs) was observed in 46.7% and hyperpolypharmacy (≥ 10 drugs) in 39.2% of patients. Increasing numbers of medications were associated with greater number of comorbid conditions, a higher prevalence of diabetes mellitus, coronary heart disease, chronic obstructive pulmonary disease, dizziness, and dyspnea and increased frailty. At discharge from the program, the non-polypharmacy group (<5 drugs) had improved outcomes in Activities of Daily Living, Instrumental Activities of Daily Living and fewer falls, which was mediated because of lower levels of frailty. The commonest drugs were analgesics (56.8%) and antiulcer drugs (52.7%). The commonest potentially inappropriate medications were tertiary tricyclic antidepressants. CONCLUSION: Polypharmacy is common in older patients discharged from hospital. It is associated with frailty, falls, and poor functional outcomes. Efforts should be made to encourage regular medication reviews and rationalization of medications as part of discharge planning. Whether careful deprescribing improves outcomes in frail patients should be the focus of randomized trials.

Salam-White, L., et al. (2014). "Predictors of emergency room visits or acute hospital admissions prior to death among hospice palliative care clients in Ontario: a retrospective cohort study." *BMC Palliat Care* 13: 35.

BACKGROUND: Hospice palliative care (HPC) is a philosophy of care that aims to relieve suffering and improve the quality of life for clients with life-threatening illnesses or end of life issues. The goals of HPC are not only to ameliorate clients' symptoms but also to reduce unneeded or unwanted medical interventions such as emergency room visits or hospitalizations (ERVH). Hospitals are considered a setting ill-prepared for end of life issues; therefore, use of such acute care services has to be considered an indicator of poor quality end of life care. This study examines predictors of ERVH prior to death among HPC home care clients. METHODS: A retrospective cohort study of a sample of 764 HPC home care clients who received services from a community care access centre (CCAC) in southern Ontario, Canada. All clients were assessed using the Resident Assessment Instrument for Palliative Care (interRAI PC) as part of normal clinical practice between April 2008 and July 2010. The Andersen-Newman framework for health service utilization was used as a conceptual model for the basis of this study. Logistic regression and Cox regression analyses were carried out to identify predictors of ERVH. RESULTS: Half of the HPC clients had at least one or more ERVH ($n = 399$, 52.2%). Wish to die at home (OR = 0.54) and advanced care directives (OR = 0.39) were protective against ERVH. Unstable health (OR = 0.70) was also associated with reduced probability, while infections such as prior urinary tract infections (OR = 2.54) increased the likelihood of ERVH. Clients with increased use of formal services had reduced probability of ERVH (OR = 0.55). CONCLUSIONS: Findings of this study suggest that predisposing characteristics are nearly as important as need variables in determining ERVH among HPC clients, which challenges the assumption that need variables are the most important determinants of ERVH. Ongoing assessment of HPC clients is essential in reducing ERVH, as reassessments at specified intervals will allow care and service plans to be adjusted with clients' changing health needs and end of life preferences.

Salih, S. A., et al. (2012). "Screening for Delirium within the interRAI Acute Care Assessment System." *J Nutr Health Aging* 16(8): 695-700.

Objectives: To develop and validate a screening strategy for delirium within the interRAI Acute Care comprehensive assessment system. Design: Prospective validation cohort study. Setting: Acute general medical wards in two acute care metropolitan hospitals in Brisbane, Australia. Participants: Two hundred thirty-nine subjects with and without delirium, aged 70 and older. Measurements: Trained research nurses assessed subjects within 36 hours of hospital admission using the inter-RAI acute care (AC) system which includes four observational delirium items: Acute change mental status from baseline (ACMS), mental function varies over the course of the day (MFV), episode of disorganised speech (EDS), and easily distracted (ED). Geriatricians assessed subjects face to face within 4 hours of nurses' assessment using the Diagnostic and Statistical Manual of Mental Disorders (DSM IV) criteria and clinical judgement to determine delirium presence. Based on the performance of each delirium feature and to achieve highest predictive accuracy, a combination algorithm of either ACMS or MFV was developed and compared with the reference standard diagnosis determined by geriatricians. Results: Geriatricians diagnosed delirium in 52 of 239 (21.7%) subjects aged 70-102 years. The area under the receiver operator characteristics (AUC) for interRAI-AC delirium screener algorithm was 0.87 (95% CI; 0.80, 0.93), sensitivity 82%, specificity 91%, positive and negative predictive value of 0.72% and 95%, and likelihood ratio of 9.6 achieving the highest predictive accuracy of all possible combination of 4 delirium features. Underlying pre-morbid cognitive impairment did not undermine validity of the screening strategy, AUC 0.85 (95% CI; 0.74, 0.95), sensitivity 90% and specificity 69%. Conclusion: The interRAI AC delirium screening strategy is a valid measure of delirium in older subjects in acute medical wards.

Sinn, C. L., et al. (2016). "Predicting Adverse Outcomes After Discharge From Complex Continuing Care Hospital Settings to the Community." *Prof Case Manag* 21(3): 127-136; quiz E123-124.

PURPOSE OF STUDY: The purpose was to identify risk and protective factors assessed at complex continuing care (CCC) admission that were associated with three adverse outcomes (death, readmission, and incidence of or failure to improve possible depression) for persons discharged from CCC to the community with home care services. **PRIMARY PRACTICE SETTINGS:** CCC, home care, community. **METHODOLOGY AND SAMPLE:** The sample included all CCC patients in Ontario assessed with the Resident Assessment Instrument-Minimum Data Set 2.0 between January 2003 and December 2010 and who were subsequently assessed with the Resident Assessment Instrument-Home Care within 6 months of discharge to the community (n = 9,940). Separate multivariable logistic regression models were developed for each outcome. **RESULTS:** Within 6 months, 4.9% of the sample had died, 6.5% were readmitted to any Ontario CCC facility, and 13.7% showed symptoms of new possible depression or failure to improve possible depression. Heart failure, chronic obstructive pulmonary disease (COPD), health instability, intravenous/tube feed, and pressure ulcer were associated with increased risk of death. Difficulty with comprehension, possible depression, COPD, unstable conditions, acute episode or flare-up, short-term prognosis, worsening self-sufficiency, and having either patient or caregiver optimistic about discharge were associated with increased risk of readmission. Existing depressive symptoms or depression, unsettled relationships, multimorbidity, and polypharmacy were associated with risk for incidence of or failure to improve possible depression. Optimism about rehabilitation potential and high social engagement were protective against readmission and depressive outcomes, respectively. **IMPLICATIONS FOR CASE MANAGEMENT PRACTICE:** Person-level clinical data collected on admission to CCC can be used to identify high-risk patients and trigger early discharge planning processes and other in-home interventions. These results support the sharing of information between settings, and highlight key areas in which care teams in CCC and case managers in home care organizations can work together to support the transition to home and potentially reduce adverse postdischarge outcomes.

Sorbye, L. W. and E. V. Grue (2013). "Hip fracture and urinary incontinence--use of indwelling catheter postsurgery." *Scand J Caring Sci* 27(3): 632-642.

BACKGROUND: Norway has a higher incidence of hip fractures than any other country. For older individuals, a hip fracture may cause dramatic changes in health status like incontinence and daily activities. Patients with hip fractures are at high risk of urinary incontinence (UI) after surgical repair. A urinary indwelling catheter (UIC) is inserted preoperatively, but should be removed within 24 hours. Our aims were to identify indicators that might predict clinical challenges related to urinary incontinence 1 year after hip fractures. **METHODS:** Inclusion criteria were patients with hip fracture age 65 years or older. They were admitted from their own home to two acute-care hospitals during 2004-2006. We used the Resident Assessment Instrument for Acute Care. **RESULTS:** A total of 331 patients were included. Thirty-five (11%) had UIC 72 hours after surgery. These patients had more frequently experienced delirium, urinary tract infection, cognitive impairment and discouragement than their counterparts. After 12 months, patients with previous UI had lower functioning levels than those with no previous UI. They had moved four times more frequently to a nursing home and had over twice the mortality. **CONCLUSIONS:** Patient with UI should be followed up with a multidisciplinary team after discharged from hospital.

Steel, K., et al. (2003). "The RAI-PC: an assessment instrument for palliative care in all settings." *Am J Hosp Palliat Care* 20(3): 211-219.

Large numbers of persons in most types of healthcare settings have palliative care needs that have considerable impact on their quality of life. Therefore, InterRAI, a multinational consortium of researchers, clinicians, and regulators that uses assessment systems to improve the care of elderly and disabled persons, designed a standardized assessment tool, the Resident Assessment Instrument for Palliative Care (RAI-PC). The RAI-PC can be used for both the design of individual care plans and for case mix and outcomes research. Some elements of this instrument are taken from the resident assessment instrument (RAI) mandated for use in all nursing homes in the United States and widely used throughout the world. The RAI-PC can be used alone or in conjunction with the other assessment tools designed by the InterRAI collaboration: the RAI for homecare (RAI-HC), for acute care (RAI-AC), and for mental health care (RAI-MH). The objective of this study was to field test and carry out reliability studies on the RAI-PC. After appropriate approvals were obtained, the RAI-PC instrument was field tested on 151 persons in three countries in more than five types of settings. Data obtained from 144 of these individuals were analyzed for reliability. The reliability of the instrument was very good, with about 50 percent of the questions having kappa values of 0.8 or higher, and the average kappa value for each of the eight domains ranging from 0.76 to 0.95. The 54 men and 95 women had a mean age of 79 years. Thirty-four percent of individuals suffered pain daily. Eighty percent tired easily; 52 percent were breathless on exertion; and 19 to 53 percent had one or more other symptoms, including change in sleep pattern, dry mouth, nausea and vomiting, anorexia, breathlessness at rest, constipation, and diarrhea. The number of symptoms an individual reported increased as the estimated time until death declined. The "clinician friendly" RAI-PC can be used in multiple sites of care to facilitate both care planning and case mix and outcomes

research.

Tarride, J. E., et al. (2016). "Loss of health related quality of life following low-trauma fractures in the elderly." BMC Geriatr 16: 84.

BACKGROUND: To estimate the long-term change in health related quality of life (HRQoL) following low-trauma fractures among individuals receiving home care (HC) services or living in long-term care (LTC) facilities using linked healthcare administrative data from Ontario, Canada. **METHODS:** HRQoL was estimated using the Health Utility Index (HUI-2) with the InterRai Minimum Data Set (MDS), a mandatory questionnaire for LTC and HC in the province of Ontario (population 14 million). The HUI-2, a validated HRQoL instrument, allows the calculation of health utility where 0 represents death and 1 the best imaginable health state. For reference, the HUI-2 utility value for Canadians aged 80-84 years is 0.61 and the minimal clinically important difference is 0.03. The MDS was linked to Ontario acute care databases for fiscal years 2007-2011 to identify low-trauma fractures using ICD-10-CA codes. Regression models were used to identify predictors of change in HRQoL from pre-fracture levels to 3 years post fracture for several populations. Low-trauma fractures included hip, humerus, vertebral, wrist, multiple and other. **RESULTS:** Twenty-three thousand six-hundred fifty-five unique patients with low-trauma fractures were identified with pre- and post-fracture HRQoL assessments, of which 5057 individuals had at least 3 years of follow-up. Compared to patients receiving HC services (N = 3303), individuals residing in LTC (N = 1754) were older, taking more medications, and had more comorbidities. LTC patients had more hip fractures (49% of total versus 29%). For all fracture types, HRQoL decreased immediately following fracture. Although levels rebounded after the first month, HRQoL up to 36 months never returned to pre-fracture levels even for non-hip fracture. For both HC and LTC cohorts, clinically important and statistically significant decreases in HUI-2 utility scores were observed 36 months post fracture. Of the 6 HUI-2 domains, mobility had the largest impact on change in HRQoL. Regression analysis indicated that living with a musculoskeletal disorder or a neurological condition and living in LTC were associated with greater decrements in utility following a fracture. **CONCLUSIONS:** Based on the analysis of one of the largest studies on HRQoL to date, among individuals living in LTC facilities or receiving HC services, fractures have a significant permanent impact on HRQoL up to 3 years following fracture.

Travers, C., et al. (2013). "Prospective observational study of dementia and delirium in the acute hospital setting." Internal medicine journal 43(3): 262-269.

BACKGROUND: Dementia and delirium appear to be common among older patients admitted to acute hospitals, although there are few Australian data regarding these important conditions. **AIM:** The aim of this study was to determine the prevalence and incidence of dementia and delirium among older patients admitted to acute hospitals in Queensland and to profile these patients. **METHOD:** Prospective observational cohort study (n = 493) of patients aged 70 years and older admitted to general medical, general surgical and orthopaedic wards of four acute hospitals in Queensland between 2008 and 2010. Trained research nurses completed comprehensive geriatric assessments and obtained detailed information about each patient's physical, cognitive and psychosocial functioning using the interRAI Acute Care and other standardised instruments. Nurses also visited patients daily to identify incident delirium. Two physicians independently reviewed patients' medical records and assessments to establish the diagnosis of dementia and/or delirium. **RESULTS:** Overall, 29.4% of patients (n = 145) were considered to have cognitive impairment, including 102 (20.7% of the total) who were considered to have dementia. This rate increased to 47.4% in the oldest patients (aged \geq 90 years). The overall prevalence of delirium at admission was 9.7% (23.5% in patients with dementia), and the rate of incident delirium was 7.6% (14.7% in patients with dementia). **CONCLUSION:** The prevalence of dementia and delirium among older patients admitted to acute hospitals is high and is likely to increase with population aging. It is suggested that hospital design, staffing and processes should be attuned better to meet these patients' needs.

Travers, C., et al. (2013). "Validation of the InterRAI Cognitive Performance Scale against Independent Clinical Diagnosis and the Mini-Mental State Examination in Older Hospitalized Patients." Journal of Nutrition, Health and Aging 17(5): 435-439.

Objective: To compare the diagnostic accuracy of the interRAI Acute Care (AC) Cognitive Performance Scale (CPS2) and the Mini-Mental State Examination (MMSE), against independent clinical diagnosis for detecting dementia in older hospitalized patients. **Design, Setting, and Participants:** The study was part of a prospective observational cohort study of patients aged \geq 70 years admitted to four acute hospitals in Queensland, Australia, between 2008 and 2010. Recruitment was consecutive and patients expected to remain in hospital for \geq 48 hours were eligible to participate. Data for 462 patients were available for this study. **Measurements:** Trained research nurses completed comprehensive geriatric assessments and administered the interRAI AC and MMSE to patients. Two physicians independently reviewed patients' medical records and assessments to establish the diagnosis of dementia. Indicators

of diagnostic accuracy included sensitivity, specificity, predictive values, likelihood ratios and areas under receiver (AUC) operating characteristic curves. Results: 85 patients (18.4%) were considered to have dementia according to independent clinical diagnosis. The sensitivity of the CPS2 [0.68 (95%CI: 0.58-0.77)] was not statistically different to the MMSE [0.75 (0.64-0.83)] in predicting physician diagnosed dementia. The AUCs for the 2 instruments were also not statistically different: CPS2 AUC = 0.83 (95%CI: 0.78-0.89) and MMSE AUC = 0.87 (95%CI: 0.83-0.91), while the CPS2 demonstrated higher specificity [0.92 95%CI: 0.89-0.95] than the MMSE [0.82 (0.77-0.85)]. Agreement between the CPS2 and clinical diagnosis was substantial (87.4%; kappa=0.61). Conclusion: The CPS2 appears to be a reliable screening tool for assessing cognitive impairment in acutely unwell older hospitalized patients. These findings add to the growing body of evidence supporting the utility of the interRAI AC, within which the CPS2 is embedded. The interRAI AC offers the advantage of being able to accurately screen for both dementia and delirium without the need to use additional assessments, thus increasing assessment efficiency.

Travers, C., et al. (2014). "Prospective observational study of dementia in older patients admitted to acute hospitals." *Australasian journal on ageing* 33(1): 55-58.

AIM: Few Australian studies have examined the impact of dementia on hospital outcomes. The aim of this study was to determine the relative contribution of dementia to adverse outcomes in older hospital patients. METHOD: Prospective observational cohort study (n = 493) of patients aged ≥ 70 years admitted to four acute hospitals in Queensland. Trained research nurses completed comprehensive geriatric assessments using standardised instruments and collected data regarding adverse outcomes. The diagnosis of dementia was established by independent physician review of patients' medical records and assessments. RESULTS: Patients with dementia (n = 102, 20.7%) were significantly older (P = 0.01), had poorer functional ability (P < 0.01), and were more likely to have delirium at admission (P < 0.01) than patients without dementia. Dementia (odds ratio = 4.8, P < 0.001) increased the risk of developing delirium during the hospital stay. CONCLUSION: Older patients with dementia are more impaired and vulnerable than patients without dementia and are at greater risk of adverse outcomes when hospitalised.

Turcotte, L. A., et al. (2019). "Clinical predictors of protracted length of stay in Ontario Complex Continuing Care hospitals." *BMC Health Serv Res* 19(1): 218.

BACKGROUND: Post-acute care hospitals are often subject to patient flow pressures because of their intermediary position along the continuum of care between acute care hospitals and community care or residential long-term care settings. The purpose of this study was to identify patient attributes associated with a prolonged length of stay in Complex Continuing Care hospitals. METHODS: Using information collected using the interRAI Resident Assessment Instrument Minimum Data Set 2.0 (MDS 2.0), a sample of 91,113 episodes of care for patients admitted to Complex Continuing Care hospitals between March 31, 2001 and March 31, 2013 was established. All patients in the sample were either discharged to a residential long-term care facility (e.g., nursing home) or to the community. Long-stay patients for each discharge destination were identified based on a length of stay in the 95th percentile. A series of multivariate logistic regression models predicting long-stay patient status for each discharge destination pathway were fit to characterize the association between demographic factors, residential history, health severity measures, and service utilization on prolonged length of stay in post-acute care. RESULTS: Risk factors for prolonged length of stay in the adjusted models included functional and cognitive impairment, greater pressure ulcer risk, paralysis, antibiotic resistant and HIV infection need for a feeding tube, dialysis, tracheostomy, ventilator or a respirator, and psychological therapy. Protective factors included advanced age, medical instability, a greater number of recent hospital and emergency department visits, cancer diagnosis, pneumonia, unsteady gait, a desire to return to the community, and a support person who is positive towards discharge. Aggressive behaviour was only a risk factor for patients discharged to residential long-term care facilities. Cancer diagnosis, antibiotic resistant and HIV infection, and pneumonia were only significant factors for patients discharged to the community. CONCLUSIONS: This study identified several patient attributes and process of care variables that are predictors of prolonged length of stay in post-acute care hospitals. This is valuable information for care planners and health system administrators working to improve patient flow in Complex Continuing Care and other post-acute care settings such as skilled nursing and inpatient rehabilitation facilities.

Vanneste, D., et al. (2013). "Healthcare professionals' acceptance of BelRAI, a web-based system enabling person-centred recording and data sharing across care settings with interRAI instruments: a UTAUT analysis." *BMC medical informatics and decision making* 13: 129.

BACKGROUND: Healthcare and social care environments are increasingly confronted with older persons with long-term care needs. Consequently, the need for integrated and coordinated assessment systems increases. In Belgium, feasibility studies have been conducted on the implementation and use of interRAI instruments offering opportunities to improve continuity and quality of care. However, the development and implementation of information technology

to support a shared dataset is a difficult and gradual process. We explore the applicability of the UTAUT theoretical model in the BelRAI healthcare project to analyse the acceptance of the BelRAI web application by healthcare professionals in home care, nursing home care and acute hospital care for older people with disabilities. METHODS: A structured questionnaire containing items based on constructs validated in the original UTAUT study was distributed to 661 Flemish caregivers. We performed a complete case analysis using data from 282 questionnaires to obtain information regarding the effects of performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), anxiety (ANX), self-efficacy (SE) and attitude towards using technology (ATUT) on behavioural intention (BI) to use the BelRAI web application. RESULTS: The values of the internal consistency evaluation of each construct demonstrated adequate reliability of the survey instrument. Convergent and discriminant validity were established. However, the items of the ATUT construct cross-loaded on PE. FC proved to have the most significant influence on BI to use BelRAI, followed by SE. Other constructs (PE, EE, SI, ANX, ATUT) had no significant influence on BI. The 'direct effects only' model explained 30.8% of the variance in BI to use BelRAI. CONCLUSIONS: Critical factors in stimulating the behavioural intention to use new technology are good-quality software, interoperability and compatibility with other information systems, easy access to computers, training facilities, built-in and online help and ongoing IT support. These findings can be used by policy makers to maximise the acceptance and the success of new technology. For researchers, the conclusions of the original UTAUT study with regards to the item and scale construction should not be copied blindly across different information systems. A bottom-up approach is preferred when building upon the UTAUT model.

Wellens, N., et al. (2011). "First-generation versus third-generation comprehensive geriatric assessment instruments in the acute hospital setting: A comparison of the Minimum Geriatric Screening Tools (MGST) and the interRAI Acute Care (interRAI AC)." *J Nutr Health Aging* 15(8): 638-644.

Wellens, N. I., et al. (2011). "Validity of the interRAI Acute Care based on test content: a multi-center study." *Aging Clin Exp Res* 23(5-6): 476-486.

BACKGROUND AND AIMS: The MDS inter-RAI Acute Care is a comprehensive geriatric assessment tool for hospitalized older persons. The aim was to examine its validity based on test content by use in daily clinical practice. METHODS: Clinical staff of multiple disciplines assessed 256 older persons (83.2 \pm 5.2 years; 60% female) in a cross-sectional multicenter study in nine acute hospitals. Test content was empirically tested by frequency distribution of clinical deficits, missing, and invalid data. Item relevance was quantified by the content validity index (CVI) and modified kappa statistics (kappa*) based on assessors' judgment. RESULTS: Clinical deficits exceeded 30% in the majority of items (67%) across all assessment periods. Mean missing data for pre-morbid, admission, day-14 and discharge assessments were 9.7%, 5.3%, 29.3% and 13.7%, respectively. Invalid scores ranged from 3.9% to 26.7%. Of the 98 items, 82 had excellent CVI (≥ 0.78). Item relevance was excellent for 82 (kappa* ≥ 0.75), good for 9 (0.60 \leq kappa* \leq 0.74) and fair for 3 items (0.40 \leq kappa* \leq 0.60). Item revision may optimize clinical relevance: removing 4 items with poor relevance would increase the overall CVI from 0.89 to 0.91, meeting the standard of excellent content validity (CVI average ≥ 0.90). CONCLUSIONS: Although the frequency distribution provides evidence that item selection of the interRAI Acute Care is appropriate for the targeted population, its use in a clinical context reveals a substantial number of missing and invalid data. To improve validity, training should pay specific attention to items with low compliance and invalid records. Software applications should also be designed to improve data quality.

Wellens, N. I., et al. (2011). "First-generation versus third-generation comprehensive geriatric assessment instruments in the acute hospital setting: a comparison of the Minimum Geriatric Screening Tools (MGST) and the interRAI Acute Care (interRAI AC)." *J Nutr Health Aging* 15(8): 638-644.

OBJECTIVE: Comparison of the first-generation Minimum Geriatric Screening Tools (MGST) and the third-generation interRAI Acute Care (interRAI AC). DESIGN: Based on a qualitative multiphase exchange of expert opinion, published evidence was critically analyzed and translated into a consensus. RESULTS: Both methods are intended for a multi-domain geriatric assessment in acute hospital settings, but each with a different scope and goal. MGST contains a collection of single-domain, internationally validated instruments. Assessment is usually triggered by care givers' clinical impression based on geriatric expertise. A limited selection of domains is usually assessed only once, by disciplines with domain-specific expertise. Clinical use results in improvement to screen geriatric problems. InterRAI AC, tailored for acute settings, intends to screen a large number of geriatric domains. Based on systematic observational data, risk domains are triggered and clinical guidelines are suggested. Multiple observation periods outline the evolution of patients' functioning over stay in comparison to the pre-morbid situation. The method is appropriate for application on geriatric and non-geriatric wards, filling geriatric knowledge gaps. The interRAI Suite contains a common set of standardized items across settings, facilitating data transfer in transitional care.

CONCLUSION: The third-generation interRAI AC has advantages compared to the first-generation MGST. A cascade system is proposed to integrate both, complementary methods in practice. The systematic interRAI AC assessment detects risk domains. Subsequently, clinical protocols suggest components of the MGST as additional assessment. This cascade approach unites the strength of exhaustive assessment of the interRAI AC with domain-specific tools of the MGST.

Wellens, N. I., et al. (2012). "Translation and adaption of the interRAI suite to local requirements in Belgian hospitals." *BMC Geriatr* 12: 53.

BACKGROUND: The interRAI Suite contains comprehensive geriatric assessment tools designed for various healthcare settings. Although each instrument is developed for a particular population, together they form an integrated health evaluation system. The interRAI Acute Care Minimum Data Set (interRAI AC) is tailored for hospitalized older persons. Our aim in this study was to translate and adapt the interRAI AC to the Belgian hospital context, where it can be used together with the interRAI Home Care (HC) and the interRAI Long Term Care Facility (LTCF). METHODS: A systematic, comprehensive, and rigorous 10-step approach was used to adapt the interRAI AC to local requirements. After linguistic translation by an official translator, five researchers assessed the translation for appropriate hospital jargon. Three researchers double-checked for translation accuracy and proposed additional items. A provisional version was converted into the three official languages of Belgium-Flemish, French, and German. Next, a multidisciplinary panel of nine experts judged item relevance to the Belgian care context and advised which country-specific items should be added. After these suggestions were incorporated into the interRAI AC, hospital staff from nine Flemish hospitals field-tested the tool in their practice. After evaluating field-test results, we compared the interRAI AC with Belgian versions of the interRAI HC and interRAI LTCF. Next, the Flemish, French, and German versions of the Belgian interRAI portfolio were harmonized. Finally, we submitted the Belgian interRAI AC to the interRAI organization for ratification. RESULTS: Eighteen administrative items of the interRAI AC were adapted to the Belgian healthcare context (e.g., usual residence, formal community services prior to admission). Fourteen items assessing the 'informal caregiver', and 17 items, including country-specific items, were added (e.g., advanced directive for euthanasia). CONCLUSIONS: The interRAI AC was adapted to local requirements using a meticulous and recursive 10-step approach. As use of the interRAI Suite continues to grow worldwide and as it continues to expand to other care settings and populations, this procedure can guide future translations. This procedure might also be used by others facing similar challenges of complex translation and adaptation situations, where multidimensional instruments are used across multiple care settings in multiple languages.

Wellens, N. I., et al. (2012). "Convergent Validity of the Cognitive Performance Scale of the interRAI Acute Care and the Mini-Mental State Examination." *The American Journal of Geriatric Psychiatry* [Epub ahead of print].

OBJECTIVE:: The Cognitive Performance Scale (CPS) is generated from five items of the interRAI/Minimum Data Set instruments, a comprehensive geriatric assessment method. CPS was initially designed to assess cognition in residential care, where it has shown good psychometric performance. We evaluated the performance of the interRAI Acute Care in identifying cognitive impairment among patients hospitalized on acute geriatric wards. METHODS:: An observational study was conducted on two geriatric wards. Trained raters independently completed the interRAI Acute Care and the Mini-Mental State Examination (MMSE) in 97 inpatients (85 +/- 5 years; 67% female). The level of agreement between CPS and MMSE was explored using comparisons of means, agreement coefficients, and diagnostic accuracy. RESULTS:: Cognitive impairment was present in 61% of the participants. Average MMSE scores were significantly different between groups with low CPS scores compared with those with high CPS scores ($p < 0.05$). CPS explained only 48.8% of the variability in MMSE. Agreement in defining cognitively impaired subjects was moderate (percentage observed agreement, 68%; kappa = 0.41). With MMSE score less than 24 as a gold standard, diagnostic accuracy of CPS was moderate (area under curve = 0.73), with low sensitivity, but excellent specificity. When lowering the MMSE cutoff to less than 18 and focusing on patients with severe cognitive impairment, CPS agreement coefficients and sensitivity increased but specificity decreased. Using education-adjusted MMSE cutoffs did not substantially affect the results. CONCLUSION:: CPS can be used for coarse triage between intact and severe cognitive impairment. Although promising results have been obtained in residential and community settings, our results suggest that CPS fails to differentiate across different levels of cognitive impairment in hospitalized geriatric patients.

Wellens, N. I., et al. (2013). "Convergent validity of the Cognitive Performance Scale of the interRAI acute care and the mini-mental state examination." *Am J Geriatr Psychiatry* 21(7): 636-645.

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Acute Care in identifying cognitive impairment among patients hospitalized on acute geriatric wards. **METHODS:** An observational study was conducted on two geriatric wards. Trained raters independently completed the interRAI Acute Care and the Mini-Mental State Examination (MMSE) in 97 inpatients (85 +/- 5 years; 67% female). The level of agreement between CPS and MMSE was explored using comparisons of means, agreement coefficients, and diagnostic accuracy. **RESULTS:** Cognitive impairment was present in 61% of the participants. Average MMSE scores were significantly different between groups with low CPS scores compared with those with high CPS scores ($p < 0.05$). CPS explained only 48.8% of the variability in MMSE. Agreement in defining cognitively impaired subjects was moderate (percentage observed agreement, 68%; kappa = 0.41). With MMSE score less than 24 as a gold standard, diagnostic accuracy of CPS was moderate (area under curve = 0.73), with low sensitivity, but excellent specificity. When lowering the MMSE cutoff to less than 18 and focusing on patients with severe cognitive impairment, CPS agreement coefficients and sensitivity increased but specificity decreased. Using education-adjusted MMSE cutoffs did not substantially affect the results. **CONCLUSION:** CPS can be used for coarse triage between intact and severe cognitive impairment. Although promising results have been obtained in residential and community settings, our results suggest that CPS fails to differentiate across different levels of cognitive impairment in hospitalized geriatric patients.

Wellens, N. I., et al. (2012). "Methods to assess the reliability of the interRAI Acute Care: a framework to guide clinimetric testing. Part II." J Eval Clin Pract 18(4): 822-827.

The interRAI Acute Care is a comprehensive geriatric assessment tool that provides a holistic picture of complex and frail hospitalized older persons. It is designed to support holistic care planning and to transfer patient data across settings. Its usefulness in clinical decision making depends on the extent to which clinicians can rely on the patient data as accurate and meaningful indicators of patients functioning. But its multidimensional character implies challenges for clinimetric testing as some of the traditional analyses techniques cannot be unconditionally applied. The objective was to present an overview of methods to examine the reliability of the interRAI Acute Care. For each line of evidence, examples of hypotheses and research questions are listed.

Wellens, N. I., et al. (2012). "Methods to assess the validity of the interRAI Acute Care: a framework to guide clinimetric testing." J Eval Clin Pract 18(2): 296-306.

The objective was to present an overview of methods to examine the validity of the minimum data set of the interRAI Acute Care (interRAI AC). Because of the multidimensional character of this comprehensive geriatric assessment tool, clinimetric testing of the interRAI AC can be more complex than that of one-dimensional instruments. Thus to facilitate testing of the interRAI AC, we translated this complexity into a structured methodological framework that outlines procedures to assess various lines of evidence. Our framework combined traditional clinimetric techniques and the standards of psychological testing. For each line of evidence, examples of hypotheses and research questions were summarized. Future clinimetric testing can use these guidelines as a basis to obtain and provide a wide and diverse body of evidence.

Wellens, N. I., et al. (2012). "Interrater reliability of the interRAI Acute Care (interRAI AC)." Archives of gerontology and geriatrics 55(1): 165-172.

We examined the interrater reliability of the interRAI AC. An observational study was conducted on 3 geriatric wards. Two trained raters completed independently the interRAI AC between 24 and 48 h after admission. A sample of 100 patients (age 84.5 +/- 5.6 years; 45% female) was analyzed. Interrater reliability was tested using observed agreement, kappa coefficients, and intraclass correlation coefficients. The overall kappa median value for nominal items was 0.82 (almost perfect). For items on ordinal level, both the overall weighted kappa median and the intraclass correlation coefficient median were 0.86 (almost perfect). According to conventional cut-offs for interpreting kappa statistics, reliability was almost perfect ($K \geq 0.81$) for 60% of all items, substantial ($0.60 < K \leq 0.80$) for 26%, moderate ($0.41 < K \leq 0.60$) for 10%, and poor ($K \leq 0.40$) for 4% of the items. The median observed agreement was 0.89. For 83% of the items, the observed agreement was greater than 0.80. This study showed substantial or almost perfect interrater reliability for 86% of the items. In addition to previous evidence, the current results suggest that the estimates of the interrater reliability of the interRAI AC are acceptable and provide preliminary evidence that the current version is appropriate for clinical application.

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Wellens, N. I., et al. (2013). "Clinical changes in older adults during hospitalization: responsiveness of the interRAI acute care instrument." *J Am Geriatr Soc* 61(5): 799-804.

OBJECTIVES: To evaluate the responsiveness of the Minimum Data Set interRAI Acute Care (AC), a comprehensive geriatric assessment system, to detect clinical changes in patient status during hospital stays. **DESIGN:** An explorative secondary data-analysis comparing prospectively collected data with the interRAI AC before hospitalization, upon admission, and at discharge. **SETTING:** Clinicians from multiple disciplines in nine geriatric and eight nongeriatric wards of nine acute hospitals performed the assessment. **PARTICIPANTS:** The interRAI AC was administered serially to 256 geriatric inpatients (aged 83.2 +/- 5.2; 60% female). **MEASUREMENTS:** Responsiveness (capacity to detect changes in patients) was calculated for the output scales on five domains: activities of daily living (ADLs), cognition, communication, depressive symptoms, and pain. Internal responsiveness was evaluated using the Friedman test and Guyatt technique. **RESULTS:** Significant differences in clinical status were found for all five domains, based on the Friedman test. Post hoc tests revealed differences between each assessment period, except for cognition and communication from admission to discharge and for depressive symptoms from before admission to discharge. The Guyatt Responsiveness Index showed good to excellent capacity to detect longitudinal changes during hospitalization for cognition, communication, and pain and substantial performance for ADLs and depressive symptoms. **CONCLUSION:** In older inpatients, fluctuations in ADLs, cognition, communication, depressive symptoms, and pain can be captured using the interRAI AC output scales, enabling clinicians to evaluate longitudinal changes from admission to discharge and to provide a comparison with patient status before the acute onset of the illness. These results support the use of these scales in geriatric and nongeriatric wards.

Wellens, N. I. H., et al. (2013). "Clinical Changes in Older Adults During Hospitalization: Responsiveness of the interRAI Acute Care Instrument." *Journal of the American Geriatrics Society* 61(5): 799-804.

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Wellens, N. I. H. D., Mieke, et al. (2011). "Validity of the interRAI Acute Care based on test content: a multi-center study." *Aging Clinical and Experimental Research* 23(5-6): 477-486.

Background and aims: The MDS inter-RAI Acute Care is a comprehensive geriatric assessment tool for hospitalized older persons. The aim was to examine its validity based on test content by use in daily clinical practice. **Methods:** Clinical staff of multiple disciplines assessed 256 older persons (83.2±5.2 years; 60% female) in a cross-sectional multicenter study in nine acute hospitals. Test content was empirically tested by frequency distribution of clinical deficits, missing, and invalid data. Item relevance was quantified by the content validity index (CVI) and modified

kappa statistics (κ^*) based on assessors' judgment. Results: Clinical deficits exceeded 30% in the majority of items (67%) across all assessment periods. Mean missing data for pre-morbid, admission, day-14 and discharge assessments were 9.7%, 5.3%, 29.3% and 13.7%, respectively. Invalid scores ranged from 3.9% to 26.7%. Of the 98 items, 82 had excellent CVI (≥ 0.78). Item relevance was excellent for 82 ($\kappa^* \geq 0.75$), good for 9 ($0.60 \leq \kappa^* \leq 0.74$) and fair for 3 items ($0.40 \leq \kappa^* < 0.60$). Item revision may optimize clinical relevance: removing 4 items with poor relevance would increase the overall CVI from 0.89 to 0.91, meeting the standard of excellent content validity (CVI average ≥ 0.90). Conclusions: Although the frequency distribution provides evidence that item selection of the interRAI Acute Care is appropriate for the targeted population, its use in a clinical context reveals a substantial number of missing and invalid data. To improve validity, training should pay specific attention to items with low compliance and invalid records. Software applications should also be designed to improve data quality.

Wright, O. R. L., et al. (2015). "Development of an integrated screener for undernutrition within a comprehensive geriatric assessment system." *Journal of Aging Research and Clinical Practice* 4(1): 25-33.

Abstract: Objective: To develop a screener for the presence of undernutrition in older adults in acute care utilizing items within a comprehensive geriatric assessment (CGA) instrument (the interRAI Acute Care). Design: Prospective cohort study and retrospective medical record review of nutritional assessment data. Setting: Acute care tertiary teaching hospital in Brisbane, Australia. Participants: Five hundred fifty-seven general medical patients aged 70 and older admitted to the hospital. Measurements: Prevalence of geriatric syndromes at admission; measures of functional status (activities of daily living), cognition, behavioural symptoms, social support, community assistance services, health conditions, medications and other medical treatments, weight, body mass index (BMI), mode of nutritional intake; demographic variables and Subjective Global Assessment (SGA) of nutritional status. These measures were tested for their prediction of undernutrition using a logistic regression model and decision tree analysis. Results: The following variables were significant independent predictors of undernutrition on admission, after adjustment for age and gender: (i) feeling sad/depressed (OR: 3.494 [1.124-10.864]; $p < 0.05$); (ii) short term memory recalling ability (OR: 3.325 [1.152-9.594]; $p < 0.05$); (iii) weight loss of 5% or more in the last 30 days or 10% or more in the last 180 days (OR: 2.877 [0.983-8.416]; $p = 0.05$); (iv) fatigue (OR: 3.494 [1.414-43.205]; $p < 0.05$). Decision tree analysis revealed two models most predictive of undernutrition: (i) short term memory recalling ability and depression (AUC 72.8% [95% CI: 65%-80.6%]); (ii) short term memory recalling ability and recent weight loss (5% or more in the last 30 days or 10% or more in the last 180 days) (AUC: 74.8% [95% CI: 65.9% - 83.6%]). Conclusion: Several measures within the interRAI-AC may be used as part of a screener for undernutrition in acute hospital patients aged 70 years or older. The combination of short term memory recalling ability and percentage weight loss provides the most statistically robust screener for undernutrition within the interRAI-AC.

Xie, H., et al. (2016). "Validation of the interRAI Pressure Ulcer Risk Scale in Acute Care Hospitals." *J Am Geriatr Soc* 64(6): 1324-1328.

OBJECTIVES: To validate the Pressure Ulcer Risk Scale (PURS) to screen for pressure ulcer (PU) outcomes in the acute hospital setting. **DESIGN:** Secondary data analysis was undertaken using a combined dataset from three prospective cohort studies. **SETTING:** General medical, surgical, and orthopedic wards in 11 hospitals in two states of Australia. **PARTICIPANTS:** Individuals aged 70 and older admitted to the hospital for longer than 48 hours from July 2005 to May 2010 (N = 1418). Individuals in coronary or intensive care units, palliative care, or transferred out of the ward within 24 hours were excluded. **MEASUREMENTS:** Trained nurses used the international Resident Assessment Instrument (interRAI) Acute Care (AC) assessment tool to collect data at admission and discharge. Adverse outcomes were documented on daily ward visits. The PURS was calculated from interRAI items, and its association with PU outcomes was tested using the c-statistic (area under the receiver operator characteristic curve). **RESULTS:** Complete data were available for 1,371 (96.7%) participants, 85 of whom (6.2%) had a PU at admission. Of the 1,286 without PUs at admission, 42 (3.3%) developed a new PU during their hospital stay. The association between PURS and outcomes had a c-statistic of 0.81 (standard error (SE) 0.02) for prevalent ulcers at admission and 0.70 (SE 0.04) for incidence of new PUs. **CONCLUSION:** When derived from the interRAI AC tool, the PURS demonstrated good to strong ability to screen for PU outcome in acute care. Assessment burden is reduced without loss of fidelity by integrating the risk scale into an existing assessment system.