Responding to Functional and Psycho-Social Problems in Hospital: The interRAI Hospital Systems

interRAI Hospital Systems offer a comprehensive solution for capture and interpretation of information related to functional and psychosocial status in hospital ecosystems. With population ageing, and the ability for health care of more robust individuals to be delivered on an outpatient basis, these issues are highly prevalent among those who still require admission to hospital.

interRAI hospital systems provide a seamless approach to data collection and utilisation across the entire continuum of care around hospitals, with applicability to the emergency department, inpatient units, geriatric assessment and palliative care services, and post-acute and rehabilitation services within and beyond the hospital. These systems complement other hospital systems related to diagnostics, biometrics, investigations and medications.

interRAI community systems are well suited to hospital "outreach" services such as hospital in the home, aged care facility "in-reach" services, community nursing and transition care programs.

These systems share design features, identical items and scalar measures that facilitate interpretation and transfer of information across care settings, within and beyond hospitals.

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Key points:

- interRAI Hospital Systems provide a comprehensive information solution for hospital ecosystems, providing vital information around functional and psychosocial problems that are often key to effective safe care and discharge preparation.
- These systems share common data elements and scalar measures that, when delivered electronically by a software solution, enable the flow of information and monitoring of progress across the hospital continuum.
- They have the unique feature of supporting both real-time clinical decision-making and a wide variety of administrative functions.
- The systems are built around the core assessment – the interRAI Acute Care – that is designed to support nursing assessment for all adult inpatients.
- The interRAI pre-admission assessment supports risk assessment and care preparation for elective patients.
- Ancillary specialised systems support assessment of older patients in the emergency department, in the inpatient setting and in post-acute care – the interRAI Emergency Department Contact Assessment, the interRAI Acute Care for Comprehensive Geriatric Assessment and the interRAI Post-Acute Care and Rehabilitation.
- Companion community systems – the interRAI Check Up and interRAI Home Care – are suited to support hospital outreach and community programs such as hospital in the home, aged care facility in-reach programs, transition care and specialist geriatric and palliative care clinics.
- interRAI systems meet the assessment requirements of the Australian Commission for Quality and Safety in Health Care Comprehensive Care standard.

Introduction

The modern hospital is confronted with an increasingly complex caseload of individuals with not only serious medical illnesses, but many associated functional and psychosocial problems that influence the nature of care required and the outcomes of that care. Population ageing is accelerating the demand for hospitalisation of individuals who bring with them pre-existing disability, frailty and social vulnerability.

Structured clinical information can play a vital role in enhancing the care of these patients:

Clinical decision support through:

- consistent profiling of patient limitations and needs
- applications that assess risk, target care to those patients with the most likely opportunity for improvement, and monitor progress across an episode of care and

Administrative functions that:

- characterise caseload and resource requirements
- evaluate the quality of care through outcome oriented quality indicators.

interRAI systems offer all of these capabilities. Importantly, they simultaneously serve clinical and administrative functions in real-time, unlike many other toolsets and classification systems.

The interRAI Hospital Systems

interRAI has developed an integrated suite of systems that provide coverage of the entire hospital continuum from the pre-admission clinic to post-acute care (Figure 1). These systems are designed to identify functional and psychosocial problems among all adult patients and to support specialist comprehensive assessment in older patients.

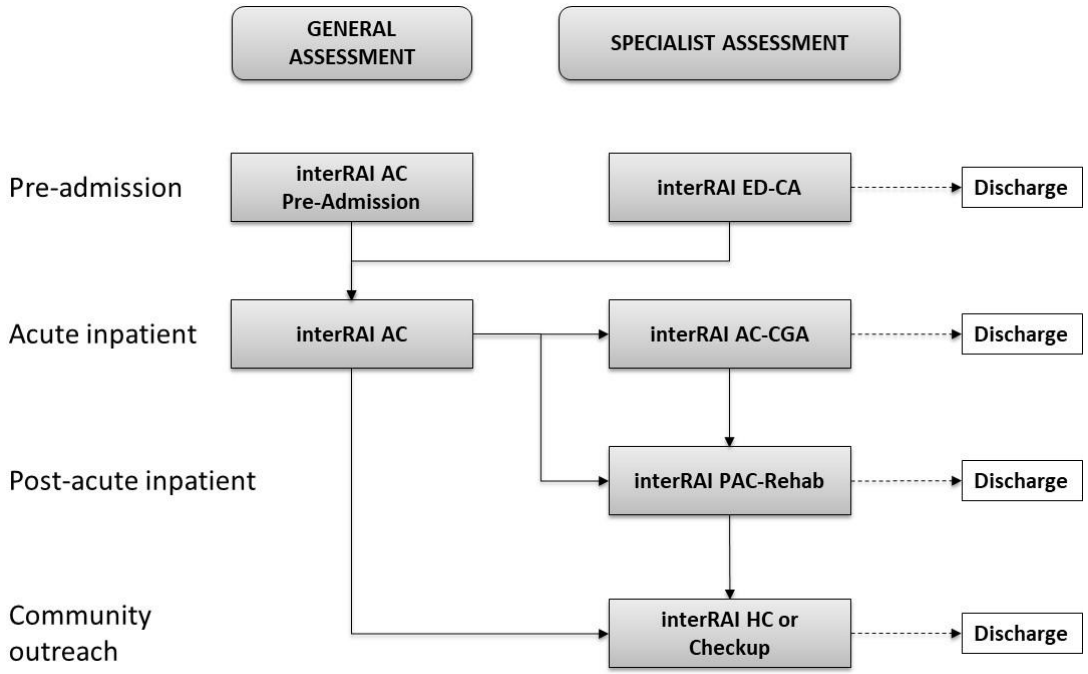

Figure 1: interRAI Hospital Systems to support the continuum of care.
AC=Acute Care; ED-CA=Emergency Department Contact Assessment; AC-CGA=Acute Care for Comprehensive Geriatric Assessment; PAC-Rehab=Post-Acute Care and Rehabilitation; HC=Home Care

interRAI systems are designed to support clinical care

An interRAI system comprises a set of clinical observations, which are scored by a clinician from information drawn from interaction with and observation of the patient, and review of the medical record. Where there is uncertainty around reliability due to cognitive or communication deficits, it may be necessary to seek collateral information from family or others.

The clinical observation data is "interpreted" by interRAI algorithms to produce "applications" which include scales to measure severity of a problem or to provide a global view of a set of issues (such as basic activities of living), diagnostic and risk algorithms, suggestions for further assessment and targeted interventions, quality indicators and case complexity measures (Figure 2). Such information can be assembled to form patient "profiles" that assist in rapid case review – clinical profiles. Once interRAI data is collected routinely, it becomes available for development of applications that draw data from multiple hospital systems. Such applications could include risk of re-admission, prediction of length of stay and case-mix grouping to support payment.

This structured interRAI information becomes available for a host of functions that assist clinicians to do their job:

- Access to functional profiles from prior episodes of care, reducing assessment burden and improving accuracy.
- All systems use the same observations and applications generating a common "language" of assessment.
- Compact designed-for-purpose assessments reduce documentation burden.
- Clinical profiles enhance communication with colleagues at handover and team meetings.
- Care plans can be semi-automatically constructed from assessments.
- Updated clinical observations enable monitoring of progress across single or multiple episodes of care.
- Integrated alerts can notify specialists of patients with particular needs, and can facilitate referrals to medical and nurse specialists, allied health, and discharge teams.

- Minimal form filling is required for administrative reporting as data is automatically generated from clinical assessments.
- Semi-automated production of discharge and handover reports at the end of an episode of care.

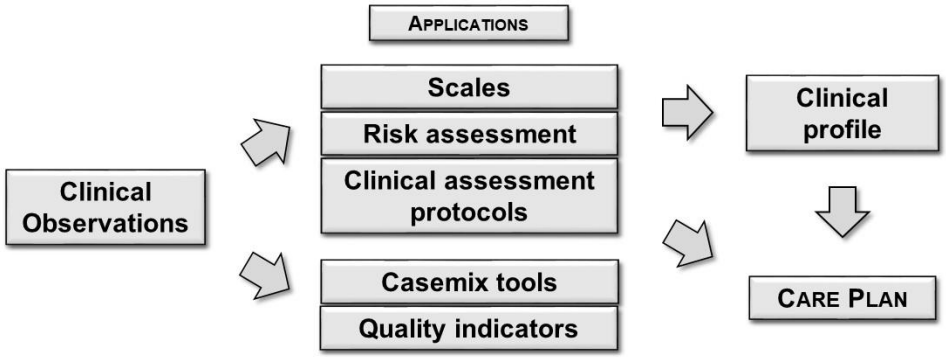

Figure 2: Schematic overview of an interRAI assessment system

And they provide vital administrative information "behind the screen"

Because interRAI clinical observations have robust psychometric properties, they are also useful for administrative and research efforts. Functional and psychosocial problems generate the need for more resources, increasing the cost of care and length of stay. If poorly recognised and managed, they result in poor outcomes for patients, including incomplete recovery and failed discharge plans.

Thus, interRAI observations provide the substrate for tools that measure case complexity (case-mix), and monitor the quality of care (quality indicators). Quality indicators have been developed for the interRAI Acute Care (older adults) and Post-Acute and Rehabilitation systems.

These "administrative" applications are available without adding burden to clinicians.

The interRAI Hospital Systems work together across the entire hospital continuum

interRAI systems are designed so that they work as a "suite". Each interRAI system contains core items and scales related to issues such as cognition, communication, activities of daily living, and pain.

This approach generates a common "language" that enables users to interpret and track assessments across settings. For example, staff working in a rehabilitation setting would have knowledge of a patient's function from pre-admission, at admission to acute care and at discharge, all within seconds of arrival in the post-acute setting. In some instances, data collected at one time point may be ported directly into the next phase of care, where the data is unlikely to have changed (e.g. pre-morbid functional status, height), thus reducing documentation burden.

An illustration of how the interRAI hospital systems might work at the individual patient level can be found in a case study presented in Appendix 1.

interRAI systems replace many of the locally developed systems in current use

Most health services and the departments within them develop "forms" that serve to record functional and psychosocial problems, assess risk of adverse events and provide evidence that appropriate procedures are in place. In Australia, these often aim to provide evidence of compliance with standards established by the Australian Commission on Safety and Quality in Health Care (ACSQHC).

Each hospital builds its own system, which typically comprises a raft of screeners and risk tools borrowed from the literature and home-grown observations developed in house. This "compilation" approach leads to large, often unwieldy systems that are difficult to complete in the time available

to staff, with resultant poor compliance. The variation between hospitals reduces the likelihood that software manufacturers will build systems to accommodate them. When these systems are migrated to a digital environment, problems of compliance are often exposed.

The replacement of these systems with interRAI hospital systems solves many of these problems. A single data set provides a large suite of applications that not only meet the assessment standards of the ACSQHC, but also informs care planning and a variety of administrative functions. Importantly, diagnostic and risk screeners developed by interRAI have at least equivalent validity to comparable standalone applications (e.g. diagnostic screen for delirium, risk assessment for pressure injury). Most such applications are rigorously developed and tested and reported in the peer-reviewed literature.

Even more important – interRAI data become available for use in all applications that use large scale data analytics to support clinical and administrative decision making. Such applications draw data from multiple systems, including biometrics, medications, diagnostics and laboratory systems.

Applications derived from the interRAI Acute Care system

Diagnostic Screeners
Delirium
Dementia
Depression
Under-nutrition

Risk Screeners
Delirium
Falls
Pressure injury

Scales
Cognitive performance
Communication
Activities of daily living
Pain
Nutrition

Clinical Action Points
Quality Indicators

Figure 3: Applications derived from the interRAI Acute Care System

Implementing the interRAI Hospital Systems requires significant investment

interRAI systems represent a dramatic departure from conventional assessment practice. To secure the myriad benefits, suitable software is required. This may involve purchase from a software vendor that supplies interRAI solutions or integration into an existing electronic medical record system. Either way, inter-operability with other software solutions is critical to secure maximum efficiency. The use of interRAI systems reduces documentation burden, but requires training and experience to make best use of the information for case review, care planning and referral.

Further information

Further information around interRAI systems can be found on the interRAI website and the interRAI Australia website (see below). The author and his interRAI colleagues are freely available for consultation. Should an Australian implementation be undertaken, senior interRAI members will make themselves available for both strategic and technical advice. This is coordinated through interRAI Australia.

About interRAI

interRAI is a not-for-profit research collaborative involving over 100 clinicians, scientists and health administrators from over 40 nations. It aims to improve the quality of life of vulnerable persons through a seamless comprehensive assessment system. It is governed by a Board of 8 directors from 3 continents.

interRAI Australia is based at The University of Queensland. It is responsible for advocacy and technical support in the Australian context.

interRAI systems are available for aged care, mental health, acute care and rehabilitation, disability services, and paediatrics, all sharing the same design principles and core items and scales. Many systems are in both self-report or assessor-based formats.

interRAI systems may be used under licence for research or routine care. Research licences are issued by interRAI Australia and others by interRAI International.

Websites:

interRAI Australia website: www.interrai-au.org for local information and developments.

interRAI website: www.interrai.org

- Descriptions of all interRAI systems
- International uptake
- Licence arrangements
- Purchase of manuals

Selected key publications:

Gray LC, Berg K, Fries BE, Henrard JC, Hirdes JP, Steel K, et al. Sharing clinical information across care settings: the birth of an integrated assessment system. *BMC Health Serv Res.* 2009;9:71.

Gray LC, Beattie E, Boscart VM, Henderson A, Hornby-Turner YC, Hubbard RE, Peel NM.. Development and Testing of the interRAI Acute Care: A Standardized Assessment Administe red by Nurses for Patients Admitted to Acute Care. Health Serv Insights. 2018;11:1178632918818836.

Peel NM, Hornby-Turner YC, Henderson A, Hubbard RE, Gray LC. Prevalence and Impact of Functional and Psychosocial Problems in Hospitalized Adults: A Prospective Cohort Study. J Am Med Dir Assoc. 2019;20(10):1294-9.

Gray LC, Peel NM, Costa AP, Burkett E, Dey AB, Jonsson PV, Lakhan P, Ljunggren G, Sjostrans F, Swoboda W, Wellens NIH, Hirdes J. *Profiles of Older Patients in the Emergency Department: Findings from the interRAI Multinational Emergency Department Study* Ann Emerg Med. 2013;62(5):467-74.Hirdes JP, Ljunggren G, Morris JN, Frijters DH, Finne Soveri H, Gray L, et al. Reliability of the interRAI suite of assessment instruments: a 12-country study of an integrated health information system. *BMC Health Serv Res.* 2008;8:277.

Improving the Quality of Care in Aged Care: An Introduction to the interRAI Suite of Systems of Comprehensive Assessment and Care for Australia – available at the interRAI Australia website www.interrai-au.org

Appendix 1: An interRAI Case Study

Here we provide an illustration of how interRAI systems can be used in concert across time and settings to support assessment and care planning.

Mr B, aged 79 years, is referred for elective hip replacement. Prior to admission, he attends the pre-admission clinic, where he is assessed for operative suitability and pre-planning of inpatient and post-acute care. The pre-admission interRAI Acute Care assessment reveals that he is moderately frail, but independent in personal activities of living (ADL). However, he depends on his wife for many other activities, including driving, which he recently ceased due to a combination of health issues, including arthritis. He has problems with short term memory, but otherwise his cognitive function appears intact. He is considered fit for surgery but he may need formal rehabilitation and careful discharge planning post-surgery.

At arrival in hospital, the admitting nurse reviews the pre-admission assessment and confirms that his functional and psychosocial status is unchanged in the 6 weeks following the pre-admission assessment. The data from the pre-admission assessment is electronically imported into the interRAI Acute Care admission assessment, enabling significant time savings in documentation.

While the operative procedure proceeds well, in the immediate post-operative period he develops a respiratory infection and severe delirium. On day 3, he suffers a minor stroke that results in hemiparesis but no other neurological impairments. The updated interRAI Acute Care assessment reveals that he is now at high risk of pressure injury and falls. It also records that he has developed bladder incontinence and that he is highly dependent in personal ADL. He is unable to mobilise or transfer without the assistance of two staff.

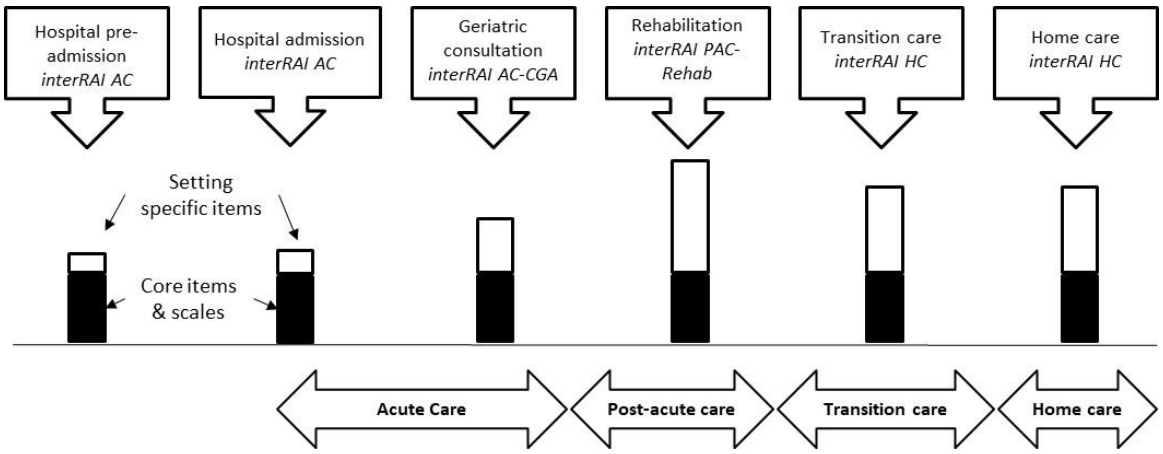

Figure 4: Sequence of assessments illustrating shared and setting specific data items and scales
AC=acute care; AC-CGA=acute care for comprehensive geriatric assessment;
PAC-Rehab=post-acute care and rehabilitation; HC=home care

He is referred to the geriatric assessment consultation service for further assessment and consideration of transfer to post-acute care. The consultation service utilises the interRAI Acute Care for Comprehensive Geriatric Assessment (CGA) to record their observations and prepare recommendations. Much of the data from preceding assessments is unchanged and can be imported into the CGA system. The consultation concludes that post-acute care is required, and he is transferred to the rehabilitation ward. His status is reviewed using the interRAI Post-Acute Care and Rehabilitation system. Once again, much of the data recorded in previous assessments is imported

into the current assessment. The new assessment provides an in-depth appraisal of his functional status, and provides a wide range of prompts for clinical care and discharge planning. It suggests that he has significant residual cognitive impairment.

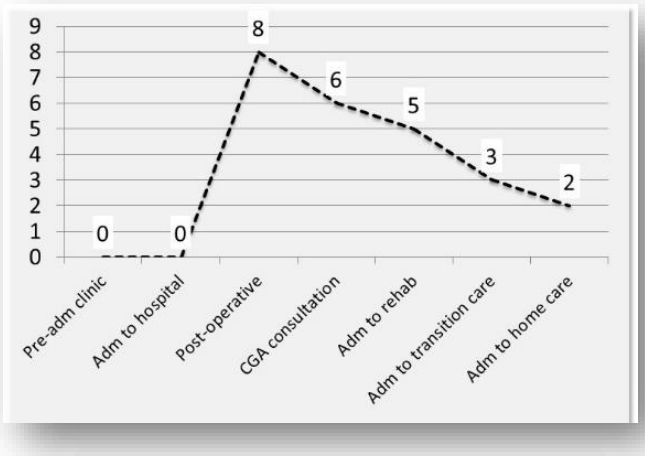

Figure 5: Charting an Activities of Daily Living Scale across the hospital continuum. Over the time period, 5 interRAI systems were applied, yet progress around many clinical parameters (in this case ADL) could be monitored across care settings.

Progress is slow, but steady. After 4 weeks, it is apparent that he will be shortly able to return home but that in-home support and rehabilitation will be required. He is referred to Transition Care. This service utilises the interRAI Home Care system to support assessment and care planning. Again, some of the inpatient data can be imported into the assessment unchanged, while other parameters are updated to reflect current status. After 12 weeks, he is referred for longer term community care, as his recovery remains incomplete. The home care service also uses the interRAI Home Care assessment system, enabling most of the data from the Transition Care program to be imported directly into the admission assessment.

Appendix 2: interRAI systems for hospital care

interRAI Hospital Systems

General adult hospital population:

Pre-admission assessment for elective patients: **interRAI Acute Care (Preadmission)**

Hospital inpatients: **interRAI Acute Care**

Specialist systems for older patients:

Geriatric assessment in the emergency department: **interRAI Emergency Department Contact Assessment**

Geriatric assessment services in hospital: **interRAI Acute Care for Comprehensive Geriatric Assessment**

Inpatient post-acute care: **interRAI Post-Acute Care and Rehabilitation**

Outreach and outpatient services:

Transition care: **interRAI Home Care**

Ambulatory clinics: **interRAI Check Up**

Hospital in the home & short stay community care: **interRAI Acute Care or interRAI Check Up**

RACF in-reach programs: **interRAI Check Up**