Improving the Quality of Care in Aged Care:
An Introduction to the
interRAI Suite of Systems of
Comprehensive Assessment and Care
for Australia

interRAI systems offer a comprehensive solution for health information management across an entire aged care system. An integrated suite of systems supports assessment, risk evaluation, care planning, payment systems and quality monitoring using a single source of data across community, residential and acute care settings. interRAI self-reported systems provide a voice for consumers around their perceptions of care and their quality of life.

In this document, we consider the principles of information design and demonstrate how interRAI systems adhere to them.

We propose a whole of system approach for Australia that would serve to provide a unified approach to care, integrated across care settings, which simultaneously would meet the needs of consumers, care providers and system administrators. If adopted, Australia would join an international community of interRAI users, offering an ability to consider strengths and weaknesses of our systems, and an opportunity to identify areas for improvement.

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Key points:

- We believe that aged care in Australia would benefit from a system-wide information strategy to efficiently and accurately support clinical care, eligibility, payment and quality improvement, and to hear the voice of care recipients. The **interRAI Suite of Assessment Systems** delivers on all elements of this strategy.
- Recent reviews into the quality and safety of aged care in Australia have consistently highlighted the absence of reliable, comparable information about care quality in residential aged care. Governments and regulators recognise the need for reform. Currently, their focus is on the funding for residential aged care, but similar approaches are needed where care is delivered in the community, hospitals and mental health programs.
- Reforms will need to be complemented by a broader information strategy for aged care, one that supports the publication of clear, readily intelligible information that includes some form of rating against core standards.
- For more than 25 years, interRAI, a not for profit international research collaborative, has developed and maintained a suite of third generation clinical and person-centred assessment systems for use across the full spectrum of care settings for older and vulnerable people.
- Because of their proven validity and reliability, and their ability to support a wide range of clinical and administrative functions, interRAI assessment systems are the most widely adopted world-wide in aged care, including Belgium, Canada, Finland, New Zealand and the United States of America.
- The interRAI assessment systems offer considerable advances in care delivery integrity and efficiency, greater system integration, and the potential to make international comparisons to better understand system performance and outcomes.
- Once available, interRAI data would form a comprehensive repository that would be available to support decision-making at the point of care, and at organisational and national levels.

Introduction

The application and utilisation of information (or data) within the aged care sector in Australia is fragmented, burdensome, not standardised and therefore not fully fit for purpose. Here we propose that an overall information strategy which supports interoperability, clinical governance and safety, and software vendor adoption, be instigated to resolve these issues. interRAI assessment systems are designed with these requirements in mind, and thus we recommend their adoption in Australia.

The problem

Separate data sets are used for each segment of the aged care system. The data are drawn from a variety of sources and they are not compatible in terms of format, scoring and interpretation. Much of the data does not have good psychometric properties[1] leading to uncertainty around interpretation, and inconsistent scoring. Good psychometric properties render data suitable for use in formal administrative or research repositories.

In Australia, data is not well suited to sharing as individuals move through the various care settings and administrative processes. There is duplication of recording of similar clinical and care concepts across settings, and thus redundancy. There is an emphasis on recording data for administration functions, in particular funding, without acknowledging its importance for clinical assessment, care delivery and quality assurance by regulators such as the Aged Care Quality and Safety Commission.

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[1] For example, individual items should be meaningful and relevant to users (face validity), appropriate to the task (content validity), be reliable when scored by separate assessors (inter-rater reliability) and when used to forecast future events or outcomes be accurate (predictive validity).

The solution

The current proposal for a new funding assessment format - separate from assessment for care provision - opens up the possibility of deploying interRAI systems to support care delivery and quality improvement.

By applying interRAI systems across the entire aged care system, there would be consistent recording of clinical information leading to clinical profiling and scalar measures that would enable all stakeholders to speak and understand the same "language" when referring to the older person's needs. Direct comparisons of needs could be made across settings, and when individuals move across care settings, there would be an immediate ability to inform new care providers of the person's needs and progress.

In this paper, we provide a detailed description of the interRAI Suite of Assessment Systems as it would apply to aged care and conclude with a description of how it could be adopted in Australia.

Constructing a data framework from interRAI Systems

Health and welfare authorities that operate a delivery system across care settings are faced with the challenge of identifying appropriate data requirements for reporting purposes. They usually require these data for several reasons:

- Understanding who is using the service and their needs;
- managing eligibility requirements;
- providing equitable funding (i.e., allocative efficiency) and
- monitoring quality of care and outcomes.

Service providers also require structured data to:

- Enable lesser skilled staff to perform at the peak of their ability;
- ensure that comprehensive assessment is performed appropriate to the broad needs of the population served;
- implement clinical decision support to assist in consistent provision of care based on need;
- understand resource utilisation;
- monitor and improve care quality; and
- understand the perceptions of care recipients in order to better meet their needs.

The interRAI Suite of Assessment Systems is designed to meet the needs of each stakeholder group. The strengths of the interRAI systems in this context are twofold:

- interRAI systems can be used simultaneously to
  - support real-time care delivery; and
  - provide robust reporting to health authorities.
- interRAI systems
  - integrate with each other;
  - share common observations and applications that enable direct comparison of needs across settings;
  - promote sharing of information in a common data language; and
  - enable data to be transferred with the person should they move across settings.

In Australia, the national government has jurisdiction over a range of aged care activities, including: advice to older people and their families through the *myagedcare* portal; preliminary telephone assessment; eligibility assessment, particularly for complex community and residential aged care programs; payments to service providers; and monitoring and maintaining quality. Beyond this, older people frequently access services in other sectors, including hospitals and mental health services. Alignment of systems across these sectors would seem to be highly desirable.

Several nations and jurisdictions within them (e.g., Canadian provinces) are building multi-setting interRAI implementations, notable examples being Belgium, several Canadian provinces, and more locally, New Zealand. In Belgium, the government has constructed a unified solution that incorporates acute, community and long term institutional care. In Ontario, Canada, there are system wide implementations in community care, mental health, palliative care and aged care. New Zealand has mandated use of interRAI home care (HC) and long term care (LTCF) systems across the nation, and is exploring similar arrangements for other care settings.

Each of these jurisdictions has established specific governance arrangements to support implementation, licensing, training and data management (Belgium (BelRAI)[2], Canada (where interRAI has formed a partnership with the Canadian Institute for Health Information)[3] and New Zealand (where the government agency TAS has responsibility of behalf of the Department of Health)[4].

Figure 1 offers a possible schema of systems that might fit Australia's needs. This schema is only suggestive.
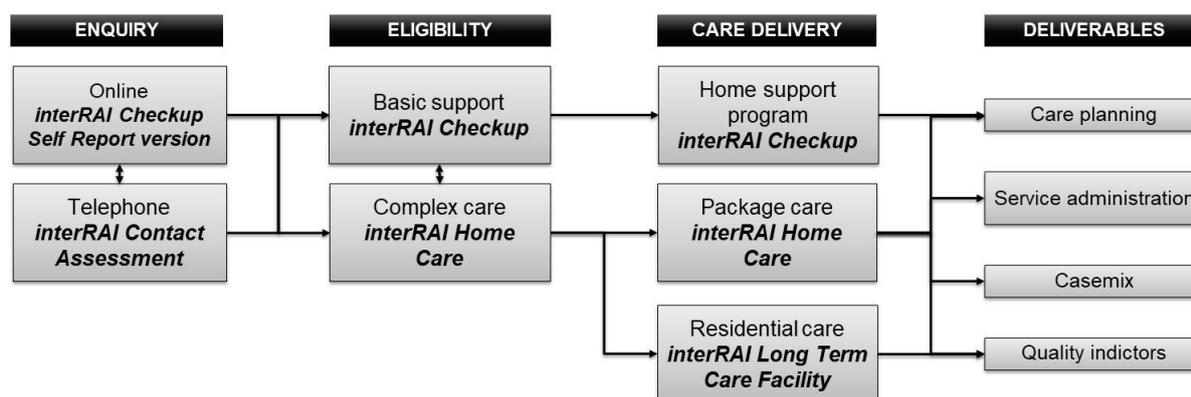

Figure 1: Possible framework of interRAI systems for aged care in Australia

To illustrate how these systems might work together, in Appendix 1, we provide an example case studies.

If an Australian implementation were to be undertaken, a process of review and possibly customisation would be required and a staged implementation procedure devised. As in the aforementioned examples, it would be advisable to establish an appropriate governance arrangement for data management in aged care including interRAI systems.

interRAI systems are licenced, primarily to protect their scientific integrity and also to formalise agreements about usage. Further information around this and related matters are found on the interRAI website or by contacting interRAI Australia directly.

Design principles for a clinical data framework
The following principles should underpin design of a data framework:

- Use of clinical application systems to record and code data digitally.
- Individual items should have documented psychometric properties, depending on their function. (e.g., face & content validity, inter-rater reliability)

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[2] See BelRAI at https://www.belrai.org/en
[3] See https://www.cihi.ca/en/the-cihiinterrai-partnership
[4] TAS – see https://tas.health.nz/analytics-insights-and-strategy/interrai/

- All items should use a similar scoring configuration (e.g., 0 = normal, higher scores represent departure from normal). (Figure 2)
- Where comparable information is sought in different settings (e.g., mobility or bathing ability in home care and residential aged care), identical data items should be utilised to enable direct comparison and to facilitate continuity of care when a person moves between settings.
- A single data set should be utilised to generate all relevant applications, including diagnostic (e.g., dementia) and risk (e.g., pressure injury) screeners, scales to measure severity (e.g., ADL or cognitive function), clinical decision support tools (who requires preventive care or treatment?), quality indicators and casemix classification.

> **HEARING**
> *Ability to hear (without hearing appliance)*
> 0 Adequate — No difficulty in normal conversation, social interaction, listening to TV
> 1 Minimal difficulty — Difficulty only in some environments (for example, when person speaks softly or is more than 2 metres away)
> 2 Moderate difficulty — Problem hearing normal conversation; requires quiet setting to hear well
> 3 Severe difficulty — Difficulty in all situations (e.g., speaker has to talk loudly or speak very slowly; or patient reports that all speech is mumbled)
> 4 No hearing

Figure 2: A typical interRAI clinical observation. Detail in the response set facilitates reliability. Most items are ordinal scales with 0 representing normal function

- All applications derived from the assessment should have demonstrated validity, preferably at the same or better performance than comparable specific standalone applications.
- Assessments should be able to be updated continuously or periodically to adjust care provision, detect risk early and monitor progress over time.
- Wherever possible, data collected by clinicians and care providers should be of immediate value to the delivery of care, to maintain their focus on care provision. Data collection by clinicians that has no clinical amenity should be kept to a minimum.
- A discrete strategy is required to hear the perceptions of service users in regard to the quality of care they experience, and their quality of life.

interRAI systems are designed on these principles.

The interRAI Suite of Assessment Systems: A Third Generation Assessment System

First generation systems, such as the current Aged Care Funding Instrument, comprise a blend of discrete scales and screeners developed independently (e.g., a dementia screen, falls risk screener) and often made-up items to fill gaps. Second generation systems comprise a set of purpose-built data items that are utilised to create a variety of applications from a single set of items. Construction starts with a set of design requirements, followed by the development of items and derivative applications. All items have similar design features.

> **Core Scales**
> *(common to most interRAI systems)*
>
> - Cognitive performance scale
> - Communication scale
> - Self-reported mood scale
> - Short ADL performance scale
> - IADL scale
> - Pain Scale
> - Body Mass Index
> - Frailty index

Figure 3: Scales that can be derived from all of the major interRAI systems

Individual interRAI assessment systems, such as the interRAI LTCF (long term care facility), are second generation systems. These systems comprise data items that are shared with all other interRAI systems ("core" items), and additional items that are setting specific.

Similarly, selected scales that are derived from these items are also available across all settings (e.g., activities of daily living scale, cognitive performance scale) (see Figure 3). These core items and scales enable direct comparisons to be made across settings and facilitate monitoring of progress when individuals move across settings (e.g., from hospital to home).

This harmonisation of observations and scales across settings defines a 3rd generation system. Such systems are ideal for programs where individuals often move across care settings, such as aged care (home, hospital, residential aged care). The interRAI Suite of Assessment Systems meets these criteria.

Applications derived from interRAI assessment systems fall into two groups:

1. Real-time clinical decision support tools:
   - Scales that combine multiple items to characterise the severity of a problem (e.g., cognitive performance, mood, ADL, pain)
   - Risk screeners to assist in predicting future adverse events (e.g., falls, delirium, pressure injury, institutional care, hospitalisation)
   - Diagnostic screeners for difficult to diagnose syndromes (e.g., delirium, dementia, depression, under-nutrition)
   - Clinical assessment protocols which identify individuals who might benefit from targeted preventive or management strategies (e.g., pressure injury prevention, reablement, depression)
2. Administrative tools:
   - Quality indicators to appraise the "outcomes" of care
   - Casemix classification tools to support caseload analysis and payment systems

This approach adheres to the principle: "collect robust data once and use it for multiple purposes".

All interRAI items are rigorously tested in multi-national field studies before release for general use. Similarly, applications derived from them are also tested to ensure that they perform to the highest achievable standard. The majority of these extensive development studies are published in the peer-reviewed literature.

interRAI systems for clinical decision support

Applications derived from an interRAI system are designed to assist clinicians and care providers to construct and implement a care plan that supports day to day care of the person. Combinations of clinical observations and applications can be used to compile a profile that enables care providers to rapidly appraise the person's needs and to communicate with colleagues within and beyond the current service setting (Figure 4).
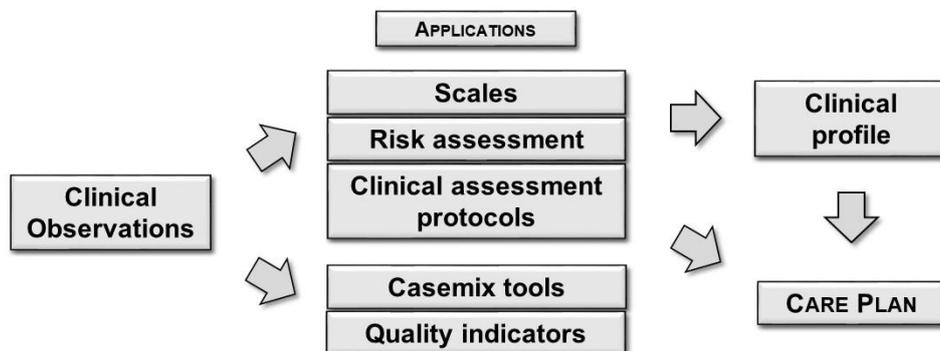

Figure 4: Schematic overview of an interRAI assessment system

Clinical assessment protocols are designed to identify individuals with problems that are amenable to preventive or remediation interventions. These protocols are supported by detailed descriptions of further assessments (if any) that may be required, and the actions that might result in improvement.

Continuous or periodic monitoring of the person's status will enable the profile to be adjusted to meet current needs, including new interventions that might be required, or actions that are no longer relevant.

Summary scales (such as ADL or pain) enable the person's status to be monitored over time, even when they move from one setting to another (e.g., from home to hospital).

Casemix tools and payment systems built on interRAI assessments

The interRAI casemix system for residential aged care, entitled "Resource Utilisation Groups" (RUG), is the world's most utilised casemix system for long term care. The principal architect of RUGs is interRAI President, Brant Fries, who commenced its development in the mid-1980s and led its various revisions. It is now in its fourth version (RUG-IV), but its predecessor (RUG-III) is the most widely used. The RUG application is a valuable tool for comparing caseloads across jurisdictions and for informing planning and payment policy. It provides the basis for payment of Medicaid-funded residents across the USA.

RUG-III classifies residents into 44 distinct groups, including several sub-groups who are receiving rehabilitation. It explains 55.5% of total per diem cost, and meets goals of clinical validity and payment incentives. It has been shown to be valid across many jurisdictions, in that the relative weights across case groups are similar.

interRAI has also developed a casemix system for home care, derived from the interRAI Home Care system. Currently, Australian interRAI researchers are exploring how functional and psycho-social data within the interRAI Acute Care system can be used to improve the understanding of casemix complexity and cost within the hospital setting.

The role of interRAI systems in quality improvement

interRAI systems are designed to support clinical assessment and care planning. Disciplined use of these systems will be associated with comprehensive, personalised care provision.

However, beyond this primary function, interRAI systems include two specific vehicles to examine the quality of care - based on clinical observations; and the person's quality of life - based on their own experience of the care that they receive.

Evaluating the quality of care

Several interRAI systems, including the interRAI LTCF (long term care facility), can be utilised to calculate risk adjusted quality indicators. Some indicators can be scored on the basis of a single assessment (e.g., the application of restraints), whereas others examine change over time. The latter include indicators where unexpected deterioration occurs, or where there is a failure to achieve expected improvement. These quality indicators have been constructed, tested and utilised in various jurisdictions for over a decade. They have been subjected to rigorous evaluation. Sophisticated statistical techniques have been applied to "risk-adjust" these indicators to minimise bias when comparing facilities that may have residents with very different problems.

Quality indicators derived from the interRAI residential aged care systems form the basis of publicly reported quality indicators in Canada[5][6] and the USA[7], and are utilised by individual organisations or groups to compare performance in many other jurisdictions. Up to 80 quality indicators can be scored from the interRAI LTCF when assessments are repeated after 3 or 6 months.

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[5] Health Quality Ontario: https://www.hqontario.ca/System-Performance/Long-Term-Care-Home-Performance
[6] Your Health System / CIHI: https://yourhealthsystem.cihi.ca/hsp/indepth?lang=en#/ and https://yourhealthsystem.cihi.ca/hsp/indepth;jsessionid=6cGxOzMuXPClmxbUMWTtRpD1.yhs?lang=en#/indicator/008/2/C5001/
[7] Nursing home compare: https://www.medicare.gov/nursinghomecompare/search.html?

interRAI quality indicators are "outcome oriented". (What happens to the person? Did they improve or deteriorate? Did they experience adverse events?) Process indicators (What was done to the resident?) are much less useful in routine use, as organisations quickly adjust procedures to match the process, without necessarily improving outcomes. Similarly, structural indicators (Are the right policies and procedures in place? Is the building design suitable?) have an even less tight relationship to outcomes. Outcome indicators are difficult to implement. However, their derivation from routine assessments enables them to be secured and scored at virtually no cost and without burden of additional data collection on care providers.

In the residential aged care sector, interRAI systems are in wide use internationally, including in Belgium, Canada, Finland, New Zealand, Switzerland and the USA to name a few. Access to international data would provide Australia with the opportunity to compare outcomes, with subsequent ability to define strengths and weaknesses of our systems – an ability that is currently lacking.

Understanding the person's perspective

interRAI has developed an extensive suite of systems that appraise the care recipient's perception of their quality of life and the quality of care that they receive. These take the form of questionnaires that for most individuals are completed unassisted. However, where the person cannot complete a questionnaire, the alternate strategy is through interview by an independent interviewer. An advantage of interRAI systems for long term care is that the system has been shown to perform reliably even with individuals with moderate cognitive impairment. This is a critical issue in environments such as Australian aged care facilities, where over half of the residents have dementia.

The interRAI Self-Reported Quality of Life system for long term care comprises 49 questions and 5 derived summary scales that reflect the person's quality of life (social life, personal control, food) and their perception of the quality of care (caring staff, staff responsiveness). Although released recently, this system is already in wide use across 3 continents.

Further information

Further information around interRAI systems can be found on 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.

Websites:
interRAI Australia website: www.interrai-au.org

- Local information and developments

interRAI website: www.interrai.org

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

Selected key publications:

Fries BE, Fahey CJ, Hawes C, Vladeck BC, Morris J, Phillips C, et al. Implementing the Resident Assessment Instrument: Case studies of policymaking for long-term care in eight countries.: *Milbank Memorial Fund;* 2003 May 2003.

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

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.

Jones, R. N., Hirdes, J. P., Poss, J. W., Kelly, M., Berg, K., Fries, B. E., & Morris, J. N. (2010). Adjustment of nursing home quality indicators. *BMC health services research, 10*, 96. doi:10.1186/1472-6963-10-96

Morris, J. N., Declercq, A., Hirdes, J. P., Finne-Soveri, H., Fries, B. E., James, M. L., . . . Topinkova, E. (2018). Hearing the Voice of the Resident in Long-Term Care Facilities-An Internationally Based Approach to Assessing Quality of Life. *Journal of the American Medical Directors Association, 19*(3), 207-215. doi:10.1016/j.jamda.2017.08.010

Mor, V., Tiziana, L., & Maresso, A. (2014). *Regulating Long-Term Care Quality*. Cambridge, UK: Cambridge University Press.

Appendix 1: interRAI Case Studies

Here we provide illustrations of how interRAI systems can be used in concert across time and settings - to support assessment, care planning and administration:

Case study 1: Continuous care

Mrs A is admitted to an acute hospital with a fractured hip. She previously lived alone and was receiving a community package. She had previously been assessed in the community using the interRAI Home Care. At arrival, the hospital staff review that prior assessment which indicates that four months earlier she had mild to moderate cognitive impairment, rarely left the house, and needed assistance with bathing, medication administration and paying bills. She was barely managing. All of this information was available within minutes of arrival. It is clear that the fractured hip might threaten her ability to remain in the community.

After surgery, she is referred to the geriatric consultation service for possible post-acute care. Their assessment is based on the interRAI Acute Care for Comprehensive Geriatric Assessment. Comparing the two assessments, there has been decline in cognitive and physical function since the last assessment, even before the fracture. The fracture is associated with further decline. She is admitted to a rehabilitation ward, but after 3 weeks there is insufficient improvement in physical function to contemplate home discharge and a decision to refer to the ACAT for possible residential care is made. The ACAT staff are able to view the hospital and previous home care assessments remotely, so when conducting the in-hospital assessment they have immediate access to a longitudinal profile of Mrs A's function over the past six months.

Data from the hospital assessment is ported into the interRAI Home Care (used for eligibility assessment), reviewed and adjusted/verified by the assessor and additional information relevant to eligibility added. Four weeks later, she is transferred to a RACF, where the staff complete their admission assessment using the interRAI Long Term Care Facility. In preparing the assessment, they can view all previous assessments conducted in the community, at arrival in hospital, and at the time of the ACAT assessment. Some of the previous data can be ported into the RACF assessment.

At 6 months, a routine follow-up assessment is conducted to support review of progress and the care plan, and calculation of quality indicators. This shows that Mrs A. has maintained her overall status in most domains since admission to the RACF.
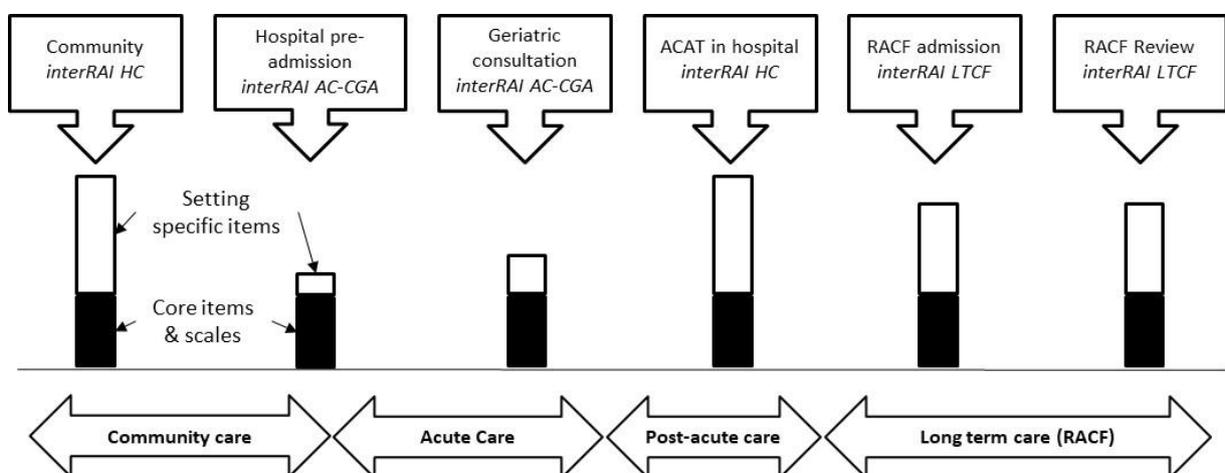

Figure 5: Sequence of assessments illustrating shared and setting specific data items and scales
HC=home care; AC-CGA=acute care for comprehensive geriatric assessment; LTCF=long term care facility

This case illustrates how a series of assessments can support clinical care and administrative functions (in this case eligibility assessment by the ACAT in hospital) using the interRAI Suite of Assessments.

"Core" items are contained in each assessment enabling information to be conveyed to subsequent care providers and progress to be monitored as the older person moves across care settings (Figures 5 & 6)
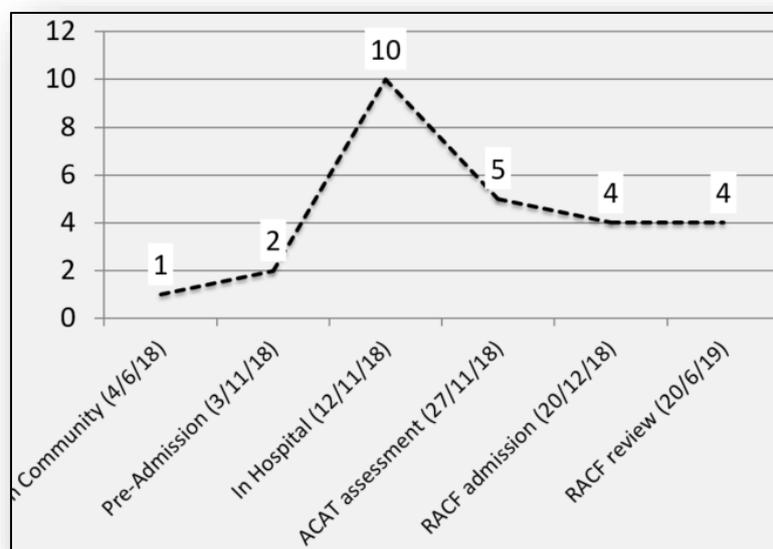

Figure 6: An illustration of how a scale from multiple interRAI assessments can enable monitoring of progress over time. In this example, we display the interRAI Short ADL scale which captures performance in personal activities of daily living. Over the time period, 3 interRAI systems were applied, but progress can still be monitored using identical metrics.

Case study 2: Seamless administration

The family of Mr B., who live interstate, are concerned that their father is no longer able to manage at home independently. With his daughter's support, he wishes to seek advice about and access to aged care services. Together, they are not sure what is available in the community, and whether this will be sufficient to sustain him for the short and medium term. At the MyAgedCare website, together they complete the interRAI Checkup – self-report version - online. This assessment suggests that indeed his situation is fragile and that there is a possibility that he may need an alternative to home care. An appropriately skilled assessor contacts them and arranges a home assessment. The assessor uses the interRAI Home Care assessment system – designed for people with likely complex care requirements – to support the assessment process. She is able to directly compare and verify the self-report information from the Checkup assessment, as it includes information that is identical to many components of the interRAI Home Care.

Based on the assessment, Mr B. is offered a home care package, and a provisional care plan, prompted by the interRAI HC. He is referred to a suitable provider in the area. At entry to the service, a further assessment is conducted by a staff member of the home care service. She has at her disposal the results of the 'eligibility' assessment in digital format within her organisation's own software solution. She also uses the interRAI Home Care system as a basis for assessment and care planning, so data entry is minimised – she conducts a thorough review, but only checks, verifies and adjusts information if changes have occurred. The interRAI HC is used by home care staff to monitor progress, as it is updated periodically if and when changes occur. At 6 months after entry, the entire assessment is reviewed and updated. Since information is regularly updated by care staff, the data burden is minimised.

Information from each assessment is used to identify case complexity, and this provides the basis for payment. Quality indicators are automatically derived from the assessment, enabling the service provider to monitor quality, and data is also submitted to the Department of Health for monitoring purposes.

Appendix 2: interRAI systems suitable for aged care

interRAI Systems for Aged Care

interRAI Long Term Care Facility – for residential aged care

interRAI Assisted Living – for low intensity residential settings

interRAI Home Care – comprehensive assessment for high intensity home care services

interRAI Checkup – for primary care, low complexity home care and short term community care

interRAI Contact Assessment – preliminary assessment for triaging and eligibility in the community and emergency departments

interRAI Acute Care – rapid assessment for all adult hospital inpatients

interRAI Acute Care for Comprehensive Geriatric Assessment – for geriatric units and consultancy services

interRAI Post-Acute Care and Rehabilitation – for inpatient rehabilitation and geriatric evaluation and management

interRAI Palliative Care - for community and institutional palliative care programs