The Development of a Case-mix System for Aged Residential Care

Public report

This document presents the key findings of a Bupa Health Foundation funded project undertaken by University of Auckland validating the interRAI LTCF case-mix system (RUG-III).

1 Setting the scene

1 Key points

- The interRAI LTCF is a comprehensive assessment tool for older people living in Aged Residential Care (ARC).
- The interRAI LTCF is the Ministry of Health mandated assessment tool.
- The interRAI LTCF supports care planning, the reporting of quality measures and indicators as well as Resource Utilisation Groups (RUG).
- RUG are a funding tool that place individuals into groups of similar needs. The approach is called case-mix.
- ARC is currently funded through a type of weekly bulk funding separated into three crude levels of need (rest home, dementia and continuing care / private hospital).
- Given that all older people in ARC have an interRAI LTCF assessment undertaken at least six-monthly, there is an opportunity to use the interRAI LTCF case-mix tool, known as RUG-III.
- RUG-III is a North American tool and has not been validated in New Zealand.
- The University of Auckland has undertaken a comprehensive testing of the tool using Bupa New Zealand data across all its care home facilities within New Zealand.

1.1 Introduction

The Ministry of Health has mandated for several years that all older people requiring long-term disability support require assessment using an appropriate interRAI assessment tool: Contact Assessment (interRAI CA), for clients with non-complex needs; Home Care assessment (interRAI HC), for clients with complex needs; or Long Term Care Facility assessment (interRAI LTCF), for clients entering or in Aged Residential Care (ARC). The interRAI LTCF enables comprehensive, standardised evaluation of the needs, strengths, and preferences of residents within ARC.

The potential for the use of interRAI LTCF for identification of clinical risk and effective planning of care for residents is well established. However, less well understood is the opportunity to use the information collected during the assessment for multiple purposes as outlined in Figure 1.

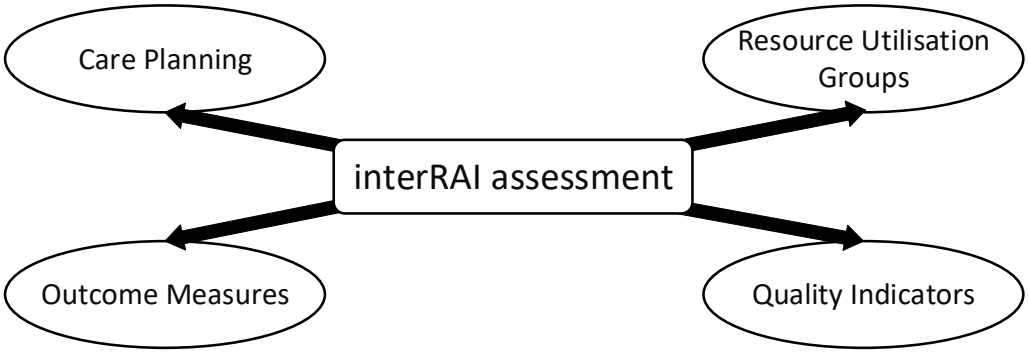

Figure 1: Outputs from interRAI assessments that can be used in planning and measuring service delivery

A key area of potential benefit in the use of data arising from interRAI assessment relates to identification of key groups of residents who share the same level of clinical complexity and resource use. This is a model commonly utilised internationally both to inform models of funding within ARC and to target initiatives to improve the quality of care for defined groups of residents.

ARC funding in New Zealand has for some time utilised a very simplistic approach, whereby a needs assessment places individuals who enter ARC into one of three levels of care or bands (Rest home, Hospital or Dementia levels of care), with each band worth a fixed weekly amount of subsidy. Over time, the banding has become less relevant as residents at rest home level care may be more dependent than the banding dictates, but for one reason or another they remain at that level. Further, the banding is self-limiting as it prohibits development opportunities such as better integration with home care and use of respite and intermediate care opportunities [1].

1.2 What is Case-mix?

Case-mix classification is a systematic approach to quantifying the relationship between patient-driven variables and resource use. It places healthcare cases into groups where members of the group are clinically similar and use similar amounts of care. Health workers classify, even if informally, whenever they reflect on cases in the past to inform care plans in similar current cases. Standard classifications abound, applied to different aspects of health or health care such as diseases, conditions, symptoms, disability and functioning, procedures, treatments and risks. The development of a classification system to aid our understanding of the needs of residents within ARC is significant as it allows us to better target interventions.

Case-mix has arisen as a well-established method of funding hospital-based health services [2-4]. Case-mix funding allows bulk funding to be more appropriately shared and it allows well-defined clinical pathways to be developed. A good case-mix system also gives meaningful clinical descriptions of these individuals. The application of case-mix is broad; it provides the basis, not only for reimbursement, but also for benchmarking facilities or programmes. Within a hospital setting in the US, parts of Europe and New Zealand / Australia, the diagnosis of a patient will determine the case-mix category they belong to. A patient within a case-mix category will have specific inputs and treatment options and therefore the average cost can be calculated.

1.2 The value of case-mix

A case-mix based financing system can distribute limited healthcare resources in a fair and equitable manner to providers. If implemented with an appropriate set of controls the system can create incentives so that: the right amount of care is provided (i.e. appropriate staffing resources); in the right setting (i.e., Hospital level care vs. Dementia level care); in the most efficient manner (i.e., frequency of interRAI assessments or staffing levels); and in the most quality conscious manner (i.e., data allows us to compare facilities to identify where high-quality care is being provided, which enables replication).

In this way, case-mix is a tool that catalogues and aggregates residents based on similar clinical and cost characteristics in order to: (i) Understand the types of residents within facilities; (ii) Measure the acuity or dependency of residents; (iii) Understand why one facility may need more resources based on the cases treated compared to another; (iv) Benchmark facilities and compare to international trends (such as in Australia or UK); and of course, (v) Finance care. It is important to note that case-mix is not a method of reducing funding, is not a means to control health professional behaviour nor is it a means to remove clinical decision making from staff.

Interestingly, for ARC in New Zealand, the move to the interRAI LTCF has meant that most of the work required to implement a case-mix system from a health professional perspective at a facility level has already been achieved.

1.3 What are case-weights?

Individuals within a case-mix category have a similar set of needs. Consequently, inputs should also be similar for all within the same group, in other words, the resource consumption is similar. The mean cost of the inputs for each case-mix category can then be calculated to give a $ value. As the acuity, complexity or dependency of case-mix categories increase, the cost of each category also increases as more resources or inputs are required to meet the needs of the individuals in the

group. Case-mix groups can be funded in this way, in other words, if a case-mix category is worth $500 for one week and there are 10 clients within the case-mix group, then the provider receives $5,000 for the week for those 10 clients. Having estimated the costs for each case-mix group, these costs are employed to determine a relative value index, where each cost is calculated relative to a base cost (e.g. $1,000.00). For example, the case-mix category B has a value of $10,000 and a case-weight of 10, relative to case-mix category A which has a value of $1,000.00.

The cost of delivering services does not remain stable over time, obvious changes such as inflation or policy changes around staffing (such as minimum wage) mean annual adjustments are required. It is here that the benefit of a case-weight system can be observed. Instead of adjusting the costs for each category, provided the relative values remain reasonably steady, then all that is needed is to adjust the base price each year. For instance, assuming an inflation rate of 10 percent, the case-mix category A will increase from $1,000.00 to $1,100.00. Thus, the case-weight for Category B remains at 10, but the value for that group is increased to $11,000. This approach is normal practice within the Ministry of Health as it adjusts the base price for the hospital case-mix system on an annual basis.

1.4 Using case-mix in ARC

The Resource Utilisation Group (RUG-III) [5] is the current (*or native*) interRAI case-mix tool, which has scattered use across North America and was established for long-term institutional care residents. The case-mix system describes relative resource use within different groups. The original work by Fries, Schneider [5] in 1994 was based on a sample of 7,658 residents across the United States. Data included a broad assessment of resident characteristics, corresponding to items of the interRAI-RAI (Now LTCF), and detailed measurement of nursing staff care time over a 24-hour period and therapy staff time over a 1-week period. The resultant RUG-III system, created 44 distinct groups and achieved 55.5 percent explanatory variance of total (nursing and therapy) per diem costs[1]. The RUG-III system improved on an earlier version not only by increasing the variance explanation (from 43%), but, more importantly, by identifying residents with 'high-tech' procedures (e.g., ventilators, respirators, and parenteral feeding) and those with cognitive impairments; by using multiple activities of daily living; and by providing explicit qualifications for the Medicare nursing home benefit.

[1] This is the proportion to which the per diem nursing and therapy costs per resident are explained by identified variables included in a statistical model that includes the RUG-III classification of residents.

It is important to note that the current tool within the interRAI LTCF has been derived to support a US based (Medicare funded) system. When the system has been validated for use in other jurisdictions, local adjustments have been required. For example, the large Canadian Staff Time & Resource Intensity Verification (CAN-STRIVE) Project [6] validating the USA data found that local adaptations were required to meet the Canadian health system model. This process was necessary for eight other smaller countries that also adopted the system. This means that the New Zealand specific issues relating to acuity, interventions and care practices and funding models are not considered within the existing RUG-III system.

This project was driven by the need to develop a funding model that is better aligned to respond to the complexity of ARC within New Zealand and an acknowledgement of the potential for utilisation of resident level data resulting from interRAI assessments. However, it was recognised that this required a robust testing of the RUG-III using New Zealand ARC data.

2 Validating the interRAI – LTCF case-mix tool in NZ

2 Key points

- Staff Time Measurement (STM) is an approach previously used to validate RUG-III across different countries (such as, Canada, US, UK, Italy, Hong Kong, Korea). The STM approach involves collecting all staffing inputs over a period of time.
- This study collected all staffing activities for all residents across all Bupa facilities over a 24hr period.
- Data were collected on an individual resident level and matched with the most recent interRAI LTCF or interRAI HC assessment.
- Both indirect (e.g. food, laundry) and direct (e.g. HCA, RN, allied health, GP time) costs were recorded.
- The RUG-III case-mix tool represents a US model of ARC and when applied to the data within the study explained 22 percent of variance in costs. This is considerably less than the 50 percent reported in the US literature but is in line with the findings of studies from other countries.
- This higher explanatory variance can be attributed to the fact that the RUG-III system was developed and tested in the same unique context.
- The RUG-III is structured through iterations of function (measured by ADL), which can be considered as 'sub-categories' and 'clinical characteristics' (which can be viewed as lead categories e.g. cognitive impairment, clinical complexity and behavioural issues).
- The study identified a preferred model with five-lead categories with further stratification of residents according to three levels of ADL function (as measured by the RUG ADL Scale).
- This provided a useable RUG-III (NZ modified) version of case-mix and the explanatory variance increased to 26 percent. More importantly there was improved population of residents across the case-mix groups and the model was congruent with the current level of service provision and the anticipated future direction of ARC in New Zealand.

2.1 How we went about it

The project team, consisting of researchers from the University of Auckland alongside Leaders and Clinicians from Bupa New Zealand / Australia obtained funding from the

Bupa Health Foundation in 2017 (see section 6) to undertake a proof of concept study with the following aims:

a. Identify a NZ residential aged care case-mix system using Bupa NZ financial and interRAI data through a methodology that acknowledged existing interRAI case-mix models (this included testing of the interRAI RUG-III tool);

b. Alignment of best evidence practice to case-mix categories;

c. Development of case-weights for resource usage for these residential aged care case-mix categories across ARC providers; and

d. Propose a mechanism for consideration of contextual factors (such as facility type, resident funding mechanism) and their impact on case-mix categories.

Data were collected using established methodologies (employed as the de-facto method of validation across multiple other studies) comprising: interRAI LTCF resident assessment data from Bupa NZ facilities; Staff Time Measurement (STM) across all Bupa NZ facilities to capture interactions with staff (bathing, dressing, medication management); and financial data. This allowed for the development of six models for resident costs over a 24-hour period. These models included iterations of the following variables: RN costs; Health Care Assistant, Activities Coordinator and Enrolled Nurse costs; allied health (physiotherapy and occupational therapy) costs; General practitioner costs; and consumable costs. Data for 2,359 residents of Bupa facilities across New Zealand were included in the analysis.

Linear Regression modelling determined the most significant variables arising from the data presented in Table 1.

Table 1: Development of data variables

Item	Descriptive
interRAI LTCF RUG-III case-mix tools (7, 12 and 35 group classification systems) which are all standard outputs available for interRAI LTCFF assessments completed in New Zealand	RUG-III 7 group classification into one of seven hierarchical domains: 1. Rehabilitation (residents must already have received rehabilitation), 2. Extensive special care (based on the need for certain significant services (parenteral feeding, tracheostomy, suctioning, etc.), 3. Special care (the presence of certain clinical conditions such as quadriplegia, stage 3 and 4 pressure ulcers, coma), 4. Clinically complex (on the presence of conditions such as aphasia, hemiplegia, terminal illness, or services such as dialysis or chemotherapy), 5. Cognitive impairment, 6. Behaviour problem (wandering, physical or verbal abuse, hallucinations), 7. Physical function (residents who do not meet the criteria for any of the above-mentioned categories are classified as Reduced Physical Function).
	RUG-III 12 group classification into one of 12 hierarchical domains: 1. Rehabilitation High, 2 Rehabilitation Medium, 3. Rehabilitation Low, 4. Extensive special care III, 5. Extensive Special Care II, 6. Extensive Special Care I, 7. Special care, 8. Clinically complex with depression, 9. Clinically complex, 10. Cognitive impairment, 11. Behaviour problem, 12. Physical function.
	RUG-III 35 group classification into one of 35 hierarchical domains: 1. Rehabilitation High, 2 Rehabilitation Medium, 3. Rehabilitation Low, 4. Extensive special care III, 5. Extensive Special Care II, 6. Extensive Special Care I, 7. Special care, 8. Clinically complex with depression, 9. Clinically complex, 10. Cognitive impairment, 11. Behaviour problem, 12. Physical function IN ADDITION, stratifying by RUG-ADL score;
RUG-ADL Scale (a 4-item scale measuring motor function with activities of daily living. It is a native tool within the interRAI assessment suite. The scores for each of the four domains are summed to give a total of 4 (independent) to 18 (person requires full assistance of two people);	
Resident level of care (rest home, dementia unit and private hospital) as the current funding model is based on level of care it was decided to include this as an independent variable in the regression modelling	
Five lead categories system (a classification system derived within the study from RUG-III categorisation)	
'Rehabilitation', 'clinically complex' (consisting of the following domains from the RUG-III 7 Group system: 'Extensive special care'; 'Special care'; Clinically complex), 'Cognitive impairment', 'Behaviour problem', 'Physical function'.	

Figure 2 illustrates the RUG-III 7, 12 and 35 Group classification system and the five-lead categories system developed in this project. Models for linear regression and analysis of variance were constructed using the available costing structures as dependent variable. Regression is a statistical measure used to determine the strength of the relationship between one dependent variable (in this case costs over a 24-hour period) and one or more explanatory variables (or independent variables), in this case, the RUG-III categories, facility and level of care.

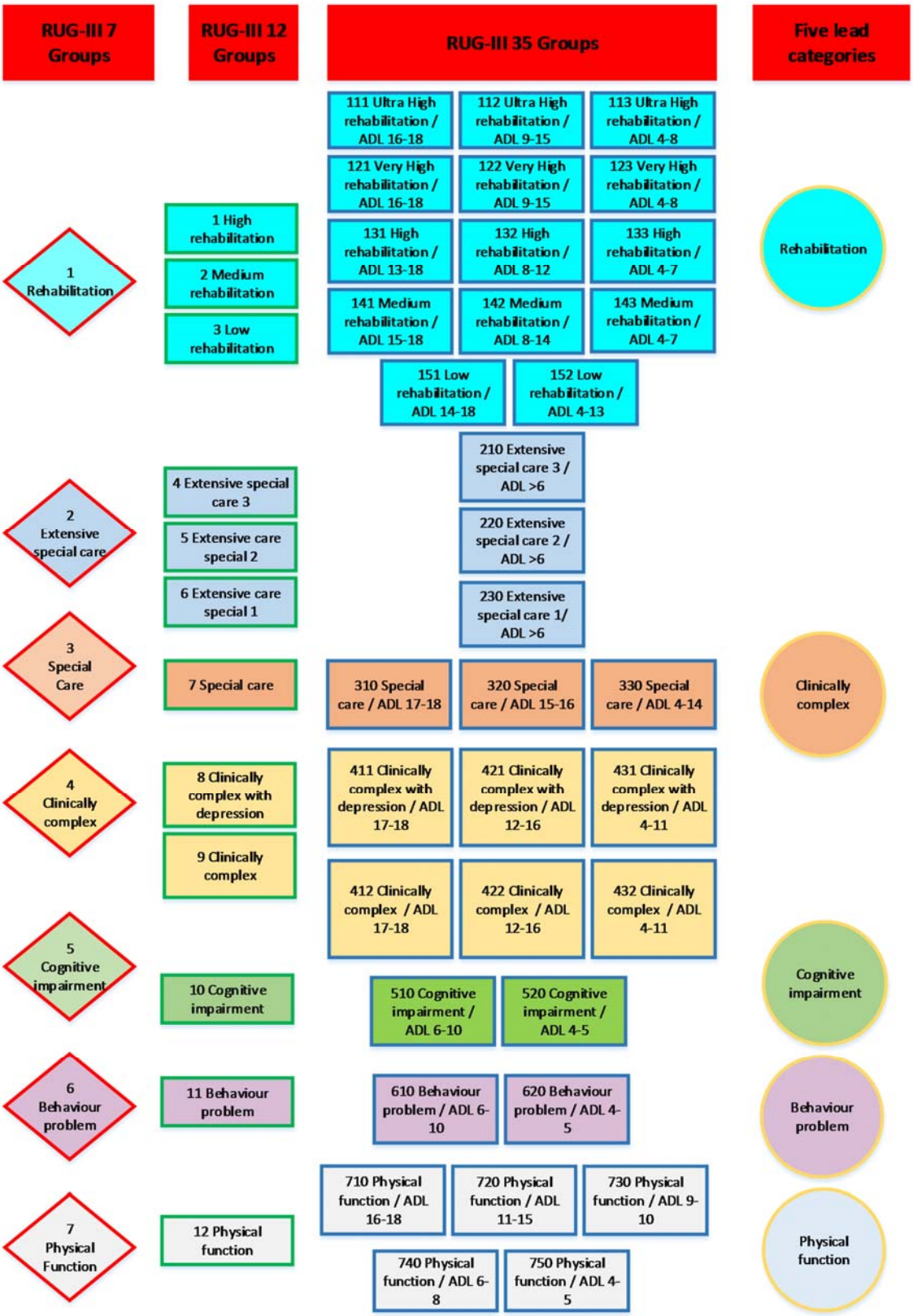

Figure 2: RUG-III and five-group case-mix Classification systems

2.2 What we found

Physical function, as measured by the RUG-ADL scale was a major driver of staff related activity and cost. In addition, across the 2,359 residents included in the analysis, very low numbers were categorised into Rehabilitation (n=30), extensive special care (n=14), special care (n=89) and behaviour problem (n=68) case-mix groups using the RUG-III 7 Group system. This issue was compounded by the refinement of residents into the 12- and 35-Group RUG-III tools.

However, even with this limitation, the RUG-III provided a reasonable level of explanatory variance around costs (22%) for RUG-III 35, rising to 26 percent for RUG-III ADL scale and five-lead categories / RUG-III 7 and 12 Group systems. The results are short of the 50 percent plus reported by interRAI in the US, though this is not surprising as the system was developed within the US context and the somewhat artificial rest home / hospital / dementia level impacts on the distribution. However, the explanatory variance of RUG-III within this study is both in keeping with published validation studies from countries other than US and is financially and clinically reasonable.

The small numbers of residents categorised to some of the case-mix groups in the current study is an obvious but modifiable issue for the direct application of the RUG-III system within New Zealand. It is suggested that this is partly driven by a difference in emphasis in New Zealand on rehabilitation and extensive special care when compared to the US (where the RUG-III was derived). It is further suggested that this difference in emphasis is significantly related to the funding model driving the service response. There is an emphasis on high cost services in the US enabled by adequate funding and a simple three level model of funding in New Zealand that is not capable of allowing a greater intensity of service response for those with rehabilitation or extensive special care needs.

The increased homogeneity of a five-group system for lead categories allows for a greater opportunity for meaningful population of case-mix groups. Integrating residents allocated to clinically complex, special care and extensive special care groups allows for a more meaningful classification system within the New Zealand Bupa data generated in this study.

Two models that involved a combination of five-lead categories and RUG-ADL were identified as providing a best fit for ARC in NZ; both in terms of statistical explanatory power as well as being clinically meaningful. The first uses all 14 RUG ADL categories and the second model collapses the 14 RUG-ADL categories into Lowest (RUG-ADL score 4-8), Medium (RUG-ADL score 9-14) and Highest (RUG-ADL score 15-18) level of need.

Case-weights were then developed for these both case-mix groups. These are presented in table 2 and have been scaled to be relative to the group with the largest

number of residents (in the table below this is Physical Function lead category and a RUG ADL score of 4). This is to enable presentation of the relative case-weights while maintaining the anonymity of the data derived from residents in Bupa facilities. It is proposed that the five-group lead category with the collapsed RUG-ADL categories be used as the case-mix system.

Table 2: Anonymised case-weights derived from the development of a case-mix system for New Zealand Aged Residential Care

Disability sub-category	Five-group Lead category				
	Rehabilitation	Clinically complex	Cognitive impairment	Behavioural problems	Physical function
Lowest needs. (RUG ADL Score 4 to 8)	1.05	1.16	1.21	1.24	1.00
Medium needs (RUG ADL Score 9 to 14)	1.63	1.75	1.47	1.44	1.67
Highest needs (RUG ADL Score 15 to 18)	2.38	2.02	Insufficient data	Insufficient data	1.81

NOTE. The national dataset of interRAI LTCF data are currently being sourced from TAS, which would allow for aggregation of residents to case-mix groups to determine if the distribution across the groups identified using Bupa data is similar to that observed in the current study.

This will allow a validation of the distribution of residents across the case-mix group observed among Bupa residents to confirm that the study findings and the resultant case-mix system is applicable across the wider NZ perspective. This will be available in the next couple of weeks. The analysis will be undertaken by the University of Auckland rather than TAS.

3 ARC Case-mix: a model for NZ

3 Key points

- New Zealand has relied on a range of relatively simplistic and crude funding tools within ARC.
- The current three band system is simply out of date and reflects a time when rest home was used as the de facto support for older people with low to moderate needs, a level of support now met by Home Care.
- With the mandated implementation of the interRAI LTCF coupled to the current ARC funding review, there is an inevitability that change will occur in the method by which ARC is funded.
- The study identified a preferred model with five-lead categories with further stratification of residents according to three levels of ADL function (as measured by the RUG ADL Scale).
- The lead categories are arguably where innovation occurs. Selection, development and costing of such using best evidence and careful financial and clinical scrutiny has the potential to drive key developments in ARC. This will allow the sector to tailor the service response to the needs of defined populations of residents
- The next step should be to utilise a mixture of evidence and clinical guidance to describe pathways for each lead category and price up accordingly.
- Although changes are required to the RUG-III algorithm to integrate the New Zealand case-mix system, these changes are minimal.

3.1 Introduction

Figure 3 illustrates the preferred model with five-lead categories with further stratification of residents according to three levels of ADL function (as measured by the RUG ADL Scale). Implementation of this model has the potential to provide a far more tailored and flexible funding mechanism to meet the complexity of the ARC environment but also will enable changes in service response that are aligned to resident need. An example of this is illustrated in the figure where the desired service response may vary across the lead categories with a focus on close liaison with primary care and the use of increased monitoring of the resident for residents identified as clinically complex and at risk of hospitalisation. Alternatively, there is a focus on interim care funded by ACC, return to community-dwelling and increased use of intensive allied health services for residents categorised in the rehabilitation lead category.

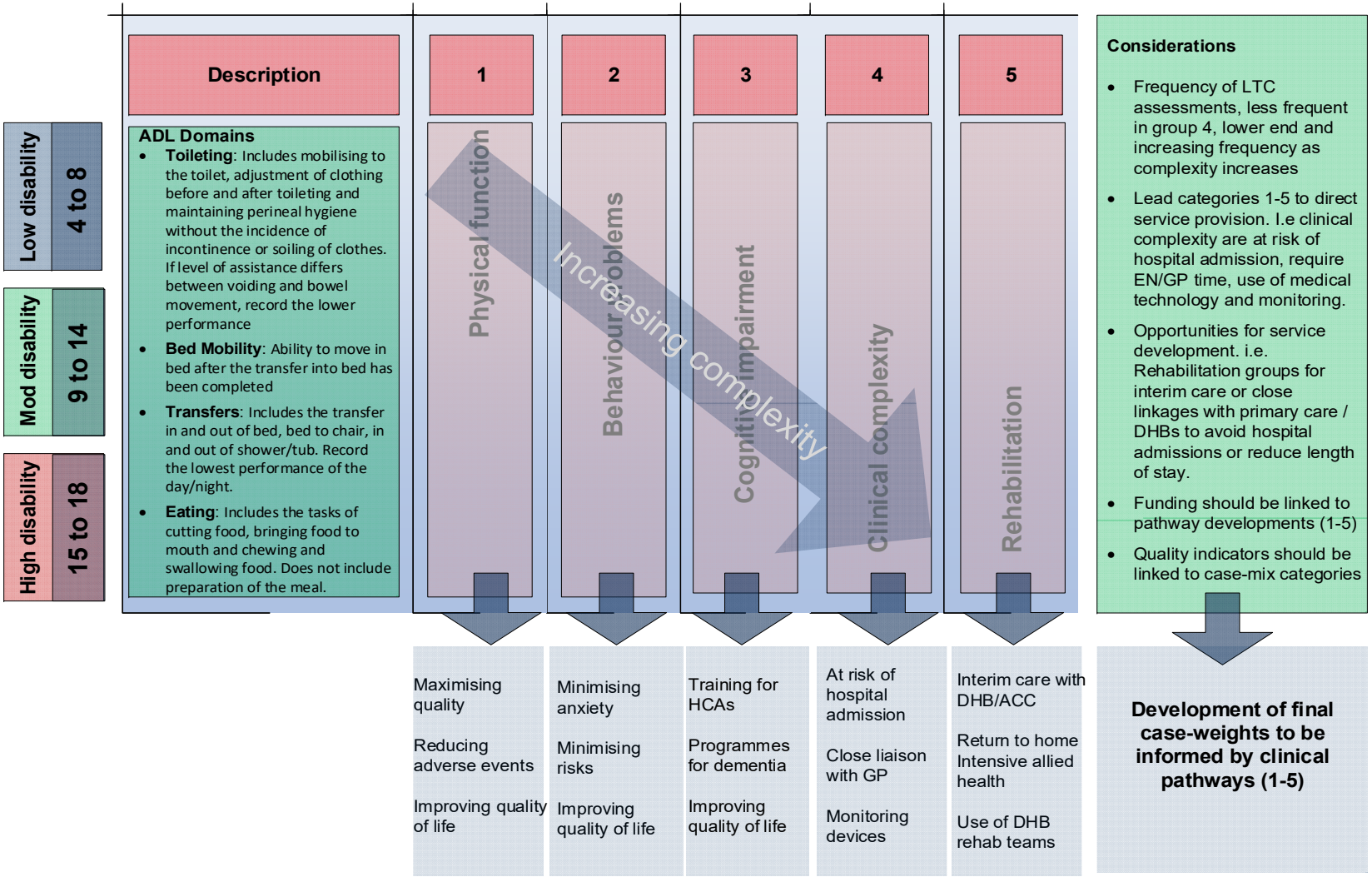

Figure 3: The preferred NZ interRAI LTCF Case-mix model

3.2 What could this mean for ARC in NZ?

New Zealand as with many other countries has relied on a range of relatively simplistic and crude funding tools. The current three band system is simply out of date and reflects a time when rest home was used as the de facto support for older people with low to moderate needs, a level of support now met by Home Care [7-12]. Further it has been argued that the three-band system has limited innovation and development of an industry that is well placed to support the acute sector.

Statistical analysis of costs showed a significant difference across the case-mix groups. However, the New Zealand RUG-III system can be implemented across all levels of facility as they are currently configured. It is important to note that the way in which care and support is delivered to residents in dementia unit / psychogeriatric facilities is different to those in rest home and private hospital / continuing care facilities with a different philosophy of care. The current screening approach across the 20 DHBs allows allocation of individuals into those three types of care. Adopting a case-mix system does not replace that and one would assume the current three types of facilities would continue.

For many years ARC organisations have increasingly sought to blend the level of care across rest home and private hospital. It is common practice for beds in facilities to be upgraded from rest home to private hospital. Within a case-mix system the distinction between rest home and private hospital beds at a facility level will increasingly become arbitrary wen a facility has both rest home and private hospital level of care. This is an important consideration moving forward.

With the mandated implementation of the interRAI LTCF coupled to current ARC funding review, there is an inevitability that change will occur. The recommendations made here have been based on a 24-hour snapshot that may or may not be representative of actual activities. However, even with this limited snapshot, we have managed to obtain results that accord with intuition, thereby forming a baseline for further investigation and improvement.

The lead categories are arguably where innovation occurs. Selection, development and costing of such using best evidence and careful financial and clinical scrutiny has the potential to drive key developments in ARC. This will allow the sector to tailor the service response to the needs of defined populations of residents. For instance, development of the 'rehabilitation' lead category can ensure alignment with ACC Non-Acute Rehabilitation, DHB interim care and non-weight bearing along with a host of other options.

3.3 Where next?

With the confirmation of the modified five-lead category RUG-III system comes the ability to develop the lead categories and therefore case-mix categories further. The current case-weights reflect the status quo not the future. The next step should be to utilise a mixture of evidence and clinical guidance to describe pathways for each lead category and price up accordingly. Such an approach would influence the case-weights and therefore pricing.

This project has primarily aimed to validate the RUG-III and has done such through identification of a combination of consolidation of lead categories. If the New Zealand RUG-III case-mix system is to be adopted there is clearly work required to adapt the current algorithm within the interRAI software

4 Bupa and the commitment to quality of care for older people

4.1 The Bupa Health Foundation

The Bupa Health Foundation funded this study. They are one of the leading charitable foundations dedicated to health in Australia. The Bupa Health Foundation is committed to improving health outcomes and ensuring the sustainability of affordable healthcare.

Through collaborative partnerships, the Bupa Health Foundation play a leading role in nurturing new ideas and approaches that can improve health and care. The Foundations work is directed towards encouraging innovations and pioneering efforts through:

- Partnerships that help translate evidence into action
- Educating and empowering the community in their own health
- Supporting new and enhanced service delivery
- Investing in health programs that impact on policy and practice

Since 2005 The Bupa Health Foundation have invested over A$30m in more than 120 projects in Australia and New Zealand. They are a founding member of New Zealanders for Health Research – the nation's only dedicated public education and advocacy alliance committed to making health research a higher priority in New Zealand.

The Bupa Health Foundation is proud to support this work through the University of Auckland, to provide a framework for developing ongoing sustainability within the Aged Residential Care sector and explore innovative models of service delivery to help meet the global needs of the ageing population.

4.2 Bupa in New Zealand

Bupa is a global health and care company, which has been committed to a purpose of longer, healthier, happier lives for close to 70 years. In New Zealand, we use our local and international experience to provide a wide range of services including care homes, retirement villages, rehabilitation and dental clinics.

Bupa is one of New Zealand's leading private residential aged care providers with 50 care homes across the country. Bupa provides an extensive range of care and support, including respite and specialised dementia care where needed. The organisation also

has over 30 retirement villages, which are an important part of aged care. Bupa believes in supporting people to live independently for as long as possible. All the villages are next door or nearby to a Bupa care home, so residents can choose to remain in familiar surroundings regardless of their changing needs over time.

The seven Bupa residential rehabilitation centres help people who have sustained an injury and require rehabilitation. Bupa specialises in traumatic brain injury, including concussion and chronic pain, helping people relearn daily skills and functions that enable them to live as independently as they can.

Bupa also owns 25 dental clinics across New Zealand and provide a wide range of oral health services including preventative, restorative and cosmetic services.

Employing more than 4,500 people in New Zealand, Bupa believes that they can make a real difference to the lives of New Zealanders through their values, purpose and the way that they deliver personalised care.

6 The project team

6.1 Researchers

Associate Professor John Parsons has the role of Director of Post Graduate Studies at the School of Nursing, the University of Auckland. He is the inaugural Bupa Fellow in Allied Health Research and is the Clinical Lead (Rehabilitation) within the Institute of Healthy Ageing, Waikato District Health Board. John has a PhD and Masters in Health Science from the University of Auckland, additional postgraduate qualifications from AUT University and an Honours degree in Physiotherapy from Brunel University in London. He has a long-standing research interest in the development of evidence based service delivery models for people with disabilities and has published over 60 peer reviewed articles and technical reports on issues relating to service delivery for older people and those with significant disabilities across different settings.

Professor Matthew Parsons has held the position of Clinical Chair in Gerontology, a Joint appointment between Waikato District Health Board and the University of Auckland since 2011. He has a PhD and Masters in Ageing from Kings College London, an Honours degree in Psychology and Human Biology and is a Registered Nurse. Matthew has been at the forefront of change in community services for over 20 years across multiple countries. He has a particular focus on rehabilitation having been intrinsically involved in the implementation of community rehabilitation teams across multiple regions and countries. He has published in excess of 100 peer reviewed journal articles and technical report and provides advice to numerous countries in relation to Home Care services.

Professor Paul Rouse is a member of the NZ Institute of Chartered Accountants and a professor in the Faculty of Business and Economics at the University of Auckland. He has a PhD, Masters and BCom from the University of Auckland and is a council member of the Operations Research Society of New Zealand. He has extensive research experience in cost modelling, performance measurement and evaluation; productivity modelling; case mix in health systems, performance evaluation in health and has published over 100 peer reviewed articles, book chapters and technical reports on the basis of this work.

6.2 Project Steering Group

The project Steering Group comprised key stakeholders (Bupa NZ, interRAI), sponsors (Bupa Health Foundation) and the research team. They met regularly for the duration of the project to facilitate the successful completion and dissemination of the project. The Group consisted of:

Jan Adams	Managing Director, Bupa New Zealand
	Global Chief Nurse, Bupa New Zealand
Carolyn Cooper	Chief Operating Officer and Lead Nurse Bupa New Zealand
Dr Isobel Frean	Head of eCare Strategy & Governance, Bupa Australia & New Zealand)
Dr Brigette Meehan	Manager interRAI National Services, TAS
Annette Schmiede	Executive Leader, Bupa Health Foundation
Julie Sellar	Finance Director, Bupa Australia & New Zealand

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