RUG-III Plus

# Decision-Support Guide

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Cette publication est aussi disponible en français sous le titre *Guide de soutien à la prise de décisions RUG-III Plus*.

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# Executive summary

This document is intended to provide guidance to health system decision-makers and decision-support staff to use the Resource Utilization Groups version III Plus (RUG-III Plus) case-mix system for organizational decision support in residential care. It summarizes the applications of the RUG-III Plus case-mix system, such as how to plan for and evaluate programming and policies in residential care. The intended audience for this guide includes staff from decision-support, financial and analytical departments, ranging from analysts to directors. An improved understanding of how to use case-mix systems for organizational decision support will enable better care for residents in Canadian organizations.

This guide also references 2 assessment tools that are used in residential care in Canada: the Resident Assessment Instrument–Minimum Data Set 2.0 (RAI-MDS 2.0©) and the new interRAI Long-Term Care Facilities (interRAI LTCF©).

There are 2 sections to this guide:

1. Section 1 provides a summary of the RUG-III Plus case-mix system, including the grouping methodology and Case Mix Index (CMI) values.
2. Section 2 provides guidelines for using RUG-III Plus case-mix information for decision support.

# Introduction

This document provides guidance on how to use the RUG-III Plus residential care case-mix system for organizational decision support. There are 2 objectives:

1. Provide a summary of the RUG-III Plus grouping methodology and CMI values.
2. Provide guidelines for using RUG-III Plus case-mix information for decision support.

Many Canadian residential care organizations are generally familiar with using Clinical Assessment Protocols (CAPs) for care planning and also with using quality indicators (QIs) and outcome scales for decision support. While case-mix systems are usually associated with funding, they have many additional applications, including

- Describing a population of residents;
- Comparing organizations;
- Monitoring estimated resource use over time;
- Planning for and evaluating policies/programs;
- Risk-adjusting QIs; and
- Creating other decision-support metrics.

Organizational decision support includes activities designed to better understand a given population within an organization. These activities can include deriving metrics and measures at one point in time to compare organizations, or deriving them over time for time series trending.

The main components of case-mix systems include a grouping methodology and a set of CMI values. Case-mix systems sort large amounts of clinical administrative data into a reasonable number of clinically and resource similar groups. Each group is associated with a CMI value that provides an estimate of resource use. A grouping methodology can be used to describe a population of residents and to compare organizations. CMI values can be used to estimate relative resource use or intensity among residents or organizations. As we will discuss later in this document, once combined with other measures, such as QIs or outcome scales, case-mix systems can identify patterns in data for further investigation.

Supporting material from the Canadian Institute for Health Information (CIHI), including information sheets, job aids and education products, are referenced throughout this guide and are available on the RUG-III Plus web page. Of particular note are the following resources:

- *RUG-III Plus Grouping Methodology* information sheet
- *Resource Utilization Groups version III Plus (RUG-III Plus) Grouping Methodology* job aid
- *Comparing the RUG-III and RUG-III Plus grouping methodologies* job aid
- *RUG-III Plus differences between RAI-MDS 2.0 and interRAI LTCF* (forthcoming 2019)

# Section 1: Overview of RUG-III Plus case-mix system

## Structure of RUG-III Plus

CIHI worked with stakeholders in Canadian jurisdictions and interRAI to develop RUG-III Plus. This represents the first update to the residential care case-mix system in Canada. RUG-III Plus is an updated version of the RUG-III grouping methodology. There are 7 RUG-III Plus categories, each with between 3 and 14 groups. Categories are ordered in a clinical hierarchy (see Figure 1 in Appendix A). The RUG-III Plus grouping methodology is characterized by clinical eligibility for each of the 7 categories based on activities of daily living (ADLs; see Figure 2 in Appendix A) and other clinical features that reflect both expected relative costs and clinical practice incentives. Details of the RUG-III Plus grouping methodology can be found in Table 1 (see Appendix A). The *RUG-III Plus Grouping Methodology* information sheet and *Resource Utilization Groups version III Plus (RUG-III Plus) Grouping Methodology* job aid available on the RUG-III Plus web page provide additional details.

### Activities of daily living

As outlined in Figure 2 and Table 1, ADLs such as a resident's ability to move around while in bed play a key role in defining the group assigned to a resident's most recent assessment. The ADL measure is defined the same way for the RUG-III Plus grouping methodology as it was for the RUG-III methodology. The RUG_III_ADL score measures the degree of assistance a resident requires for 4 activities: moving in bed, transferring, using the toilet and feeding himself or herself. A score of 4 for the 4 activities combined indicates that very little assistance is required with ADLs, while a maximum score of 18 indicates total dependence on others for these ADLs.

### Assigning RUG-III Plus groups

Clinical and administrative information from residential care assessment data determines the RUG-III Plus categories and groups assigned. Each assessment is reviewed to identify relevant categories and, within those categories, relevant groups. Most assessments could be assigned to more than one relevant category and/or group. The RUG-III Plus group is assigned using the **index-maximizing** approach, meaning group assignment is based on the RUG-III Plus group with the highest CMI value.

RUG-III Plus assignment of assessments is driven primarily by the level of ADL impairment. In the presence of multiple clinical criteria that would classify the resident in any number of RUG-III Plus categories, the degree of ADL impairment defines the group assignment within any given category. See Figure 2 and Table 1, as well as the *Resource Utilization Groups version III Plus (RUG-III Plus) Grouping Methodology* job aid on the RUG-III Plus web page for more details.

## Update to RUG-III grouping methodology

There are 3 key differences between the RUG-III and RUG-III Plus grouping methodologies:

1. The RUG-III Extensive Services indicator was replaced with a simplified list to identify assessments triggering the Extensive Services category. The RUG-III Plus Extensive Care items are
   - Higher ADL impairment (score of 7 or more); and
   - Any one of
     - Tracheostomy care;
     - Ventilator/respirator care;
     - Antibiotic-resistant infection (vancomycin-resistant enterococci, methicillin-resistant *Staphylococcus aureus*); and/or
     - *Clostridium difficile* infection.
2. The criteria to assign the Extensive Services groups for RUG-III Plus were also updated:
   - Requiring tracheostomy care ***and*** ventilator/respirator care classifies an assessment in the top group — SE3.
   - Requiring tracheostomy care ***or*** ventilator/respirator care classifies an assessment in the middle group — SE2.
   - Not requiring tracheostomy care or ventilator/respirator care (i.e., having an infection requiring isolation precautions) classifies an assessment into the lowest group — SE1.
3. In RUG-III Plus, the Impaired Cognition category has been moved below the Behaviour Problems category in the clinical hierarchy. This change reflects the observation of slightly higher staff time provided to residents in the Behaviour Problems groups compared with the Impaired Cognition groups, as observed in the Canadian Staff Time Resource Intensity Verification (CAN-STRIVE) study.[i, 1]

i. It should be noted that the Behaviour Problems groups classify residents who have few impairments in their ADLs and do not have other clinically resource-intensive characteristics such as requiring extensive therapy. Residents who have troubling behaviours and higher ADL impairment or other clinically resource-intensive characteristics are not classified in the Behaviour Problems groups.

The changes to the Extensive Services items and groups better describe the Canadian residential population studied in the CAN-STRIVE research. The changes also reflect the original RUG-III research.[2] The *Comparing the RUG-III and RUG-III Plus* grouping methodologies job aid on the RUG-III Plus web page provides a summary of these differences.

# interRAI LTCF and RAI-MDS 2.0 differences

The RUG-III Plus grouping methodology and CMI values were designed for use with the RAI-MDS 2.0 assessment tool. A version of the RUG-III Plus grouping methodology for the interRAI LTCF assessment tool is also available to licensed CIHI vendors. See Table 2 for detailed RUG-III Plus classification rules for the interRAI LTCF. The main differences between the grouping methodologies relate to the information available in the Restorative Nursing data element in the interRAI LTCF (also termed Nursing Rehabilitation). The job aid *RUG-III Plus differences between RAI-MDS 2.0 and interRAI LTCF* (to be available in 2019 on the RUG-III Plus web page) contains a summary of these differences. The RUG-III Plus CMI values designed for the RAI-MDS 2.0 may also be applied to the interRAI LTCF.

# Overview of RUG-III Plus CMI values

RUG-III Plus CMI values were designed to provide a unit-less relative measure of estimated resource use for each RUG-III Plus group. CIHI worked with its partners and stakeholders across Canada to derive RUG-III Plus CMI values, based on staff time measurement data collected by interRAI and the University of Waterloo. For technical details regarding the creation of RUG-III Plus CMI values, refer to *Creating Residential Care Decision-Support Tools: The Methodology Behind RUG-III Plus CMI Values* (to be available in 2019 on the RUG-III Plus web page). The RUG-III Plus CMI values are listed in Table 3.

# Section 2: Decision-support guidelines

Case-mix systems take large amounts of clinical administrative data and provide a reasonable number of clinically relevant and resource-similar groups. RUG-III Plus groups provide the basis for meaningful comparisons of Canada's residential care data.

Vendor systems and software applications play a major role in organizational decision support. The specifications that CIHI provides to licensed vendors are applied in software and other applications within residential care organizations, regional health authorities and ministries of health. A given organization's resident assessment data will have its RUG-III Plus case-mix group and its associated CMI value assigned by the vendor system. This information is summarized and used for organizational decision support.

You should consider the following concepts in the RUG-III Plus case-mix system methodology when using case-mix information for decision support.

## Contextual importance

The RUG-III Plus grouping methodology and CMI values were designed to be applicable to Canadian residential care organizations; however, some contextual factors should be considered. RUG-III Plus CMI values were developed using Ontario staff time measurement data from 2007 to 2009 and may not be generalizable to other jurisdictions. If pan-Canadian resident-level cost or staff time measurement data was to be made available, CIHI would be able to refine the RUG-III Plus case-mix system.

## Decision support for longitudinal data

Canadian residential care data is longitudinal; it is collected throughout a resident's stay at a facility. There are often several assessments for a given resident at a given facility, and many residents will have lengths of stay of 365 days a year because they live in the facility. As a result, length of stay does not provide useful information regarding costs or resource use.

There are different ways to use resident assessment data for organizational decision support. For a given resident in a given facility, you can

- Use the case-mix group and CMI value from the most recent assessment; or
- Use the case-mix group and CMI value from all relevant assessments over a given reporting period.

# Key applications of case-mix systems

Case-mix systems have several applications, including

- Describing and comparing clients and organizations;
- Combining with other metrics/performing risk-adjustment;
- Planning for or evaluating new policies/programs; and
- Informing funding.

## Describing and comparing clients and organizations

There are many ways to describe and compare clients and organizations using case-mix measures.

### RUG-III Plus category

The proportion of resident assessments classified in RUG-III Plus categories can be used to understand the case-mix distribution of residents in a given organization. A stacked bar graph of the proportion of residents in each RUG-III Plus category within a given facility can be used to make comparisons between organizations or over time.

### Using CMI values

CMI values provide an estimate of relative resource use and can be used to make comparisons between organizations or over time. CMI values can also be used to compare residents in order to estimate how much more resource intensive one resident is compared with another.

### Time series trending reporting

Reporting using time series trending is helpful for making comparisons between fiscal quarters or fiscal years. Trending case-mix measures can help identify changes in case mix or CMI values over time within the same organization or across organizations. It can also be helpful for evaluating case-mix measures before and after a policy or program intervention.

### Identifying peers

One of the greatest benefits of case-mix measures is the ability to identify peers. Organizations that have a similar case-mix distribution or CMI value may be good candidates for comparison using other measures in order to evaluate policies and programs. Peer organizations are often useful when combining and examining data to set benchmarks or targets.

Identifying appropriate peer organizations requires carefully considering a facility's particular context. Facility size, presence of specialty units and access to specific services such as rehabilitation therapists are some things to consider when identifying peers. For example, an urban facility associated with a hospital may have access to a greater variety of staff types and might be able to provide care to a more complex set of residents than a small rural facility that has difficulty recruiting therapists and other non-nursing staff. These aspects need to be considered when defining the most appropriate peers.

## Combining with other metrics/performing risk-adjustment

Case-mix measures can be combined with other measures, such as outcome scales and QIs, to identify trends when comparing facilities. For example, CMI values can be used in conjunction with ADL impairment measures and scales over time to assess changes in functional status among residents; this can help identify a need for increased staffing supports. CMI values can be used to derive weighted case information, such as the Cost of a Standard Resident Day indicator, which can help assess relative costs over time at the organization and system levels.

Additionally, the proportion of residents in certain case-mix categories and with given CMI values can be used to risk-adjust QIs. Please see *CCRS Quality Indicators Risk Adjustment Methodology* for more details regarding risk-adjustment of residential care QIs.

## Planning for or evaluating new policies/programs

Many applications of CMI values are relevant to health programming and policies. As previously discussed, comparing organizations and combining case-mix measures with other measures are key applications of case-mix systems. These applications can be employed in the context of planning for or evaluating a program or policy in residential care. It will be increasingly important to link administrative, clinical and case-mix data for more refined analysis, such as unit-level analyses and patient satisfaction trends.

## Informing funding

One of the most common applications of case-mix systems is informing funding. Usually, the CMI value is used to adjust a portion of residential care funding. For more details on funding applications using case-mix systems, please see *The Why, the What and the How of Activity-Based Funding in Canada: A Resource for Health System Funders and Hospital Managers*.

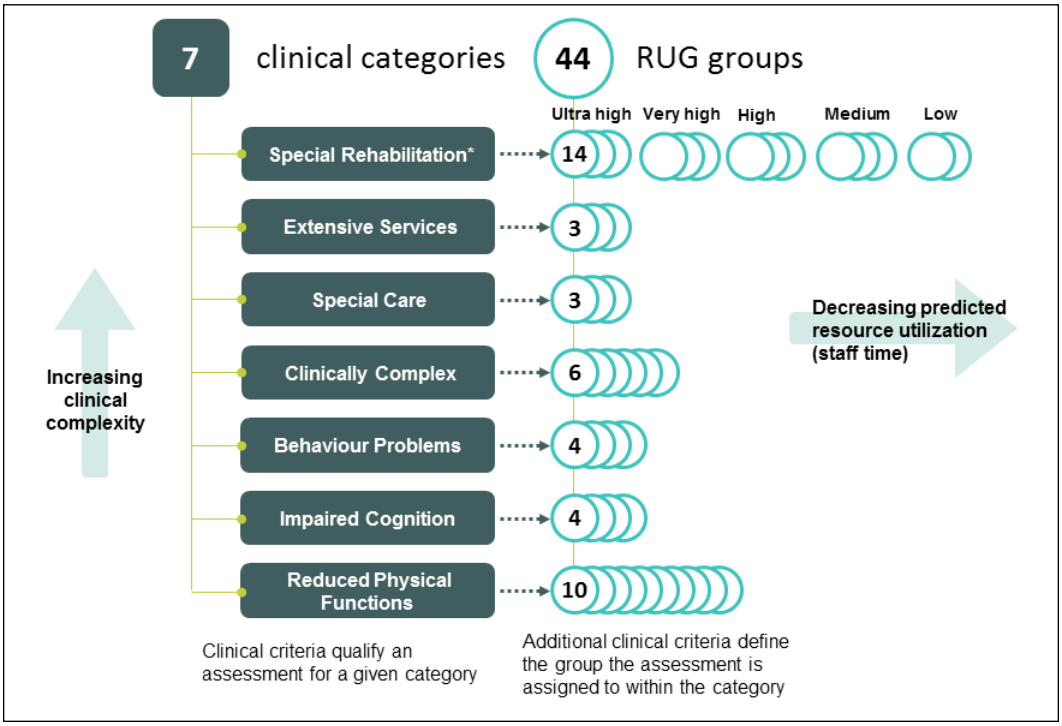
Some jurisdictions use reports that weight resident days within a given time period as part of their approach to funding residential care. A weighting methodology is applied to residential care assessment data to weight the days of stay in a given facility over any given time period. Considerations for occupancy, unassessed days, missing assessments and outbreaks can be incorporated into the weighting methodology and, ultimately, the funding approach. For more information regarding the weighting methodology used by the Ontario Ministry of Health and Long-Term Care, please see the *Continuing Care Reporting System: Interpreting RUG Weighted Patient Day Reports* manual. Please note that CIHI provides RUG Weighted Patient Day reports for Ontario facilities as part of a separate agreement.

# Conclusion

The intent of this document is to provide health system decision-makers and decision-support staff with an understanding of the RUG-III Plus case-mix system and how it can be used to support residential care for Canadian seniors. The RUG-III Plus grouping methodology and the approach used to develop and apply CMI values were described. Case-mix decision-support concepts relevant to residential care in Canada were also described. The RUG-III Plus case-mix system is a powerful decision-support tool. When combined with other decision-support tools, it can provide valuable insights regarding residential care populations and areas for future investigation.

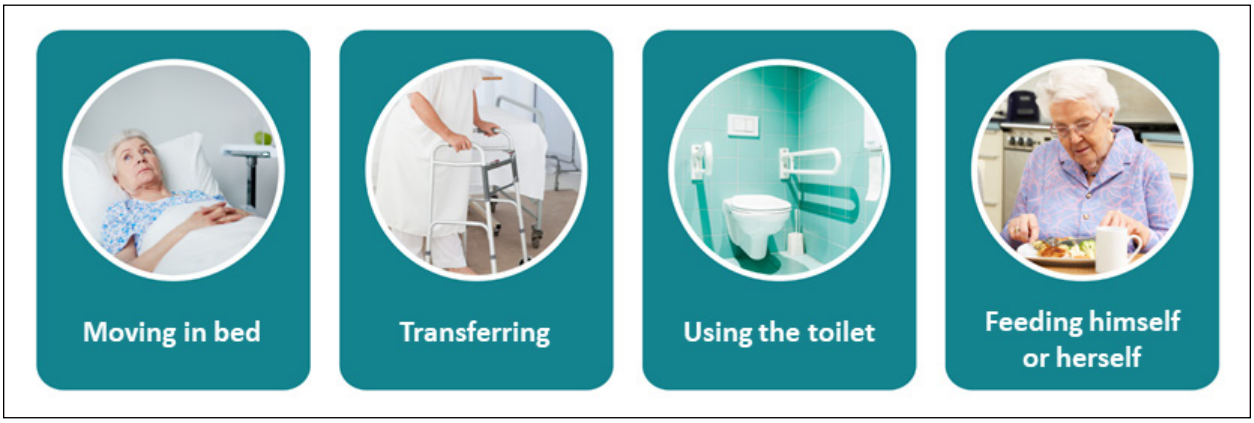
# Appendix A: Tables and figures

## Figure 1 High-level RUG-III Plus structure




**Note**
* There are 5 subcategories for Special Rehabilitation (ultra high, very high, high, medium and low).

## Figure 2 Activities of daily living comprising the RUG_III_ADL score




**Note**
ADLs define the RUG-III Plus grouping methodology. The RUG_III_ADL score is made up of a numerical measure assessing the degree of difficulty a resident experiences moving around in bed, transferring, using the toilet and feeding himself/herself.

## Table 1 RUG-III Plus classification rules for the RAI-MDS 2.0

| RUG-III Plus category | Category assignment rules | Subcategory/group assignment rules | RUG_III_ADL score | Terminal split criteria | RUG-III Plus group rank | RUG-III Plus group |
|---|---|---|---|---|---|---|
| **Special Rehabilitation — Ultra High** | 150 or more minutes of therapy AND 1 or more therapies on 5 or more days<br><br>OR<br><br>45 or more minutes of therapy AND 1 or more therapies on 3 or more days AND 2 or more nursing rehab techniques on 6 or 7 of last 7 days | 720 or more minutes of therapy AND 1 or more therapies on 5 or more days AND 2 or more therapies on 3 or more days | 16 to 18 | ADL impairment | 1 | RUC |
| | | | 9 to 15 | ADL impairment | 2 | RUB |
| | | | 4 to 8 | ADL impairment | 3 | RUA |
| **Special Rehabilitation — Very High** | | 500 or more minutes of therapy AND 1 or more therapies on 5 or more days | 16 to 18 | ADL impairment | 4 | RVC |
| | | | 9 to 15 | ADL impairment | 5 | RVB |
| | | | 4 to 8 | ADL impairment | 6 | RVA |
| **Special Rehabilitation — High** | | 325 or more minutes of therapy AND 1 or more therapies on 5 or more days | 13 to 18 | ADL impairment | 7 | RHC |
| | | | 8 to 12 | ADL impairment | 8 | RHB |
| | | | 4 to 7 | ADL impairment | 9 | RHA |
| **Special Rehabilitation — Medium** | | 150 or more minutes of therapy AND 1 or more therapies on 5 or more days | 15 to 18 | ADL impairment | 10 | RMC |
| | | | 8 to 14 | ADL impairment | 11 | RMB |
| | | | 4 to 7 | ADL impairment | 12 | RMA |
| **Special Rehabilitation — Low** | | 45 or more minutes of therapy AND 1 or more therapies on 3 or more days AND 2 or more nursing rehab techniques on 6 or 7 of last 7 days | 14 to 18 | ADL impairment | 13 | RLB |
| | | | 4 to 13 | ADL impairment | 14 | RLA |

| RUG-III Plus category | Category assignment rules | Subcategory/group assignment rules | RUG_III_ADL score | Terminal split criteria | RUG-III Plus group rank | RUG-III Plus group |
|---|---|---|---|---|---|---|
| **Extensive Services** | High ADL Impairment score (7 to 18) AND tracheostomy care OR ventilator/respirator OR antibiotic-resistant infection OR *Clostridium difficile* infection | Tracheostomy care AND ventilator/ respirator care | 7 to 18 | Specific combination of Extensive Services items | 15 | SE3 |
| | | Tracheostomy care OR ventilator/ respirator care | | | 16 | SE2 |
| | | Infection requiring isolation | | | 17 | SE1 |
| **Special Care** | Tracheostomy care OR ventilator/respirator OR antibiotic-resistant infection OR *Clostridium difficile* infection<br><br>OR<br><br>High ADL Impairment score (7 to 18) AND any Special Care items | RUG_III_ADL score 17 or 18 | 17 or 18 | ADL impairment | 18 | SSC |
| | | RUG_III_ADL score 15 or 16 | 15 or 16 | ADL impairment | 19 | SSB |
| | | RUG_III_ADL score 4 to 14 | 4 to 14 | ADL impairment | 20 | SSA |
| **Clinically Complex** | Tracheostomy care OR ventilator/respirator OR antibiotic-resistant infection OR *Clostridium difficile* infection<br><br>OR<br><br>Any Special Care items<br><br>OR<br><br>Any Clinically Complex items | RUG_III_ADL score of 17 or 18 AND 3 or more depression items | 17 or 18 | Depression items | 21 | CC2 |
| | | RUG_III_ADL score of 17 or 18 | 17 or 18 | | 22 | CC1 |
| | | RUG_III_ADL score of 12 to 16 AND 3 or more depression items | 12 to 16 | Depression items | 23 | CB2 |
| | | RUG_III_ADL score of 12 to 16 | 12 to 16 | | 24 | CB1 |
| | | RUG_III_ADL score of 4 to 11 AND 3 or more depression items | 4 to 11 | Depression items | 25 | CA2 |
| | | RUG_III_ADL score of 4 to 11 | 4 to 11 | | 26 | CA1 |

| RUG-III Plus category | Category assignment rules | Subcategory/group assignment rules | RUG_III_ADL score | Terminal split criteria | RUG-III Plus group rank | RUG-III Plus group |
|---|---|---|---|---|---|---|
| **Behaviour Problems** | RUG_III_ADL score of 4 to 10 AND troubling behaviours | RUG_III_ADL score of 6 to 10 AND 2 or more nursing rehab techniques on 6 or 7 of last 7 days | 6 to 10 | Restorative nursing | 27 | BB2 |
| | | RUG_III_ADL score of 6 to 10 | 6 to 10 | | 28 | BB1 |
| | | RUG_III_ADL score of 4 to 5 AND 2 or more nursing rehab techniques on 6 or 7 of last 7 days | 4 to 5 | Restorative nursing | 29 | BA2 |
| | | RUG_III_ADL score of 4 to 5 | 4 to 5 | | 30 | BA1 |
| **Impaired Cognition** | RUG_III_ADL score of 4 to 10 AND high Cognitive Performance Scale (CPS) score of 3 to 6 | RUG_III_ADL score of 6 to 10 AND 2 or more nursing rehab techniques on 6 or 7 of last 7 days | 6 to 10 | Restorative nursing | 31 | IB2 |
| | | RUG_III_ADL score of 6 to 10 | 6 to 10 | | 32 | IB1 |
| | | RUG_III_ADL score of 4 to 5 AND 2 or more nursing rehab techniques on 6 or 7 of last 7 days | 4 to 5 | Restorative nursing | 33 | IA2 |
| | | RUG_III_ADL score of 4 to 5 | 4 to 5 | | 34 | IA1 |

| RUG-III Plus category | Category assignment rules | Subcategory/group assignment rules | RUG_III_ADL score | Terminal split criteria | RUG-III Plus group rank | RUG-III Plus group |
|---|---|---|---|---|---|---|
| **Reduced Physical Functions** | All assessments qualify | RUG_III_ADL score of 16 to 18 AND 2 or more nursing rehab techniques on 6 or 7 of last 7 days | 16 to 18 | Restorative nursing | 35 | PE2 |
| | | RUG_III_ADL score of 16 to 18 | 16 to 18 | | 36 | PE1 |
| | | RUG_III_ADL score of 11 to 15 AND 2 or more nursing rehab techniques on 6 or 7 of last 7 days | 11 to 15 | Restorative nursing | 37 | PD2 |
| | | RUG_III_ADL score of 11 to 15 | 11 to 15 | | 38 | PD1 |
| | | RUG_III_ADL score of 9 or 10 AND 2 or more nursing rehab techniques on 6 or 7 of last 7 days | 9 or 10 | Restorative nursing | 39 | PC2 |
| | | RUG_III_ADL score of 9 or 10 | 9 or 10 | | 40 | PC1 |
| | | RUG_III_ADL score of 6 to 8 AND 2 or more nursing rehab techniques on 6 or 7 of last 7 days | 6 to 8 | Restorative nursing | 41 | PB2 |
| | | RUG_III_ADL score of 6 to 8 | 6 to 8 | | 42 | PB1 |
| | | RUG_III_ADL score of 4 to 5 AND 2 or more nursing rehab techniques on 6 or 7 of last 7 days | 4 to 5 | Restorative nursing | 43 | PA2 |
| | | RUG_III_ADL score of 4 to 5 | 4 to 5 | | 44 | PA1 |

**Notes**

Therapy includes occupational, physical and speech–language therapies.

Restorative nursing includes splint or brace assistance, bed mobility, transfer, walking, dressing or grooming, eating or swallowing, amputation or prosthesis care, communication, any scheduled toileting plan and bladder retraining program.

Special Care items include severe pressure ulcers and skin treatments, feeding tube, parenteral/enteral intake, aphasia, wound care, daily respiratory therapy, higher ADL impairment and cerebral palsy, fever, vomiting, weight loss, pneumonia, dehydration, higher ADL impairment and multiple sclerosis, higher ADL impairment and quadriplegia, and radiation.

Clinically Complex items include feeding tube, parenteral/enteral intake, comatose, septicemia, severe burns, dehydration, higher ADL impairment and hemiplegia/hemiparesis, internal bleeding, pneumonia, end-stage disease, chemotherapy, dialysis, physician order changes/visits, challenges with diabetes medication management, transfusions, oxygen therapy and foot problems.

Troubling behaviours include wandering, being verbally abusive, being physically abusive, socially inappropriate/disruptive behaviour, resisting care (occurred on 4 or more of last 7 days) and delusions/hallucinations (present in last 7 days).

The RUG_III_ADL score ranges from 4 to 18.

Terminal split criteria are defined as the last set of clinical criteria evaluated to differentiate groups.

## Table 2 RUG-III Plus classification rules for the interRAI LTCF

| RUG-III Plus category | Category assignment rules | Group assignment rules | RUG_III_ADL score | Terminal split criteria | RUG-III Plus group rank | RUG-III Plus group |
|---|---|---|---|---|---|---|
| **Special Rehabilitation — Ultra High** | 720 or more minutes of therapy AND 1 or more therapies on 5 or more days AND 2 or more therapies on 3 or more days | RUG_III_ADL score 16 to 18 | 16 to 18 | ADL impairment | 1 | RUC |
| | | RUG_III_ADL score 9 to 15 | 9 to 15 | ADL impairment | 2 | RUB |
| | | RUG_III_ADL score 4 to 8 | 4 to 8 | ADL impairment | 3 | RUA |
| **Special Rehabilitation — Very High** | 500 or more minutes of therapy AND 1 or more therapies on 5 or more days | RUG_III_ADL score 16 to 18 | 16 to 18 | ADL impairment | 4 | RVC |
| | | RUG_III_ADL score 9 to 15 | 9 to 15 | ADL impairment | 5 | RVB |
| | | RUG_III_ADL score 4 to 8 | 4 to 8 | ADL impairment | 6 | RVA |
| **Special Rehabilitation — High** | 325 or more minutes of therapy AND 1 or more therapies on 5 or more days | RUG_III_ADL score 13 to 18 | 13 to 18 | ADL impairment | 7 | RHC |
| | | RUG_III_ADL score 8 to 12 | 8 to 12 | ADL impairment | 8 | RHB |
| | | RUG_III_ADL score 4 to 7 | 4 to 7 | ADL impairment | 9 | RHA |
| **Special Rehabilitation — Medium** | 150 or more minutes of therapy AND any therapies combined on 5 or more days | RUG_III_ADL score 15 to 18 | 15 to 18 | ADL impairment | 10 | RMC |
| | | RUG_III_ADL score 8 to 14 | 8 to 14 | ADL impairment | 11 | RMB |
| | | RUG_III_ADL score 4 to 7 | 4 to 7 | ADL impairment | 12 | RMA |
| **Special Rehabilitation — Low** | 45 or more minutes of therapy AND any therapies combined on 3 or more days | RUG_III_ADL score 14 to 18 | 14 to 18 | ADL impairment | 13 | RLB |
| | | RUG_III_ADL score 4 to 13 | 4 to 13 | ADL impairment | 14 | RLA |
| **Extensive Services** | High ADL Impairment score (7 to 18) AND tracheostomy care OR ventilator/respirator OR infection requiring isolation | Tracheostomy care AND ventilator/ respirator care | 7 to 18 | Specific combination of Extensive Services items | 15 | SE3 |
| | | Tracheostomy care OR ventilator/ respirator care | | | 16 | SE2 |
| | | Infection requiring isolation | | | 17 | SE1 |
| **Special Care** | Tracheostomy care OR ventilator/respirator OR infection requiring isolation<br><br>OR<br><br>High ADL Impairment score (7 to 18) AND any Special Care items | RUG_III_ADL score 17 or 18 | 17 or 18 | ADL impairment | 18 | SSC |
| | | RUG_III_ADL score 15 or 16 | 15 or 16 | ADL impairment | 19 | SSB |
| | | RUG_III_ADL score 4 to 14 | 4 to 14 | ADL impairment | 20 | SSA |

| RUG-III Plus category | Category assignment rules | Group assignment rules | RUG_III_ADL score | Terminal split criteria | RUG-III Plus group rank | RUG-III Plus group |
|---|---|---|---|---|---|---|
| **Clinically Complex** | Tracheostomy care OR ventilator/respirator OR antibiotic-resistant infection OR infection requiring isolation<br><br>OR<br><br>Any Special Care items<br><br>OR<br><br>Any Clinically Complex items | RUG_III_ADL score of 17 or 18 AND 3 or more depression items | 17 or 18 | Depression items | 21 | CC2 |
| | | RUG_III_ADL score of 17 or 18 | 17 or 18 | | 22 | CC1 |
| | | RUG_III_ADL score of 12 to 16 AND 3 or more depression items | 12 to 16 | Depression items | 23 | CB2 |
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| | | RUG_III_ADL score of 4 to 11 AND 3 or more depression items | 4 to 11 | Depression items | 25 | CA2 |
| | | RUG_III_ADL score of 4 to 11 | 4 to 11 | | 26 | CA1 |
| **Behaviour Problems** | RUG_III_ADL score of 4 to 10 AND troubling behaviours | RUG_III_ADL score of 6 to 10 AND nursing rehab techniques on at least 5 of the last 7 days | 6 to 10 | Restorative nursing | 27 | BB2 |
| | | RUG_III_ADL score of 6 to 10 | 6 to 10 | | 28 | BB1 |
| | | RUG_III_ADL score of 4 or 5 AND nursing rehab techniques on at least 5 of the last 7 days | 4 or 5 | Restorative nursing | 29 | BA2 |
| | | RUG_III_ADL score of 4 or 5 | 4 or 5 | | 30 | BA1 |
| **Impaired Cognition** | RUG_III_ADL score of 4 to 10 AND high Cognitive Performance Scale (CPS) score of 3 to 6 | RUG_III_ADL score of 6 to 10 AND nursing rehab techniques on at least 5 of the last 7 days | 6 to 10 | Restorative nursing | 31 | IB2 |
| | | RUG_III_ADL score of 6 to 10 | 6 to 10 | | 32 | IB1 |
| | | RUG_III_ADL score of 4 or 5 AND nursing rehab techniques on at least 5 of the last 7 days | 4 or 5 | Restorative nursing | 33 | IA2 |
| | | RUG_III_ADL score of 4 or 5 | 4 or 5 | | 34 | IA1 |

| RUG-III Plus category | Category assignment rules | Group assignment rules | RUG_III_ADL score | Terminal split criteria | RUG-III Plus group rank | RUG-III Plus group |
|---|---|---|---|---|---|---|
| **Reduced Physical Functions** | All assessments qualify | RUG_III_ADL score of 16 to 18 AND nursing rehab techniques on at least 5 of the last 7 days | 16 to 18 | Restorative nursing | 35 | PE2 |
| | | RUG_III_ADL score of 16 to 18 | 16 to 18 | | 36 | PE1 |
| | | RUG_III_ADL score of 11 to 15 AND nursing rehab techniques on at least 5 of the last 7 days | 11 to 15 | Restorative nursing | 37 | PD2 |
| | | RUG_III_ADL score of 11 to 15 | 11 to 15 | | 38 | PD1 |
| | | RUG_III_ADL score of 9 or 10 AND nursing rehab techniques on at least 5 of the last 7 days | 9 or 10 | Restorative nursing | 39 | PC2 |
| | | RUG_III_ADL score of 9 or 10 | 9 or 10 | | 40 | PC1 |
| | | RUG_III_ADL score of 6 to 8 AND nursing rehab techniques on at least 5 of the last 7 days | 6 to 8 | Restorative nursing | 41 | PB2 |
| | | RUG_III_ADL score of 6 to 8 | 6 to 8 | | 42 | PB1 |
| | | RUG_III_ADL score of 4 or 5 AND nursing rehab techniques on at least 5 of the last 7 days | 4 or 5 | Restorative nursing | 43 | PA2 |
| | | RUG_III_ADL score of 4 or 5 | 4 or 5 | | 44 | PA1 |

**Notes**

Therapy includes occupational, physical and speech–language therapies.

Nursing rehabilitation techniques include splint or brace assistance, bed mobility, transfer, walking, dressing or grooming, eating or swallowing, amputation or prosthesis care, and communication.

Special Care items include severe pressure ulcer and turning/repositioning program, feeding tube, parenteral/enteral intake, aphasia, major skin problems/tears/cuts, wound care, daily respiratory therapy, higher ADL impairment and cerebral palsy, fever, vomiting, weight loss, pneumonia, dehydration, higher ADL impairment and multiple sclerosis, higher ADL impairment and quadriplegia, and radiation.

Clinically Complex items include feeding tube, parenteral/enteral intake, comatose, septicemia, dehydration, higher ADL impairment and hemiplegia, internal bleeding, pneumonia, end-stage disease, chemotherapy, dialysis, physician order changes/visits, challenges with diabetes medication management, transfusions, oxygen therapy, and foot problems.

Troubling behaviours include wandering, being verbally abusive, being physically abusive, socially inappropriate/disruptive behaviour, resisting care (occurred on 4 or more of last 7 days) and delusions/hallucinations (present in last 7 days).

The RUG_III_ADL score ranges from 4 to 18.

Terminal split criteria are defined as the last set of clinical criteria evaluated to differentiate groups.

## Table 3 RUG-III Plus CMI values

| RUG-III Plus categories | RUG-III Plus group | Rank | RUG-III Plus CMI values |
|---|---|---|---|
| Special Rehabilitation | RUC | 1 | 3.563 |
| | RUB | 2 | 3.195 |
| | RUA | 3 | 2.970 |
| | RVC | 4 | 3.040 |
| | RVB | 5 | 2.671 |
| | RVA | 6 | 2.447 |
| | RHC | 7 | 2.490 |
| | RHB | 8 | 2.090 |
| | RHA | 9 | 1.954 |
| | RMC | 10 | 2.314 |
| | RMB | 11 | 1.883 |
| | RMA | 12 | 1.694 |
| | RLB | 13 | 1.995 |
| | RLA | 14 | 1.553 |
| Extensive Services | SE3 | 15 | 2.438 |
| | SE2 | 16 | 2.053 |
| | SE1 | 17 | 1.661 |
| Special Care | SSC | 18 | 1.804 |
| | SSB | 19 | 1.603 |
| | SSA | 20 | 1.461 |
| Clinically Complex | CC2 | 21 | 1.649 |
| | CC1 | 22 | 1.649 |
| | CB2 | 23 | 1.565 |
| | CB1 | 24 | 1.429 |
| | CA2 | 25 | 1.088 |
| | CA1 | 26 | 1.000 |
| Behaviour Problems | BB2 | 27 | 1.139 |
| | BB1 | 28 | 1.068 |
| | BA2 | 29 | 0.769 |
| | BA1 | 30 | 0.736 |
| Impaired Cognition | IB2 | 31 | 1.021 |
| | IB1 | 32 | 0.963 |
| | IA2 | 33 | 0.690 |
| | IA1 | 34 | 0.662 |

| RUG-III Plus categories | RUG-III Plus group | Rank | RUG-III Plus CMI values |
|---|---|---|---|
| Reduced Physical Functions | PE2 | 34 | 1.601 |
| | PE1 | 36 | 1.601 |
| | PD2 | 37 | 1.301 |
| | PD1 | 38 | 1.238 |
| | PC2 | 39 | 1.013 |
| | PC1 | 40 | 0.966 |
| | PB2 | 41 | 0.889 |
| | PB1 | 42 | 0.850 |
| | PA2 | 43 | 0.649 |
| | PA1 | 44 | 0.622 |

**Note**

RUG-III Plus CMI values were provided to CIHI-licensed vendors in January 2018.

# Appendix B: Text alternative for figure

**Figure 1 High-level RUG-III Plus structure**

There are 7 RUG-III Plus categories, each with a number of groups. There are a total of 44 groups among the 7 categories combined. All RUG-III Plus categories are ordered in a hierarchy from lowest to highest clinical complexity: Reduced Physical Functions, Impaired Cognition, Behaviour Problems, Clinically Complex, Special Care, Extensive Services and Special Rehabilitation. Note that there are 5 subcategories for Special Rehabilitation (ultra high, very high, high, medium and low). There are 10 groups in the Reduced Physical Functions category, 4 groups in the Impaired Cognition category, 4 groups in the Behaviour Problems category, 6 groups in the Clinically Complex category, 3 groups in the Special Care category, 3 groups in the Extensive Services category and 14 groups in the Special Rehabilitation category.

# References

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