

# Development of the nursing home Resident Assessment Instrument in the USA

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## Abstract

**Background:** the nursing home Resident Assessment Instrument (RAI) includes a set of core assessment items, known as the Minimum Data Set (MDS), for assessment and care screening and more detailed Resident Assessment Protocols in 18 areas that represent common problem areas or risk factors for nursing home residents. Its primary use is clinical, to assess residents on admission to the nursing home, at least annually thereafter and on any significant change in status and to develop individualized, restorative plans of care.

**Aim:** to describe the content and development of the RAI, including US testing for MDS item reliability and validity of the RAI, and the results of a 4-year evaluation of the effects of its clinical use.

**Conclusions:** the evaluation found that implementation of the RAI was associated with significant improvements in a variety of measures of process quality, resident functional outcomes and reduced hospitalization. Other uses of the RAI data in the USA—including payment using resident classification systems and, with RAI-based outcome-oriented quality indicators, quality assurance activities—and the status of RAI use in other countries are also summarized.

**Keywords:** *assessment, nursing homes, Minimum Data Set, Resident Assessment Instrument*

## Introduction

This paper describes the content and development of the nursing home Resident Assessment Instrument (RAI), including the testing for reliability and validity in the USA. It also summarizes the effects of its clinical use to assess nursing home residents and develop individualized care plans. In addition, it mentions other uses of the RAI data in the USA, such as for payment using resident classification systems and to generate outcome-oriented quality indicators. Finally, it briefly summarizes the process by which this innovation has been diffused across other nations and the status of RAI use in other countries.

## Genesis of the RAI

The RAI was part of a set of reforms enacted by the United

States Congress in the Omnibus Budget Reconciliation Act of 1987 (OBRA-87). The RAI and other OBRA-87 provisions were the most sweeping reforms to how nursing homes were regulated since the onset of federal payment for nursing home care with the passage of Medicare and Medicaid programmes in the mid-1960s. Their enactment was generated by recognition of changing standards of clinical care in the industry, concerns about continuing problems in nursing home quality and widespread recognition that existing federal and state regulatory systems were ineffective.

In an effort to address these problems, in 1983 Congress asked the National Academy of Sciences and its Institute of Medicine to examine nursing home quality and report on how to improve nursing home regulation. The Institute of Medicine formed a committee of experts and after a 2.5-year study and a series of hearings, the committee issued its report [1, 2].

One of its central recommendations was the development of a uniform, comprehensive resident assessment system.

The Institute of Medicine committee argued that a uniform, comprehensive assessment of each resident was essential to improving the quality of care in the nation's nursing homes [1]. The committee viewed comprehensive functional assessment as the cornerstone of individualized care planning that would focus on helping each resident attain and maintain their maximum practicable functioning and well-being. In addition, the committee argued that the resident-level data from such assessments were essential to the development of outcome-oriented measures of quality and the implementation of resident-focused quality assurance systems.

Congress enacted most of the committee's recommendations, including resident assessment, as part of OBRA-87. It gave authority to develop the resident assessment instrument and regulations governing its use to the federal agency responsible for setting nursing home standards, the Health Care Financing Administration. The RAI was developed by a research consortium under contract with that agency [3]. (The contract was between the Health Standards Quality Bureau, Health Care Financing Administration and Research Triangle Institute in North Carolina. The Institute's collaborators included the Hebrew Rehabilitation Center for Aged in Boston, MA, the Center for Gerontology and Health Care Research at Brown University, Providence, RI and the Institute of Gerontology at the University of Michigan at Ann Arbor.)

The new assessment regulations, originally slated for implementation in October 1990, were fully implemented in Spring 1991 and now apply to more than 90% of all nursing homes in the USA. They require use of the RAI when the resident is first admitted to a nursing home and at least annually thereafter to assess the resident and develop the resident's plan of care.

### Process of RAI development

The RAI development team began work in October 1988. To aid it, the project team established 18 clinical work groups. These work groups included geriatricians, gero-psychiatrists, nurses, social workers, dieticians, physical, occupational and speech therapists, recreational therapists, dentists, nursing home operators, resident advocates and researchers. Our first task was to articulate the goals that would guide development of the RAI and be responsive to the congressional mandate for a uniform, comprehensive functional assessment. Thus, we wanted an instrument whose main use was clinical—to focus attention on a view of the 'whole' person, to encourage restorative and rehabilitative care and to guide care plans. Further,

the RAI was intended to facilitate communication and problem-solving among a multi-disciplinary team of caregivers (e.g. nurse, physician, social worker, therapist, dietician) by creating a common 'language' and understanding of the resident. We also recognized that the RAI should be feasible for use in the average nursing home, which often lacked access to geriatricians, mental health professionals and sometimes even licensed therapists. Finally, the RAI items had to be reliable across users (inter-rater reliability).

Achieving these goals involved several major activities, including: (i) reviewing existing instruments; (ii) determining the domains to be included and the items, definitions and response categories to be included in each domain; (iii) establishing the reliability and validity of the instrument; and (iv) developing training materials to accompany the assessment instrument. As shown in Table 1, this was an iterative and interactive process.

### Reviewing existing instruments

The project team started by reviewing more than 80

Table 1. Content of the Resident Assessment Instrument: components and major domains or areas

| <b>Minimum Data Set for resident assessment and care screening</b> |  |
|--|--|
| Background and customary routines                                  | Cognitive patterns<br>Vision patterns        |
| Communication/hearing patterns                                     | Continence<br>Activity pursuit patterns      |
| Physical functioning and structural problems                       | Health conditions<br>Oral/dental status      |
| Mood and behaviour patterns  | Medication use                               |
| Disease diagnoses  |  |
| Oral/nutritional status  |  |
| Skin condition   |  |
| Special treatments and procedures                                  |  |
| <b>Resident Assessment Protocols</b>                               |  |
| Delirium   | Cognitive loss/dementia                      |
| Visual function  | Communication                                |
| ADL functional/rehabilitative potential                            | Urinary incontinence and indwelling catheter |
| Psychosocial well-being  | Mood state                                   |
| Behaviour problem  | Activities                                   |
| Falls  | Nutritional status                           |
| Feeding tubes  | Dehydration/fluid maintenance                |
| Dental care  | Pressure ulcers                              |
| Psychotropic drug use  | Physical restraints                          |

ADL, activities of daily living.

existing geriatric assessment instruments. Through this process, we identified the domains or areas which others felt were essential for assessment and care planning in nursing homes. In addition, we found that for the most part these instruments recognized the reality of good geriatric care for a population with multiple chronic illnesses and disabilities. Thus, the domains and items that were included led them to focus less on diseases and diagnoses and more on the functional consequences.

While these assessment instruments were illuminating, none completely addressed the range of functional areas or provided the comprehensive and 'holistic' view of the resident that the project team felt was essential. In particular, many neglected to focus on the resident's strengths and preferences, although understanding these is essential to developing an individualized care plan that focuses on maximizing independence. In addition, many existing instruments were 'profession-specific', developed for use by physicians, nurses or rehabilitation specialists. Also, several key areas that affect functioning, such as mood and psychosocial functioning, were often omitted or inadequately addressed in existing instruments used in nursing homes. Further, many used response categories that were too general to provide the information needed to develop individualized rehabilitative or restorative care plans. Finally, some otherwise excellent instruments or scales were inadequate for use with a nursing home population because they were not structured to assess the large number of residents who have significant levels of cognitive impairment and are unable to report on their own condition. Thus, the project team used the review to help inform the selection of key domains, but it was clear that a new instrument was needed to meet the goals of comprehensiveness, uniformity and reliability.

### Content of the RAI

To achieve the goals set by Congress, the Health Care Financing Administration and the project team, we concluded that three things were needed [3, 4]. The first was a core set of assessment items that would provide a comprehensive picture of each resident's functional status, including the resident's strengths, preferences and needs. This is known as the Minimum Data Set for resident assessment and care screening (MDS). The second element was a set of specialized assessment protocols that are intended to more directly link the MDS information to care plan decisions. These are 18 condition-focused Resident Assessment Protocols (RAPs) which specify an additional, highly focused assessment if the resident's status, as revealed by the MDS, suggests a problem, risk for development of a problem, or potential for improved function. Such conditions are identified by applying a set of algorithms specified in each RAP area

to a resident's MDS data. Facility staff then use the more specialized assessment guidelines found in the RAPs to identify potentially treatable causes and focus decisions about the resident's plan of care and services. (Table 1 summarizes the MDS domains and the 18 RAP areas.) The third element of the RAI is a user's manual with detailed specifications about how to complete the MDS and RAP assessment process (e.g. interviewing staff, residents and family members, reviewing records), item definitions, examples of coding options and clinical guidelines for using the RAPs to develop care plans [5]. In addition, the RAI includes a quarterly review that specifies a subset of MDS assessment items and is intended to monitor the resident's response to the care plan and determine whether sufficient change has occurred to trigger a more comprehensive assessment.

### Development and testing of the RAI

We determined the domains to be included, using the areas specified by Congress, those reflected in other comprehensive instruments and those identified by expert clinicians as key to the functional well-being of nursing home residents. The clinical/research work groups then specified the items, definitions and response categories that were essential in each domain. After creating the first drafts, which were internally reviewed, the project team identified additional staff from nursing homes around the country and other well-known clinicians and researchers who were asked to review and comment on various drafts. This became an iterative process, with reviews leading to further revisions by the clinical workgroups—and reviews of the new drafts. Before the first field test of the MDS, 27 drafts and revisions were completed, based on reviews by hundreds of clinical experts and nursing home providers across the country. During the process of testing and retesting, elements of the RAI went through an additional 15 revisions with clinical reviews.

In addition to clinical reviews, we tested two versions of the MDS and RAPs in a total of 28 nursing homes in six states, using facility and research nurses, with dual assessments of more than 600 residents. These tests, including debriefing of facility staff who tested the RAI, were used to establish the face validity and inter-rater reliability of the RAI items and assessment protocols, to limit items to those considered essential to care planning by facility providers and expert clinicians, and to improve the training manual. The results of these tests and reliability of the final RAI/MDS items are reported elsewhere [3, 6-8]. Figure 1 summarizes this development process.

Subsequent testing has established the validity of the MDS through creation of scales of MDS items (i.e., the cognitive performance scale and psychosocial well-being scale) and comparison of these to existing

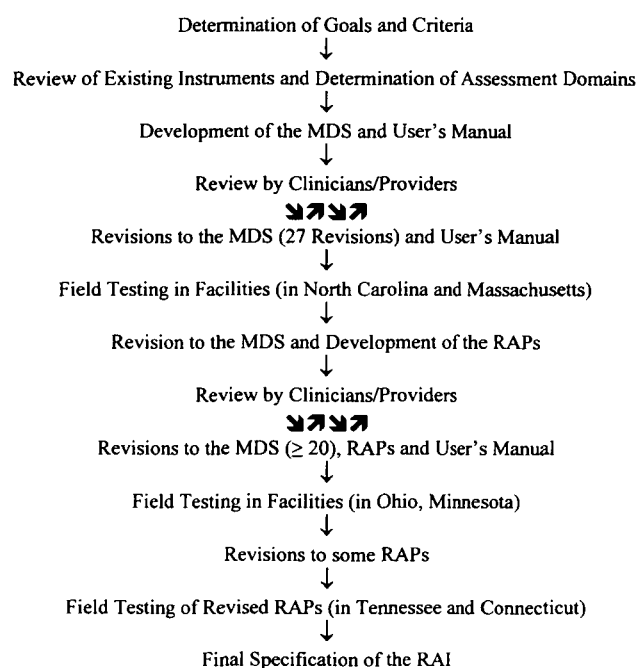


Figure 1. Process of Resident Assessment Instrument development.

'gold-standard' instruments, such as the Folstein Mini-Mental State Examination, that address various domains in the RAI [9, 10]. Finally, as summarized below, a 4-year evaluation of the effects of the RAI further established its clinical validity and utility in improving quality of care for elderly people [11].

### Use in the USA

Facilities must use the RAI to assess residents upon admission in order to develop their plan of care. The RAI is also used to assess residents annually after admission and upon any significant change in their health status. Quarterly assessments are performed to monitor the effects of care and the need for modifications to the care plan. In addition, in about one-quarter of the states, data from the RAI are used to identify residents with complex medical or rehabilitative care needs, or high disability in the activities of daily living (ADLs). These data are then used to adjust facilities' reimbursement by the Medicaid programme. Most of these states are using what is known as a Resource Utilization Group (the RUGS-III system) based resident classification system to determine the nursing home's payment [12] and the current version of the RAI contains all the items needed for the RUGS-III system. RAI data are also being used to determine eligibility of nursing home residents for State and federal payments for nursing home care. Finally, the RAI data are being used to develop quality indicators, based on resident

outcomes and key process quality variables on the MDS. These quality indicators are being used to improve the survey process which is part of the federal quality assurance system [13].

### Effects of the RAI on quality

The Health Care Financing Administration commissioned a comprehensive evaluation of the impact of the RAI on facilities and the quality of resident care. The RAI evaluation design was a pre/post-test design that examined changes in the process of care and longitudinal resident outcomes as measures of quality. The major findings, summarized below, can be found in a final report to the Health Care Financing Administration [11] and in a series of papers [14-16]. The evaluation was conducted in 10 states in 269 randomly selected nursing homes. It involved assessment of the quality of care and resident status for more than 4000 residents. Comparisons of process quality and resident outcomes were performed between a pre-RAI period (1990 and early 1991) and a post-RAI-implementation period in the Spring and Autumn of 1993. The major findings include such statistically significant improvements as:

1. Increase in the comprehensiveness and accuracy of the information available in residents' medical records;
2. Increase in the comprehensiveness of care planning, with care plans in the post-RAI period addressing a greater percentage of residents' health problems, risk factors and their potential for improved function;
3. Improvements in a wide array of other care processes that affect residents' quality of care and quality of life, including increased involvement of families and residents in care planning, increased use of advance directives, increased use of behaviour management programmes, increased involvement in activities and decreased use of problematic interventions, such as indwelling urinary catheters and physical restraints;
4. Significant reductions in decline among residents in such areas as physical functioning in ADLs, cognitive status and urinary continence; and
5. A significant reduction in the number of nursing home residents who were hospitalized, with no increase in mortality.

### Discussion

#### Strengths of the RAI

Clinicians have long recognized that comprehensive functional assessment of elderly subjects is central to

maximizing their physical and cognitive functioning and their quality of life. Indeed, studies have established its utility in improving quality, reducing unnecessary nursing home placement and improving the functional well-being of elders in hospital, ambulatory and clinic settings [17–21]. With the RAI, we find that this process achieves similar results in long-term care facilities.

The evaluation of the RAI demonstrated its utility in improving the quality of care in US nursing homes. Further, we learned more about why it is effective from the perspective of long-term care administrators and directors of nursing. In two studies, the vast majority of nursing home administrators and directors of nursing or unit nurses who were surveyed reported that it improved assessment and care planning in their facilities, improved their ability to identify problems and improved their ability to determine whether care plans were achieving desired effects [22–25]. Further, it enhanced clinicians' knowledge and ability to intervene effectively in such areas as identification of delirium, dehydration and mood problems—areas that were typically under-diagnosed and under-treated prior to the implementation of the RAI. Similarly, another survey of nursing home staff in six states found that staff viewed the MDS as a useful tool for clinicians [26].

At the same time that administrators and nursing home staff were generally positive about the impact of the RAI on quality, about one-third of staff felt it did not improve quality. Moreover, between half and two-thirds of the staff felt that completing the RAI added to their paper-work burden, including even some of those who felt it improved quality of care. In addition, a recent study indicates that some facilities are experiencing significant difficulties using the RAI appropriately, resulting in inaccurate MDS data and poor use of the RAPs [27]. Thus, ensuring effective use of the RAI to improve quality of care and life for residents uniformly across facilities and implementing practices that minimize the burden on facilities requires additional work. At the same time, a summary of nursing home staff's views on why the RAI has proved clinically useful (Table 2) is instructive.

Finally, we find that because of its reliability, the RAI/MDS data can be used for a variety of purposes in addition to its original and primary goal of improving care. Facilities in the USA use it to determine staffing needs and for continuous quality improvement initiatives. Staff use it to support their clinical decision-making. Families and long-term care ombudsmen use it to help them understand and evaluate the care being provided to elders. Policy-makers use it to set nursing home payment rates that encourage access for heavy care residents and achieve greater equity across providers. State and federal inspection agencies use it to evaluate facilities' performance, using resident outcomes and key process quality indicators which allow them to more effectively target their quality assurance

Table 2. Nursing home staff's views on why the Resident Assessment Instrument (RAI) has proved useful

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|---|
| The RAI provides a holistic view of the resident as a person, not merely a list of nursing care needs, by including a focus on strengths, preferences and customary routines  |
| The Minimum Data Set provides a comprehensive summary across the major functional domains, so that, for example, the resident's cognitive status can be considered in relation to his or her activities of daily living status, when deciding on the appropriate rehabilitation or restorative care plan intervention |
| The use of standardized definitions and response categories provides a common language across disciplines which facilitates multi-disciplinary team assessment and care planning  |
| The Resident Assessment Protocols provide a systematic way to link assessment information to care plan decisions  |
| The focus of the RAI assessment is on restoring and maintaining function, so it not only identifies current problems but also the risk for the development of new problems and identifies the potential for improved function. This facilitates more aggressive and affirmative care plan interventions               |

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activities. Increasingly, researchers are also using it to examine the effects of various clinical interventions and to study policy-relevant issues, such as the relationship between cost and quality.

### The international community and the RAI

The international long-term care community has also found multiple uses for the RAI. Starting in 1990, geriatricians and researchers in other countries began expressing interest in the RAI and its development in the USA. Geriatric assessment has a long history in European countries; thus, a systematic way of bringing this process to the care of elders in nursing homes was appealing to many of these geriatricians who learned of the RAI at professional meetings and from colleagues. Other researchers were drawn to the RUGs system as a means of paying nursing facilities appropriately for 'heavy care' residents and discovered the RAI as part of the process of investigating use of RUGs.

Table 3 presents a summary of the main uses of the RAI in countries that participate in *interRAI*, an organization of geriatricians, academic researchers and other professionals committed to developing and using standardized assessment instruments to improve care for elders. In each of these countries, an *interRAI* member has taken lead responsibility for translating the MDS, the training or user's manual and, in most countries, the RAPs. (This has also included a process of 'reverse translation' and comparisons between the

Table 3. International use of the Resident Assessment Instrument (RAI)

| Country         | Language                     | Reliability testing | Main use   |
|-----------------|------------------------------|---------------------|--|
| Sweden          | Swedish                      | Yes                 | Initially, to see whether use of RUGs could reduce hospital length of stay and pay nursing homes more equitably; now, for research   |
| Italy           | Italian                      | Yes                 | To train nurses in gerontological nursing; also implemented testing effects of full RAI use on quality of care in two regions and in nursing homes in regions, with possibility of national implementation |
| UK              | English                      | No                  | Testing effect on quality of care and being evaluated as potential national standard assessment for continuing care homes  |
| Denmark         | Danish                       | Yes                 | Implementation of the full RAI for use in nursing homes in Copenhagen; full country implementation under consideration if appropriate software becomes available   |
| The Netherlands | Dutch                        | No                  | Testing effect of use of the full RAI on quality   |
| Japan           | Japanese                     | Yes                 | Testing effect of RAI to provide quality-based incentive payments  |
| Iceland         | Icelandic                    | Yes                 | Full country implementation of the RAI for assessment and care planning  |
| Switzerland     | Swiss French<br>Swiss German | Yes                 | Testing impact on quality in several cantons   |
| France          | French                       | No                  | Prospective study in a few facilities to determine acceptability and effect on quality; testing expanded to more facilities  |
| Spain           | Spanish                      | No                  | To measure differences in facilities' case mix, with consideration of using RUGs for nursing facility payment  |
| Canada          | English                      | Yes                 | Testing utility of RUGs to identify case mix differences among facilities; implemented for chronic care hospitals in Ontario and being considered in Saskatchewan  |
| Germany         | German                       | No                  | Being advocated for use in determining eligibility for the new long-term care benefit under German social security law   |
| Norway          | Norwegian                    | No                  | May replace locally developed assessment system for long-term care   |
| Finland         | Finnish                      | No                  | RUG-III validation study completed and evaluation of MDS/RAI underway  |
| Czech Republic  | Czech                        | No                  | Results of a MDS/RAI study being used to inform policy development in long-term care   |

MDS, minimum data set for resident assessment and care screening; RUGs, resource utilization groups.

original and twice-translated versions to reduce ambiguities or incompatibility across the versions.) Thus, versions of the RAI exist in 14 languages (most recently Chinese) and it is being actively used in several nations.

Based on the experience of the European and Japanese investigators, the following observations can be made:

1. The RAI has been found to be reliable in several trials in several countries [28] and appears to be a

transportable instrument, irrespective of differences in local cultural habits and institutional settings;

2. The RAI is very well-accepted by care professionals in Europe who have been trained in its use and actually used it;

3. The RAI-associated resident classification system (RUGs-III) is also transportable, leading to satisfactory workload estimates across facilities and countries and their associated payment systems; and

4. The RAI offers a powerful common language across professionals of different disciplines, across institutions and across regions and countries.

These findings suggest the RAI can facilitate cross-national research and help identify potential for improvements in quality of care and greater system equity and efficiency. Widespread use of the RAI can also contribute to the development of valid process and outcome quality measures that will enhance the move to evidence-based health care.

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