

Encouraging Best Practice Nutrition and Hydration in Residential Aged Care

Final Report

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**Encouraging Best Practice in
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Main messages

This project supported the development and implementation of best practice nutrition and hydration practice in nine residential aged care facilities throughout NSW, using a Participatory Action Research approach. The project had a major impact on the way staff considered nutrition and hydration, their ability to seek and process information, and their willingness, confidence and capability to trial new approaches. A particular impact of the project was that it elevated the importance of nutrition and hydration as essential components of care, both at the facility level and at the organisation level. Change in nutrition care practice was achieved to some degree within all facilities, and in all but one facility, a favourable change or maintenance in resident nutrition markers was observed for at least 30% of residents.

There was a ripple effect within facilities whereby the project had its initial impact on staff directly involved in the project, then on other staff in the facility (as practices were rolled out and more staff were engaged), and ultimately on the food and nutrition received by residents. Further, some features of the project were adopted at the organisational level including training for catering staff and use of screening and monitoring protocols.

A primary recommendation arising from this project would be that aged care facilities are encouraged to consider ways in which they can improve their food service practices and improve nutrition and hydration in aged care by:

- Recognising nutrition and hydration as important parts of care.
- Recognising how the nutritional needs of older people differ from those of other adults.
- Developing a plan for improving nutrition and hydration that addresses local priorities and concerns and based on best practice, review of local data, and staff and residents' experiences.
- Seeking resident preferences regarding meals and meal schedules, and implementing changes that reflect these preferences.
- Monitoring plate waste using a simple plate waste tool, and monitor residents' weights to identify residents at risk of malnutrition, by recording regular and accurate weights.
- Responding to the needs of residents who are higher risk of malnutrition.
- Considering changes to staff rosters to allow better catering skill mix, and better support for residents at meal-times.
- Considering changes to the dining environment to create a more congenial atmosphere at meal-times.
- Considering using food moulds to create more appealing pureed meals.
- Considering programs for residents with high nutritional needs such as those with dementia.
- Considering training programs for staff, including catering staff.

To enable these practices, a Tool Kit was developed that accumulated the approaches, strategies and tools developed through the Participatory Action Research process, in consultation with facility staff. The tool kit provides information on how to plan for change within a facility, and also provides tools and strategies for screening and monitoring nutrition and hydration, for implementing changes. The kit is a resource which can be disseminated Australia wide to improve clinical practice in nutrition and hydration.

Executive summary

The purpose of this project was to enable best practice nutrition and hydration approaches described in the *Best Practice Food and Nutrition Manual for Aged Care Facilities* [1] to be implemented in nine residential aged care facilities throughout NSW. In this best practice approach to nutrition and hydration, staff were encouraged to be alert for factors that place residents at risk of poor nutrition and hydration, and to apply best practice approaches to support people at risk of malnutrition and/or dehydration. The ultimate goal was to improve nutrition and hydration and quality of life for the residents.

The project was successful in engaging all nine facilities in Participatory Action Research projects to identify and trial opportunities to improve nutrition and hydration among their residents, and positive outcomes were observed in most facilities.

The objectives of the project were:

- to detail the nutritional and hydration status of a cohort of residents in aged care facilities and to monitor the nutritional and hydration status and key outcomes (e.g. quality of life) of this cohort across a 32 week period;
- to apply Participatory Action Research methods to develop best practice in nutrition and hydration management, tailored to the needs of residents and characteristics of respective facilities;
- to identify key characteristics of context and evaluate the change processes associated with successful practice change and beneficial service user outcomes; and
- to develop an education package that could be distributed for implementation by other facilities across Australia, based on the approaches taken by facilities involved in this project to improve nutrition and hydration.

At each facility a nutrition team was established, comprising a nutrition champion and other staff members identified locally. Each team was supported and facilitated by three university-based practice development and nutrition advisors: two nurses and a dietitian. The Participatory Action Research approach at each site included resident consultation and regular meetings during which staff were encouraged to reflect on local practice with the aid of resident nutritional assessments, food satisfaction and plate waste surveys conducted by independent project dietitians. With the help of the advisors, facility staff identified topics and objectives for change and developed strategies to achieve these (The Nutrition Practice Development Plan). Project funding backfilled staff time and other resources required at each site: e.g. skills training, equipment, etc. The aims were to build capacity within each facility to identify the need and opportunities for change and to support the implementation of these changes, with the ultimate goal of improving nutrition and quality of life for residents.

From the start we placed a high value on sustainability of activities beyond the life of the project. To this end we purposively focused on the professional development of facility staff, and facilitated, supported, and resourced them to conduct all project activities, where feasible.

Evaluation was an integral part of the project and evaluation data were used to support development and implementation of best practice nutrition and hydration practice in each residential aged care facility involved in the project. The evaluation included impact and process evaluations, and utilised both quantitative and qualitative methodologies to assess:

- Processes involved in the best practice approach(es) chosen and implemented by staff;

- Changes effected in nutrition and hydration care processes; and
- Changes in the nutritional status of participating residents.

All facilities responded enthusiastically to the project and made an effort to review their current practices, respond to local evidence, and to develop plans for dealing with priority needs and opportunities within their context of care. However, well-developed plans were often stalled by staff absences or changes, emergent events such as influenza epidemics, or by other unforeseen circumstances. Consequently some facilities were not able to put their plans into full effect prior to the third assessment.

Despite these barriers and delays, it was clear that the project had a major impact on the way staff considered nutrition and hydration, their ability to seek and process information, and their willingness, confidence and capability to trial new approaches. It was also evident that there was a ripple effect whereby the project had its initial impact on staff involved in the nutrition meeting, then on other staff in the facility (as practices were rolled out and more staff were engaged), and ultimately on the food and nutrition received by residents.

Further, because the facilities belonged to two organisations, there was opportunity for communication between facilities and within organisational structures. As the project rolled out it became apparent that a number of facilities wanted to adopt and trial procedures developed by other facilities in the project. This influence allowed for tools and procedures developed during the project to be successively trialed and reinvented. Examples included the approaches to moulding pureed meals, the use of plate waste studies to assess expressed food preferences and resident intakes, and the use of the screening and monitoring pathway.

Some features of the project were adopted at the organisational level including training for catering staff and use of screening and monitoring protocols. Specific aspects of engagement and facility activities are detailed below.

Change in nutrition care practice was achieved to some degree within all facilities, and in all but one facility, a favourable change or maintenance in resident nutrition markers was observed for at least 30% of residents. Maintenance of nutrition status in this frail population should be seen as a positive outcome.

This project also achieved some major improvements for staff, by enhancing their knowledge and skills and supporting their access to and use of the best available evidence in their everyday practice. The project encouraged staff to use evidence and to seek local data to support the evidence. Feedback from the nutrition assessments encouraged staff to adopt and trial ways to continuously monitor resident's nutritional risk and to enact ways to maintain nutrition and hydration and to prevent weight loss (or encourage weight gain). As staff initiated their own monitoring plans they used these as a way to gather and collate evidence for individuals (indicating trends over time) and for the facility as a whole. Plate waste data and food services survey data pointed to opportunities to respond to residents preferences. Other forms of review included analysis of food handling, delivery of meals to residents, and the overall dining room experience. As changes were made, staff reflected on the impacts of these changes on the residents.

As the project evolved, a Tool Kit for Best Practice Nutrition and Hydration in Residential Aged Care was developed by the research team in consultation with facility staff. The purpose of the tool kit was to synthesise the strategies and tools used throughout the project, for ongoing use by facility staff. The tool kit not only provides information on how

to plan for change within a facility, but also provides tools and strategies for screening and monitoring nutrition and hydration, and for implementing changes. In addition, the tool kit contains a copy of the *Best Practice Food and Nutrition Manual for Aged Care Facilities* [1], a tape measure, and a 'nutrition and hydration champion' badge. The printed materials have been copied to a DVD for reproduction, and several instructional videos are also contained on the disc.

The project provides a huge amount of information for the improvement of nutrition and hydration in residential aged care, including that:

- facility staff and management are enthusiastic about improving nutrition and hydration in aged care.
- information about residents' preferences and plate waste can provide facilities with useful data to help in reviewing practices.
- a number of changes can be made to the way that food is prepared and presented, even in facilities where most food is provided by outside providers using cook-chill processes.
- facilities can consider moulding pureed meals and these moulding processes can be incorporated into catering practices.
- monitoring of residents' weights can be used within facilities to identify residents at risk, but facilities need a method to help them to undertake this systematically and accurately, and to respond to the needs of those residents who are higher risk.
- positive changes in some resident's nutrition and hydration can be achieved.

There were also some important learnings for the project team that we expect would be useful for others working with facilities to achieve practice change.

Overall, the project achieved impacts at the resident, staff and system levels. Considerable improvements in clinical care for residents were achieved, reflected in improved or maintained nutrition status for many residents across the life of the project. The project also achieved some major improvements for staff, by enhancing their knowledge and skills and supporting their access to and use of the best available evidence in their everyday practice.

The project went some way to achieving the overall aim of the Encouraging Best Practice in Residential Aged Care (EBPRAC) Program to improve evidence-based clinical care for aged care residents, and to enable nationally consistent application of clinical practice in residential aged care.

The Tool Kit for Best Practice Nutrition and Hydration in Residential aged care that arises from this project is a resource which can be disseminated Australia wide to improve clinical practice in nutrition and hydration.

Main Report

1 Introduction

1.1 Background

The problem of under-nutrition among older people

In Australia, malnutrition in older people is a common and important condition. Under-nutrition is of particular concern as it can result in poor quality of life [2-4], chronic disability, functional decline and poor clinical outcomes. Adverse clinical outcomes related to under-nutrition among older people include reduced cognitive function, reduced mobility [5-6], fractured neck of femur [7-9], pressure ulcers, impaired immune response and increased risk of infection [10], poor wound healing, and delayed recovery from illness [11,12]. There are also links between poor nutrition and increased health care utilisation, increased health care costs, and death [13-19].

Risks of malnutrition in aged care

Poor nutrition is a particular risk for people in residential aged care [20, 21]. However, while malnutrition is widely considered to be common among aged care residents, estimates of the prevalence of malnutrition among older people in residential care vary depending on the setting, the population, and on the measures used to assess nutrition. It has been estimated that up to 85% of residents are malnourished [22-24], however most reported prevalence estimates are in the range of 15% - 60% [25-27]. Analysis of data from a nationally representative sample of 15,566 nursing home residents in the USA, and using BMI under 18.5 as a marker for malnutrition, found mild malnutrition in 12% of residents, and severe malnutrition (BMI<16) in 27% [28]. Similar findings were reported in a recent Australian study of fourteen low care facilities, where 34% of participants were considered to be protein malnourished and 62% had deficits in energy intake [29].

Factors contributing to malnutrition among aged care residents

The risk of malnutrition among residents in aged care facilities is influenced by several factors [30]. Many of these factors relate to the person's age and to underlying conditions such as chronic illness and disability [31-34]. Compared to younger adults, older people generally consume less food due to lower metabolic rates, less physical activity, and reduced appetite [35]. As a result, older people generally have difficulty meeting the recommended daily allowance for energy and protein, and multivitamins and minerals [36]. Older peoples' risk of under-nutrition is further affected by chronic disease, reduced sense of taste, smell, reduced salivary flow, loss of teeth, chewing and swallowing problems [37-39], and changes to cognitive function which can alter eating habits and reduce food intakes [40, 41]. Medications used to treat these conditions can also contribute to malnutrition through reduced appetite, dry mouth, slower gastric emptying, constipation, and reduced nutrient absorption [30, 42]. Therapeutic diets (e.g. diabetic diets) and texture modified diets can also lead to malnutrition as they may not provide adequate energy and other nutrients for the person's needs [43].

What's more, while energy intakes tend to be lower among older people, many chronic conditions that are common among older people increase energy requirements (e.g. chronic obstructive lung disease, infection) further exacerbating the risk of malnutrition [30]. There are also changes in the physiological response of the stomach leading to early satiety and reduced appetite [44]. Moreover, many age-associated changes occur in the human body that may reduce absorption of nutrients in the food that is eaten [30].

Hydration

Similar factors also produce vulnerability to inadequate hydration in residents, which is the most common cause of fluid imbalance in older Australians. Poor hydration is clinically important because inadequate hydration is associated with many adverse consequences including poor oral health, poor skin integrity, constipation, urinary tract infection, and confusion. Poor hydration itself can also contribute to reduced food intake and malnutrition.

The importance of food services

While the older person's underlying state may predispose to malnutrition, food intake is the most important risk factor for malnutrition among older people in care [45]. In turn, food intake is greatly influenced by the facility's food services (including food quality, presentation and meal schedules), social aspects of eating, and appropriate assistance with eating [46-48].

Simple food service modifications, such as providing smaller more energy dense meals, providing more food earlier in the day, and providing more choices can promote better intakes and reduce plate waste [49-51]. Better food quality, presentation and temperatures also encourage higher intakes [45, 52, 53], and opportunities for varied dining occasions such as formal evenings, barbecues, milk shakes, ice-creams, cafes etc. may also promote food intakes by increasing social interaction and dining variety [54-57]. There are therefore significant opportunities for improving practices for better nutrition in residential aged care facilities.

Understanding resident's food preferences and presenting food they will enjoy and can eat also has potential to enhance residents' satisfaction with meals, their food intakes, and quality of life [58, 59]. Better communication between residents and catering staff has also been related to improved food satisfaction and intakes [60] and residents should be involved in planning menus and meal schedules [61].

Monitoring residents' nutrition

Assessment and monitoring of residents nutrition state is important as under-nutrition is often overlooked and mistakenly attributed to aspects of normal ageing [62]. A number of methods for screening and monitoring are available but close monitoring of body weight is the simplest and probably most reliable way to screen for malnutrition [30, 63-66]. Anthropometric indices such as mid-arm circumference can also be helpful indicators of malnutrition [67], and biochemical markers, such as serum albumin, predict mortality and other outcomes in older people. However there is no single marker that accurately measures nutritional status and these measures are not recommended for screening [30, 68-72].

A number of screening tools have been developed that are appropriate for use in aged care. The Malnutrition Screening Tool (MST) includes three questions about weight, appetite and weight loss and has been shown to relate well to more objective measures of nutrition [73, 74]. A similar instrument, the Malnutrition Universal Screening Tool (MUST) derives a score classifying nutritional risk as low, medium or high on the basis of BMI, history of unexplained weight loss and the effect of acute illness [75-77].

Responding to under-nutrition among residents in aged care facilities

Residents who are identified as malnourished or at risk of under-nutrition through screening and monitoring should receive appropriate nutritional support in order to gain or maintain weight and to prevent adverse outcomes [78-85]. Such support can be by encouraging residents to eat more and by increasing the nutrients in the food they eat by adding nutrient dense foods such as fat (butter, margarine), carbohydrate (extra sugar or honey) and protein boosters [86,87]. Snacks between meals are another way to increase intakes among older adults [11, 30, 88-91].

The main goal of nutritional support is to encourage residents to eat as many calories as possible to prevent further weight loss, regain weight, and prevent further loss of muscle mass [92]. Weight gain is of particular importance since it correlates with improvements in immune function, muscle function and functional independence [93].

Nutrition Standards for Aged Care Facilities

The *Standards for Aged Care Facilities, Standard 2.10* states that all residents receive adequate nourishment and hydration, and that policies and practices are to provide:

- Assessment, documentation and review of resident's nutrition and hydration needs.
- Availability of a varied, healthy and well-balanced diet that accounts for individual preferences.
- Provision of sufficient food and fluid to meet nutritional requirements
- Provision of assistive devices to enable residents to meet their nutrition and hydration needs.
- Assistance to maintain dietary customs in accordance with religious and cultural beliefs.
- Regular assessment of swallowing and provision of foods of appropriate texture.

Purpose of this Project

The purpose of this project was to enable best practice nutrition and hydration approaches to be implemented in residential aged care facilities to reduce the burden and impact of malnutrition and dehydration for residents. In this best practice approach to nutrition and hydration, staff were encouraged to be alert for factors that place residents at risk of poor nutrition and hydration, and to apply best practice approaches to support people at risk of malnutrition and/or dehydration.

The project arose through discussions with colleagues in Baptist Community Services (as part of an existing collaboration regarding research and evaluation for better clinical practice) and UnitingCare Ageing.

The objectives of the project were:

- to detail the nutritional and hydration status of a cohort of residents in aged care facilities and to monitor the nutritional and hydration status and key outcomes (e.g. quality of life) of this cohort across a 32 week period;
- to apply Participatory Action Research methods to develop best practice in nutrition and hydration management, tailored to the needs of residents and characteristics of respective facilities;
- to identify key characteristics of context and evaluate the change processes associated with successful practice change and beneficial service user outcomes; and;
- to develop an education package that could be distributed for implementation by other facilities across Australia, based on the approaches taken by facilities involved in this project to improve nutrition and hydration.

1.2 The nature of the change in practice

This project was designed to enable facilities to better implement practices described in the *Best Practice Food and Nutrition Manual for Aged Care Facilities* written by Bartl and Bunney and endorsed by the Australian Nursing Home and Extended Care Association (ANHECA) (now Aged Care Association Australia – ACCA) NSW [1]. This manual was first released in 2004. At the start of this project, this publication was the most comprehensive and user-friendly guide for nutrition and hydration management in the residential aged care setting. The manual was written for a sector that is not well researched (compared to other healthcare sectors) and the guidelines were derived from evidence ranging from research (often undertaken in other than aged care settings) through to expert opinion and consensus. Prepared by two dietitians who are widely recognised as experts in older person's nutrition, the guidelines were formatted to address the specific needs of residential aged care. Intended for a readership that has had less exposure than other healthcare sectors to now-standard guideline format (systematic search and literature review, hierarchies of evidence, explicit quality criteria and graded strengths of recommendations), the presentation of these guidelines was designed to be user-friendly to a broad spectrum of aged care staff.

In preparing for this project, we found that whilst most facilities were familiar with the manual, many of the recommendations were not part of everyday practice. The aim of this project was to build capacity within each of nine facilities to identify the need and opportunities for change in practice in accordance with recommendations in the manual and to support the implementation of these changes. The ultimate goal was to improve nutrition and quality of life for the residents.

The *Best Practice Food and Nutrition Manual for Aged Care Facilities* [1] includes ideas and information concerning:

- Resident assessment and monitoring of nutrition and hydration needs, food preferences and consumption.
- Maintaining and gaining weight.
- Menu planning to ensure continued food quality, variety and choice, and involving residents and/ or family.
- Nutritional requirements.
- Encouraging independence at meal times.
- Assessment of swallowing ability and provision of textured modified diets.
- Providing a comfortable dining environment and pleasant relaxed to improve appetite and food enjoyment.

- Coping with food-related behaviour that comes with dementia.
- Oral health.
- Physical activity.
- Food hygiene and safety.
- Correct food preparation equipment and maintenance.

A central goal of the project was to encourage aged care workers' uptake and implementation of best practice as described in the *Best Practice Food and Nutrition Manual for Aged Care Facilities* [1] that would promote residents' nutritional intake, prevent weight loss, prevent constipation and other adverse events, and add to the residents' enjoyment of food as part of their overall quality of life.

1.3 Context

This project supported the development and implementation of best practice nutrition and hydration practices in nine residential aged care facilities throughout NSW. These facilities are operated by either Baptist Community Services or UnitingCare Ageing in NSW, and this project was developed in collaboration with these two organisations. Selected facilities were located in Tamworth, Singleton, Bateau Bay, Baulkham Hills, Forster, Parkes, Point Clare, Bangor and Hamilton. The facilities varied according to geographical location with two facilities being in the Sydney metropolitan area, five being on the coast of NSW but outside of Sydney, and two being in rural centres (see Map).



Map of NSW showing location of facilities (highlighted in blue text)

The various contexts in which each facility operated was an important consideration in our project. Using the Participatory Action Research approach (see Section 2.2) we set out first to understand and highlight those contextual factors that might affect implementation of best practice approaches to nutrition and hydration. In our data, facilities were described as complex and diverse settings, employing staff from diverse cultural and linguistic backgrounds and with variable skill levels. Likewise, residents were culturally and ethnically diverse, and were seen to have different needs and expectations. An essential tension derived from facilities being simultaneously the residents' home, staff's workplace, and a business site.

Organisational and structural elements associated with facility business also affected responsiveness to this project. These elements included the legal and organisational framework within which facilities operated: for example, professional and food hygiene standards, staffing levels and turnover, resident dependency profiles, contracts and food suppliers. Many facilities did not have control over menus or food preparation, as these were determined and provided at a regional level. The need for staff to give priority to accreditation-related activities worked against the project in some instances (such as when facilities asked to postpone their involvement to avoid role overload) and worked for the project in other instances (such as when facilities saw the project as assisting them to meet accreditation requirements). Moreover, the new Aged Care Funding Instrument (ACFI) tool was implemented in the early stages of the project. This change entailed additional work for facility staff and limited their ability to engage with projects during the early stages.

Another important organisational feature was the responsibility for food services. Food and mealtimes were universally regarded as central to residents' lives and a priority area of care. However, the distributed nature of food service activities, with component parts contributed by catering, hospitality, managers and care staff, posed organisational hurdles. There was some evidence of conflicting values between the person-centred ethos of care and the business model. The food budget was emphasised by most managers, and catering and care staff were also keenly aware of how budget limitations affected their areas of work.

Physical features of the facilities were also important, and local building works had impact in some instances. The physical location of the facilities was particularly important for facilities in more rural and regional areas as they were further away from other providers, management and other services and supports.

2 Methods

2.1 Model for change / implementation

The project used Participatory Action Research as a means to support development of practice within the facilities in line with the *Best Practice Food and Nutrition Manual for Aged Care Facilities* [1]. The core elements of Participatory Action Research include theory-generation, problem-solving and the professional development of participants [94]. Participatory Action Research is a collaborative activity founded on partnership between researchers and participants in order to create change (in this case improvement of residents' nutrition and hydration). The research design is problem-focused, context-specific and future-orientated. The participatory process is intended to be educative and empowering, involving a dynamic approach in which problem identification, planning, action and evaluation are interlinked [95].

We underpinned this approach using an emerging framework for practice change, the Promoting Action on Research Implementation in Health Services (PARIHS) framework (Figure 1). Under this PARIHS framework, practice change is more likely when, ‘evidence is scientifically robust and matches professional consensus and patients’ (residents’) preferences (high evidence), the context is receptive to change with sympathetic cultures, strong leadership, and appropriate monitoring and feedback systems (high context), and when there is appropriate facilitation of change, with input from skilled external and internal facilitators (high facilitation)’ [96].

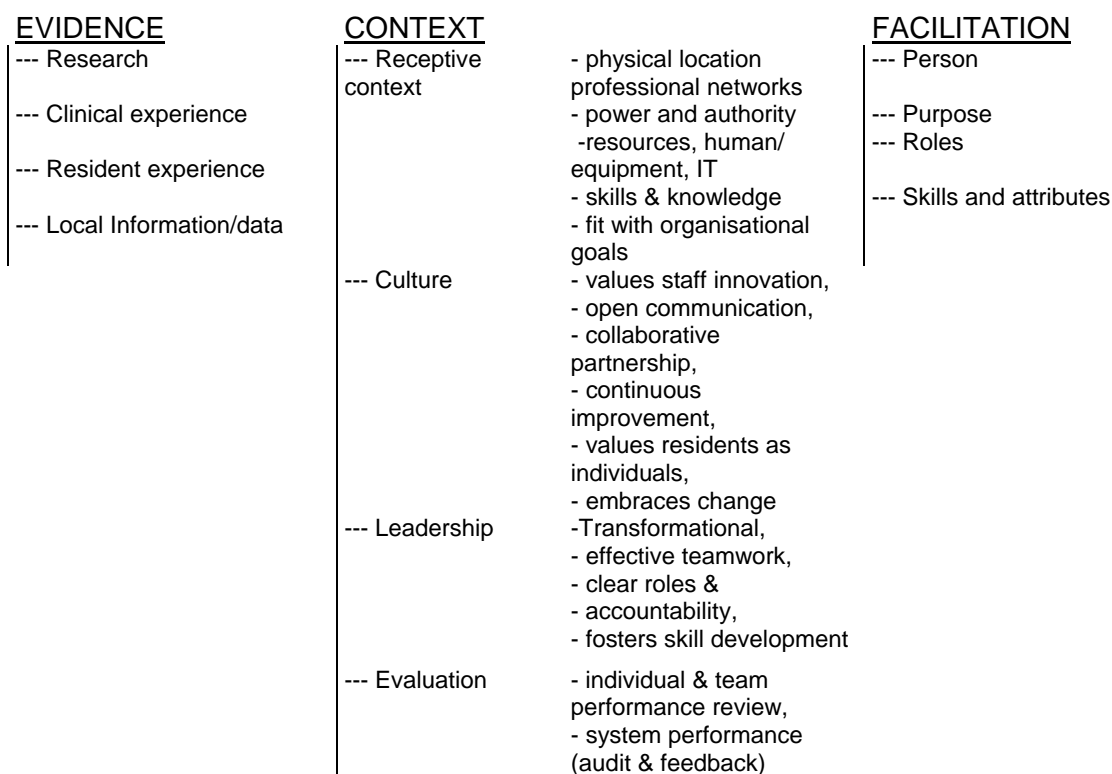


Figure 1: The PARIHS framework [96].

In practical terms, this means that our approach to practice development was one of:

- Working collaboratively with facilities to identify needs and opportunities for change,
- Working with facilities to develop and implement a plan for change,
- Helping facilities to monitor progress towards change, by undertaking evaluations and providing feedback,
- Helping and facilitating staff develop skills and confidence in assessing needs, planning and trialling interventions and evaluating their impact.

At each facility a nutrition team was established, comprising a nutrition champion and other staff members identified locally. Each team was supported and facilitated by three university-based practice development and nutrition advisors: two nurses and a dietitian.

The Participatory Action Research approach at each site included resident consultation and regular meetings during which staff were encouraged to reflect on local practice with the aid of resident nutritional assessments, food satisfaction and plate waste surveys conducted by independent project dietitians. With the help of the advisors, facility staff identified topics and objectives for change and developed strategies to achieve these (The Nutrition Practice Development Plan). Project funding backfilled staff time and other resources required at each site: e.g. skills training, equipment, etc. The aims were to build capacity within each facility to identify the need and opportunities for change and to support the implementation of these changes, with the ultimate goal of improving nutrition and quality of life for residents.

Each facility initiative was planned to be conducted over a 32-week timetable (although circumstances in some facilities meant that this timetable was extended in an attempt to accommodate the facility's needs). A nine-week lead time was included at the start of the timetable to allow facilities to be prepared for the practice development process (see Figure 2).

Week	Activities			
	Organisational	Assessment	Consultation	Nutrition Meetings and Practice Development
-9	<ul style="list-style-type: none"> Phone call to arrange meeting times and confirm champions and other staff involvement 			
-5	<ul style="list-style-type: none"> Start-up Meeting – to explain project procedures and provide project protocol 			
-2	Resident recruitment	Audit and Assessment training		
-1		Audit 1		
1	Recruitment of staff and residents for Focus Groups and Interviews	Assessment 1 Food Survey 1		
2				
3			Staff interviews 1 Resident Interviews and Focus Groups 1	Develop Nutrition Plan
4	Meal time observations (plate waste)			
5-11				Implement Nutrition Plan
12-14				Maintain Nutrition Plan
15-16		Assessments 2		
18-21				
22-25				
26-28		Audit 2 Assessments 3 Food Survey 2	Staff Interviews 2 Resident Interviews and Focus Groups 2	
29-32				

Figure 2: Practice Development Activities.

Facilities started at different time points from January 2008-January 2009 (See Figure 3 Schedule of Engagement of Facilities). This staggered approach to facility engagement allowed the project team to focus on a few facilities at once, to optimise support of practice development, and to allow the learning from each project to inform the next.

One facility served both as pilot facility at the start of the project (to help with the development of measures and methods) and as the final facility at the end of the project.

	2008											2009											
	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
1		Green	Red	Red																			
2					Green	Red	Red	Green	Red	Red	Red	Blue											
3					Green	Red	Red	Green	Red	Red	Red	Red	Blue										
4						Green	Red	Red	Green	Red	Red	Red	Blue										
5							Green	Red	Red	Red	Green	Red	Red	Blue									
6							Green	Red	Red	Red	Red	Green	Red	Red	Blue								
7										Green	Red	Red	Red	Green	Red	Red	Blue						
8												Green	Red	Red	Green	Red	Red	Blue					
9													Green	Red	Red	Green	Red	Red	Blue				
10														Green	Red	Red	Red	Red	Blue				
	Green	Assessment 1				Red	Active Phase				Green	Assessment 2				Blue	Assessment 3						

Figure 3: Schedule of Engagement of Facilities.

The overall process involved:

- Identification of champions within each facility. Champions were people who were enthusiastic about nutrition change and generally included senior nursing staff, usually working with more junior nursing or care staff. The champions were chosen to provide credible advocates for change and needed to have some authority (formal as well as informal) to see that changes were carried out.
- Interviews with key staff and residents to identify needs and opportunities for change.
- Assessment of residents' nutrition status to provide feedback to staff.
- Assessment of residents' food satisfaction and expressed preferences (plate waste) to provide feedback to staff.
- Review of menu plans.
- Nutrition meetings to discuss guidelines and evidence for best practice, the need and opportunities for change within the facility, priorities for change (selected guidelines and objectives), strategies and actions for change.
- Development of a Nutrition Practice Development Plan, including identification of objectives and how these relate to the *Best Practice Food and Nutrition Manual for Aged Care Facilities* and the required staff input and other resources.
- Nutrition advisor input into menu and food service changes and nursing advisor input into care and management practices.
- Ongoing liaison, monitoring and assistance with change.
- Sharing of strategies developed and trialled in other studies, locations and facilities.
- Development of educational packages and access to training opportunities.

From the start we placed a high value on sustainability of activities beyond the life of the project. To this end we purposively focused on the professional development of facility staff, and facilitated, supported, and resourced them to conduct all project activities, where feasible.

2.2 Stakeholder engagement

Participatory Action Research relies on effective partnerships between stakeholders. To assist these partnerships we used practice development approaches deriving from adult learning theories, social influence models, and marketing approaches. For example:

Adult Learning Theories: We situated everything we did in relation to practice at the facility. We framed our activities in terms of developing practice in line with resident and staff needs and wants, rather than in terms of abstract implementation of evidence. We pursued topics identified by staff themselves as important, and, where staff found this difficult to articulate, worked in ways designed to support staff to develop lines of reasoning to achieve this goal themselves, rather than supplied direction.

Social Influence Models: We actively sought to promote contact with exemplars of good practice, recognised as role models in the field. We used existing networks between clinicians to promote and support changes in practice, such as adoption of new ways to present modified meals, and use of validated assessment tools.

Marketing approaches: We used multiple approaches to 'sell' the worthwhile nature of engagement with this project, including appeals to:

- altruism (residents will benefit);
- self-interest (there will be fewer complaints to deal with; families will approve and support this);
- professionalism (implementation of current best evidence; quality improvement);
- rationalism (this activity will save time on other activities or consequences);
- facility-level benefit (this will help demonstrate adherence to Standard 2.10 at accreditation);
- job satisfaction (variety in individuals' daily work);
- hedonism (we took cakes).

We used brightly coloured posters and newsletters circulated widely to reach as broad a facility audience (including residents and families) as possible.

Organisational approaches: quality care was seen as dependent upon a cascade of inter-related actions that could be supported or hindered by the structures of the organisation itself and local features of the context of change. We used the Promoting Action on Research Implementation in Health Services (PARiHS) [96], with appropriate exploration of its utility within residential aged care settings, to guide identification of key areas to consider in developing our practice development strategies.

2.3 Partnerships

Participatory Action Research was chosen as the framework for the project because it is founded on development of partnerships between team members. Participatory Action Research does not see researchers and research participants as distinct and separate groups. This project was therefore seen as a joint initiative, between university team members and staff from each facility and organisation. We framed everything we did – from making meeting appointments through to delivering educational input – in terms of shared opportunities, and ensured we made it clear we were respectful and considerate of facility staff and residents as well as project requirements. We deliberately cultivated collaborative relationships during the early interview stage, providing a positive basis for the Nutrition Meetings. Our approach during meetings was to encourage, empower and support our facility co-workers. This was assisted by University team members spending considerable amounts of time with facility staff. The practice development and nutrition

advisors spent long periods of time at each site for staff interviews and Nutrition Meetings. Telephone and email contact was maintained between meetings. The assessment teams also spent weeks of time at each site and became, to some extent, an integral feature at the sites during the project.

Both university and facility staff came to the project with a high level of commitment and passion for the project, which assisted in development of mutual regard amongst team members, and resulted in nutrition meetings being enjoyable, friendly and interactive experiences for everyone.

2.4 Governance

The project was run out of the Research Centre for Gender, Health and Ageing (RCGHA) at the University of Newcastle (Directed by Professor Julie Byles). Professor Lin Perry, led the Participatory Action Research component of the project along with Dr Helen Bellchambers and Mr Andrew Howie and with additional nutritional advice provided by Professor Sandra Capra. Associate Professor Lynne Parkinson led the quantitative aspects of the project (nutrition assessment, quality of life, and food services surveys). Dr Annette Moxey provided overall project co-ordination and management, assisted by Ms Non Lavarro, Ms Elodie Sprenger and Ms Julie Brookes.

Nutrition assessments and plate waste studies were supervised by qualified dietitians Ms Nicole Murphy and Ms Gemma Courtney. They were also responsible for training and supervising the dietitian assessors.

Statistical analyses were undertaken by Mr Ian Robinson and Ms Lucy Galliene under the supervision of Mr Richard Gibson.

Qualitative analyses were conducted by Prof Lin Perry, Dr Helen Bellchambers and Dr Annette Moxey and Professor Julie Byles, assisted by Ms Elodie Sprenger.

Ms Carol Penning, Ms Kristin Smith, Ms Marilyn Goff, and Ms Emma Chesterfield provided liaison with the aged care organisations, and champions and representatives from each aged care facility provided liaison between university and facility staff. Each facility was seen to have its own independent project that complied to a Nutrition Practice Development Plan developed by the facility in collaboration with the project team.

Coordination of the project was achieved at weekly project meetings, held in RCGHA offices and involving the project team. Project teleconferences open to all stakeholders were also scheduled for each Monday at 2pm.

Project documents were posted on the University of Newcastle *BlackBoard* intranet.

2.5 Evaluation methods

Design and Setting

This project supported the development and implementation of best practice nutrition and hydration practice in nine residential aged care facilities throughout NSW. Facilities were nominated for involvement by their organisation (Baptist Community Services or UnitingCare Ageing). Selected facilities were sited in Tamworth, Singleton, Bateau Bay, Baulkham Hills, Forster, Parkes, Point Clare, Bangor and Hamilton. Commencement of the intervention was staggered, to allow the project team to focus on a few facilities at

once, optimise support of practice development, and apply learning from one facility to the next.

Ethical approval for the project was obtained from the University of Newcastle Human Research Ethics Committee (approval number H-2008-0025).

The evaluation included impact and process evaluations, and utilised both quantitative and qualitative methodologies. The evaluations aimed to assess:

- Processes involved in the best practice approach(es) chosen and implemented by staff;
- Changes effected in nutrition and hydration care processes; and
- Changes in the nutritional status of participating residents.

These processes were not discrete from the practice development approach and each facility was provided with feedback to assist staff in identifying needs and opportunities for change in nutrition and hydration care, to set priorities, to identify individual residents at-risk and areas of high need, and to monitor progress of change.

Processes involved in the best practice approach(es) and the changes effected in nutrition and hydration care processes were assessed using interviews with key facility staff, focus groups or individual interviews with residents, and from the proceedings of Nutrition Meetings (the main vehicle for practice development interactions between the university and facility staff). Residents were also asked to complete a food services survey. Each of these evaluation approaches are described below:

Interviews with key facility staff: Experienced qualitative researchers conducted semi-structured interviews with facility managers and key nursing staff, catering and other staff at each facility, concurrently with the first and final nutrition assessments (weeks 1-3 and 26-28 respectively). Interviews were with the same staff on both occasions to the extent that this was possible.

The interview schedule comprised open questions and prompts about the facility as a workplace, structural, procedural and cultural values and practices; mealtime and food-related activities. The schedule was developed during discussions between the University and facility staff.

Information from the initial interviews provided insight into the operation of each facility, its unique history, practices and characteristics, and the characteristics of the overall resident population. During the interview, staff were asked to identify nutrition and hydration problems they believed could be the focus of their intervention. This information was valuable for generating discussion in subsequent Nutrition Meetings.

Review interviews provided information on the process of introducing and implementing practice change at each facility and direct feedback about which strategies for change were perceived to have worked well – and which were less productive.

Focus Groups and/or Individual Interviews with Residents: Focus groups were conducted by experienced qualitative researchers at the same time as the first and last Nutrition Assessments. In instances where it was not possible to conduct a focus group, residents were interviewed individually. The second focus group or interview was with the same residents as the first if possible. The residents were asked to discuss the meals and meal times at the facility, with an emphasis on positive and

negative aspects of both. Information from the first focus groups provided feedback for discussion in Nutrition Meetings. Information from the second focus group or interview provided an indication of the impact of any practice changes on the residents.

Nutrition Meetings: Nutrition Meetings facilitated and provided support for change as well as a measure of the processes of change. Meetings were recorded and transcribed for in-depth qualitative analysis.

With their consent, staff and residents were interviewed in locations within the facilities that allowed privacy. Nutrition meetings were held in convenient locations within the facilities. Interviews and meetings were digitally recorded using an Olympus DS-50 digital voice recorder, and independently transcribed. Transcripts were checked against digital voice recordings. Transcripts were entered into NVivo 8 and analysed using a hybrid approach to qualitative methods of thematic analysis which involved a data-driven inductive approach [97].

Food Services Survey: An anonymous *Food Services Survey* based upon one developed by Wright et al [98] was offered to all hostel residents in each participating facility (Appendix 1). The administration of the *Food Services Survey* was coincident with the collection of data for nutrition assessments 1 and 3 (weeks 1-3 and 26-28 respectively).

Changes in the nutritional status of participating residents were assessed using composite nutrition assessments and audit of residents' notes.

Nutrition Assessments: Nutrition assessments were undertaken at three time points by a team of Nutrition Assessors. Time 1 (weeks 1-3) involved a full assessment conducted with a sample of up to 50 residents per facility or unit which included:

- Demographic information (gender, date of birth, country of birth, first language spoken, marital status).
- Malnutrition Screening Tool [73] – a brief nutrition screening tool which has been shown to have a high sensitivity and specificity for predicting Subjective Global Assessment, which is a reliable and valid indicator of nutritional status when performed by trained assessors.
- Subjective Global Assessment and Patient Generated Subjective Global Assessment (PG-SGA) [99] – The scored PG-SGA provides a continuous numerical score as well as providing a global rating of nutrition and demonstrates good reliability and concurrent and predictive validity [100].
- Anthropometric measures (knee height, weight, ulna length, mid arm circumference, body mass index (BMI), calf circumference, grip strength) which have previously been shown to be related to nutritional status in older people [101].
- Lean body mass (Bioelectrical Impedance)¹ – Maintaining lean body mass is associated with improved quality of life, and other health outcomes [102].
- Quality of life (DemQOL, and DemQOL Proxy) [103] was assessed at the time of the nutrition assessments. The DemQOL tool has recently been recommended for use in residential aged care settings [104] as it is suitable for people with dementia, is brief, and has been extensively validated [103].

¹ Participating residents who had either a pacemaker or defibrillator fitted were not eligible for this assessment. Ineligible residents were identified in a document signed by facility managers, before nutrition assessments commenced.

All are validated instruments and generally accepted in aged care as appropriate for assessing nutrition and quality of life. Data from the assessments at each facility were returned to the University and entered into the project data base. A summary of the statistical analyses of the residents' assessment data was presented to respective facility staff at subsequent Nutrition Meetings. This was part of the evidence that facility staff were asked to consider when deciding which aspects of their nutrition and hydration practice to change.

In weeks 15-16 of each facility's engagement with the project, the Nutrition Assessors returned to facilities and readministered the PG-SGA and DEMQoL with consenting participating residents. At this time, if there was attrition of previous resident participants, new residents were also invited to participate in the evaluation. The assessment was kept deliberately minimal at this point, to reduce response burden for residents.

The full nutrition assessment was then repeated in weeks 26-28 of each facility's engagement with the project. The series of assessments provides a measure of any change in residents' nutrition status over each facility's engagement with the project.

The results of the nutrition assessments were also provided to facility staff and discussed at the Nutrition Meetings. This feedback allowed identification of residents at risk and provided on-going review of the progress of practice change.

Audit of residents' notes: The audit was undertaken by (one or two) facility staff who were identified by facility managers as experienced and qualified to do so. Training in auditing techniques was provided in person on site by the university team members. Staff completed audits over the two or three weeks following training. The audit included items about admission date, RCS/ACFI level, nutrition care, relevant co-morbidities, and mental health.

Completed audits were returned to the university. Audit data were then entered into the project data base. The audit data are used to provide basic background and clinical data for residents involved in the evaluation and also to check current and changing practices of nutrition assessment and support (in accordance with the nutrition guidelines).

Plate Waste Studies

The plate waste studies provided insight into the patterns of resident food and drink consumption. Nutrition Assessors recorded the amount of food left on the resident's plate after they had finished eating their meal. Breakfast, lunch, dinner, morning and afternoon tea and supper were observed over a 24 hour period. In instances where there was not a structured time for supper, facility staff recorded any items consumed by residents during the night.

The plate waste studies were undertaken at the suggestion of participating facilities as part of their Nutrition Practice Development Plans. The studies were primarily used to inform the facilities as to food preferences and possible changes to menu options and servings, as well as the adequacy of nutritional intake for individual residents (see Section 3.1 below). However the data also provided useful insight into the residents' expressed preferences and nutritional intakes.

3 Results

3.1 Process

All facilities responded enthusiastically to the project and made an effort to review their current practices, respond to local evidence, and to develop plans for dealing with priority needs and opportunities within their context of care. The extent to which these plans were able to be operationalised within the project time frame did vary across facilities. On many occasions, well developed plans were stalled by staff absences or changes, emergent events such as influenza or other infectious epidemics, or by other unforeseen circumstances. Consequently some facilities were not able to put their plans into full effect prior to the third assessment. This effect can be seen in the activity timelines for each facility (Appendix 2) where many activities were initiated toward the end of the 32 week plan.

Despite these barriers and delays, it was clear that the project had a major impact on the way staff considered nutrition and hydration, their ability to seek and process information, and their willingness, confidence and capability to trial new approaches. It was also evident that there was a ripple effect whereby the project had its initial impact on staff involved in the nutrition meeting, then on other staff in the facility (as practices were rolled out and more staff were engaged), and ultimately on the food and nutrition received by residents.

Further, because the facilities belonged to two organisations, there was opportunity for communication between facilities and within organisational structures. As the project rolled out it became apparent that a number of facilities wanted to adopt and trial procedures developed by other facilities in the project. This influence allowed for tools and procedures developed during the project to be successively trialled and reinvented. Examples included the approaches to moulding pureed meals, the use of plate waste studies to assess expressed food preferences and resident intakes, and the use of the screening and monitoring pathway.

Some features of the project were adopted at the organisational level including training for catering staff and use of screening and monitoring protocols. Specific aspects of engagement and facility activities are detailed below.

Facility engagement

Overall there was very high engagement by facilities. Attendance at nutrition meetings provides one marker of facility engagement and is depicted in Figure 4 (attendance at one or more nutrition meetings) and in Table 1.

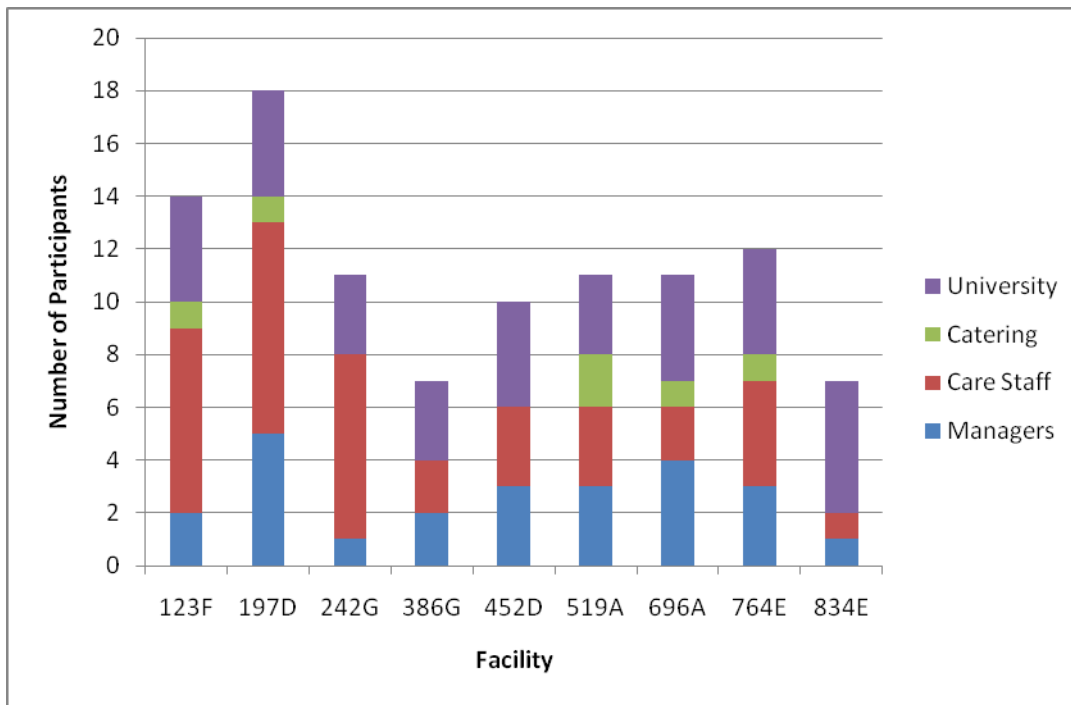


Figure 4: Numbers of university, facility catering, care and management staff who attended at least one nutrition meeting for each facility (named individuals).

Attendance patterns of staff groups varied across facilities, and this was not entirely a reflection of the needs of individual project topics. One of the factors which appeared to influence staff involvement in the project team was a feature of the business model of the individual facility, with observed variation in the degrees to which food service, clinical care and facility management processes worked together to plan and implement changes.

This organisational climate influenced the model of teamwork that key facility staff operated from, and their approach to development and implementation of any project activities that crossed these three areas.

Table 1: Numbers of university, catering, care and facility management staff who attended each nutrition meeting (NM) for each facility.

Nutrition Meeting	Attendees	123F	197D	242G	386G	452D	519A	696A	764E	834E
NM1	Managers	2	2	0	2	3	3	4	2	1
	Care Staff*	4	5	6	1	2	2	2	0	1
	Catering	1	0	0	0	0	0	1	0	0
	University	1	3	3	3	4	3	4	3	4
NM2	Managers	1	1	1	1	1	1	3	2	1
	Care Staff*	3	1	1	2	0	1	1	3	1
	Catering	0	1	0	0	0	1	0	0	0
	NM2uni	3	3	3	2	2	3	1	3	4
NM3	Managers	1	2	0	1	2	1	3	2	1
	Care Staff*	2	2	1	0	0	1	2	1	1
	Catering	0	1	0	0	0	2	1	1	0
	University	2	2	2	2	3	1	2	1	4
NM4	Managers	1	1	0	1	2	2	2	1	1
	Care Staff*	0	2	2	0	2	0	2	2	1
	Catering	0	1	0	0	0	1	1	0	0
	University	2	2	3	2	2	3	2	3	4
NM5	Managers	1	3	1	1	1		2	2	1
	Care Staff*	1	3	1	0	0		1	0	1
	Catering	0	1	0	0	0		1	0	0
	University	2	4	1	2	2		2	2	2
NM6	Managers		3			2		2	1	1
	Care Staff*		2			2		1	1	1
	Catering		1			0		1	0	0
	University		3			2		1	2	3
NM7	Managers									1
	Care Staff*									1
	Catering									0
	University									3

* Care staff includes nurses, activity officers and educators

Facility Activities

Each facility identified a particular focus for the project in their area. It was neither reasonable nor feasible to expect facilities to review and address practice in all the areas covered by the *Best Practice Food and Nutrition Manual for Aged Care Facilities*. The information included in this manual is very broad-ranging, of necessity covering all aspects of nutrition and hydration within residential aged care facilities, from assessment of residents through to menu planning, food hygiene and waste disposal. Many of these areas are covered by regulatory frameworks (e.g. HACCP – Hazard Analysis and Critical Control Points), or had recently been reviewed and upgraded in-house anyway. Further, use of Participatory Action Research as the practice development and capacity building framework of the project meant that topic choice had to lie with facility staff. It was therefore a necessary feature of this project that each facility chose one or more topics that was a priority for them.

Specific activities adopted by facilities included:

Focusing on resident preferences, nutritional quality and sensory experience of food:

1. Review of menus and plate wastage in light of resident preferences (as indicated through food surveys and resident interviews) and nutritional content. This was not regarded as a discrete activity but rather as an ongoing process.
2. Changes to type and manner of meal items provided, to enhance quality of food and resident sensory experience, e.g. use of breadmakers and soup tureens to allow 'cooked on site' options.
3. Changes to staff rosters to provide better catering skill mix across all three main meals of the day.
4. Changes to the dining room environment to enhance the pleasurable experience of dining, including a) establishment of a 'café-type' ambiance, and b) looking at current café provision, its staffing and uses.
5. Changes to the preparation of pureed meals, including exploring the use of puree moulds to improve the look and texture of pureed meals, and to improve meal 'cueing'.
6. A focus on needs and preferences of residents living with dementia, with a particular consideration of the role of food as both sensory experience and part of overall behavioural management strategies.
7. The use of coloured plates to help visually impaired residents with their meals, and square plates to help identify those residents whose food intake requires close attention.
8. The use of insulated mugs and bowls to help regulate food temperatures.

Focusing on risk assessment and care planning:

1. Nutrition assessment results were discussed with staff as part of the nutrition meetings.
2. Working together, university and facility staff members developed and trialled a draft nutritional risk screening, planning and monitoring protocol that can be used by facility staff as part of routine care. This chart links to a food and dietary supplementation pathway developed by the university dietitians.
3. Purchase of equipment to assist with accurate anthropometric assessment.

Focusing on residents identified as 'high risk' for malnutrition:

1. Working together, university and facility staff members developed and trialled a pathway for food and dietary supplementation for residents identified as at high nutritional risk. The tool includes a list of food items, with energy exchange values. Staff used this list to identify resident preferences for food supplement items and appropriate times to supply supplement items within the day. The tool also provides staff with a recording system and an evaluation framework to track effects on resident dietary intake and weight.

2. Two facilities focussed on needs and preferences of residents living with dementia, with a particular consideration of the role of food nutritional quality and mode of presentation in terms of promotion of independence, health and well-being. This approach encompassed elements of environment and staff education and training as well as food content and presentation (e.g. Use of nutrient-dense, easy to consume items (“finger foods”) and elimination of items high in colourings and preservatives for residents with dementia, particularly those exhibiting behaviours of concern).

Focusing on staff knowledge and skills:

1. Discussion with key facility staff members, and in one facility, use of video taped footage of food preparation processes, enabled review of food production, delivery and serving processes, with accompanying identification of areas of staff knowledge and skill deficit. Given the geographical spread of facilities, we worked with facilities to identify local providers able to supply training for facilities on an on-going basis.
2. Visits to Lottie Stewart facility to see pureed food moulding system in operation and learn: a) how this system may be incorporated within existing food service systems; and b) how this technique can be used to enhance resident sensory food experience as well as improve dietary intake both quantitatively and qualitatively.
At four facilities, staff explored how moulded puree meals would fit into the facility’s food service systems and whether or not the kitchen had the appropriate equipment. In one facility, staff were able to work out a system to undertake moulding of puree food using current equipment and staffing. Moulded puree meals were trialled with residents and facilities have food moulds on order.
3. Purchase of breadmakers and training of recreational activity officer in the use of this equipment to make bread, and to enable the recreational activity officer to teach and supervise residents’ involvement in this activity.
4. Skills and tools to organise and run a food taste-testing session, and evaluate resident preferences of food items sampled.
5. Training in the use of video recording as an adjunct to process mapping food preparation and delivery systems.
6. Training in use of the Malnutrition Universal Screening Tool (MUST) and other ways to identify and score residents according to their degree of risk of malnutrition.
7. Development of and training in the use of a screening, monitoring and food supplementation decision aid flow chart to identify residents who would benefit from food supplementation, plan and monitor effects of an appropriate nutritional supplementation program. This has entailed learning about standardised ways to conduct anthropometric assessments and about energy content of supplementary food items.
8. Workshops for care and catering staff, to cover:
 - Aged Care Standards: Nutrition and hydration; Oral and dental care
 - Customer service in aged care
 - Nutritional needs of the resident
 - Presentation and making meals palatable.

Other training for catering staff including Certificate III course in hospitality arranged by one organisation.

9. A Tool Kit was developed that accumulated the approaches, strategies and tools developed through the Participatory Action Research process (see Section 3.2).

A list of activities adopted by the facilities, and the guidelines on which they are based is provided in Appendix 3.

Organisational level activities

One organisation has set up an in-house Certificate III level module in hospitality.

The second organisation has adopted the principles and draft version of the screening, monitoring and food supplementation flowchart developed as part of this project. The flow chart will be reviewed at organisational level, with a view to incorporating the procedure and tools into organisational policy and training processes.

Facilities and organisations are to provide further updates on developments since the final Nutrition Meeting at each site at the “mini-conference” to be held in Newcastle in November 2009 (see Section 3.4 Dissemination).

Challenges to practice change

- 1. Multiple and frequent changes of key staff members at facilities.** This challenge slowed progress of projects and meant that projects could not always adhere to the 32 week timetable. A further consequence was that, because changes were slow to be effected, it is possible that full impact of the changes may not be apparent within the evaluation time frame.
- 2. Not all key staff attended nutrition meetings in all facilities.** Engagement with some key staff such as catering managers was important for influencing change in the facilities. We encouraged facilities to include these staff in their teams wherever possible.
- 3. The project presented opportunities for staff professional development, which entailed an unfamiliar way of working for most facility staff.** Participatory Action Research as a practice development framework offered staff opportunities to develop skills in problem identification and problem solving and gave them a means to initiate, integrate and implement changes in their local working practices. Facility staff varied in the speed and scope of response to this opportunity.
- 4. Staff shortages.** In theory, facilities have a pool of casual staff which they use to cover sickness etc. and who could be available to backfill staff for project work. However, many facilities were already making maximal use of these flexible workers as well as any additional shifts for which their staff were available, just to provide daily establishment staffing levels. Thus, while the project was able to provide funding to backfill staff for project activities, this was not always possible.
- 5. Many ‘frontline’ facility staff have limited knowledge of principles and practices of nutrition and hydration issues affecting residents.** This was a particular challenge in relation to identifying nutritional needs, accommodating social aspects of eating, and ‘on the spot’ problem-solving for residents with complex needs. The project identified a need for staff training in these particular aspects of nutrition and worked with each facility to identify specific training needs and means to address these.
- 6. Facility staff not directly involved in the project unaware of the purpose of the Nutrition Assessments** - despite posters promoting the project and the involvement of key staff members.
- 7. Turn around of assessment data analysis in time for facility staff to account for it in their nutrition planning.** University research staff members were not used to providing data for fast feedback to facilities. Project processes had to be revised, and University staff had to be trained to achieve this outcome.

- 8. Delays in ordering and obtaining equipment** - in particular, puree food moulds that needed to be sourced from the United States.

Challenges to evaluation

- 1. Conducting project across multiple and geographically distant facilities** – the tyranny of distance combined with the complexities of working with multiple sites.
- 2. Difficulties contacting some facilities and difficulties obtaining complete and timely data.** Information was difficult to obtain in some cases. This challenge was often related to staffing changes and staff availability. There were also difficulties communicating with key staff members regularly rostered with night shifts and/or without email access.
- 3. Staff illness within the university team.** Data collection and feedback timeframes were challenged when Nutrition Assessors and data entry personnel were ill or otherwise absent.

3.2 New Resources Developed

An educational tool kit was developed by the research team in consultation with facility staff. The purpose of the tool kit was to synthesise the strategies and tools used throughout the project, for ongoing use by facility staff. The tool kit not only provides information on how to plan for change within a facility, but also provides tools and strategies for screening and monitoring nutrition and hydration, and for implementing changes. In addition, the tool kit contains a copy of the *Best Practice Food and Nutrition Manual for Aged Care Facilities* [1], a tape measure, and a 'nutrition and hydration champion' badge. The printed materials have been copied to a DVD for reproduction, and several instructional videos are also contained on the disc. Costs of the materials are provided in Table 2, below. The contents of the tool kit are summarised in Table 3 (over page), and a copy of the materials will be provided with this report.

Table 2: Costs of tool kit components.

Item	Approximate Cost
Printing of materials	\$3,600
Boxes	\$11 ea
Tape measures	\$30 ea
Manuals	\$25 ea
Badges	\$12 ea
DVD production (incl. discs and instructional videos) – one off fixed cost	\$14,000

Table 3: Implementing Best Practice Nutrition and Hydration Support in Residential Aged Care Tool Kit.

Introductory materials

(Booklet 1) Toolkit: Introductory Materials
(Information Sheet 1) Busting the myths about nutrition and hydration in RAC
(Letter 1) An open letter for dietitians
(Table 1) Links from Tool Kit to Guidelines

Screening and assessing nutrition needs

(Information Sheet 2) Screening residents' nutritional risk
(Information Sheet 3) Nutrition screening tools
(Chart 1) Resident monthly weight chart
(Tool 1) BMI table
(Tool 2) Nutrition screening flowchart
(Tool 3) Snack food suggestions
(Chart 2) Snack food suggestions chart
(Chart 3) Action plan
Example Case study

Accurate Measurement

(Information Sheet 4) How to measure weight accurately
(Information Sheet 5) How to measure ulna length / height
(Information Sheet 6) Metal tape measures
(DVD 1) *Measuring weight*
(DVD2) *Measuring ulna length / height*

Medicare Allied Health

(Information Sheet 7) Allied health Medicare rebates
(Tool 4) Medicare items for allied health services for people with chronic conditions and complex care needs
(Tool 5) Enhanced Primary Care (EPC) Program referral form
(Information Sheet 8) Accredited Practising Dietitian

Food options and preferences

(Information Sheet 9) Food tasting sessions
(Information Sheet 10) Cook on-site options
(Information Sheet 11) Resident food surveys
(Chart 4) Resident food survey
(Information Sheet 12) Recipe book

Plate waste

(Information Sheet 13) Plate waste
(Chart 5) Plate waste chart
(Chart 6) Plate waste graph
(Chart 7) Energy intake calculator
Examples:

- Plate waste Case Study
- Plate waste graph
- Energy intake calculator

Food quality

(Information Sheet 14) Energy-dense snacks
(Information Sheet 15) Food temperatures
(Information Sheet 16) Taste fatigue
(Information Sheet 17) Improving Pureed meals
(DVD3) *Pureed meals*
(Information Sheet 18) Food quality

Broadening the sensory experience

(Information Sheet 19) The dining room experience
(Information Sheet 20) Nutrition and hydration for residents with 'behaviours of concern'

Additional Resources

Pureed meals poster
Introductory poster
The Practice Food and Nutrition Manual for Aged Care Facilities
Tape Measure
Nutrition and Hydration Champion badge

3.3 Impact

3.3.1 Impact on the use of evidence

At the start of the project, few facility staff made overt use of evidence to aid planning and decision making. While some staff did identify evidence as a foundation of care, these were the exception. Where evidence was used in decision-making it was mostly in the form of guidelines from a credible source, rather than original scientific research. Some staff had been involved in practice development activities and recognised the importance of evaluation in encouraging the involvement of other staff. In such cases, the worth of any change rested on how it was experienced in practice, how it was applied and what it was seen to achieve, rather than its scientific merit.

For the most part, staff's clinical experience and intuition were the key sources of information. On-the-job daily experience enabled close knowledge of the residents as individuals, providing a knowledge store which meant that staff felt they just knew what to do: 'I see them every day, 5 days a week, so you think you tend to know'. For some, the focus was on the preferences of the individual resident, on ensuring individual preferences were met with the broad aim: 'to better accommodate an individual's need around food, what they like to eat, what satisfies them'. Resident and family complaints were a respected form of feedback, but were often reported in relation to aspects over which staff perceived little control, principally in relation to the effect of food hygiene regulations in relation to availability and storage of particular food items. Local quality audits were conducted by both organisations, but the results were seldom referred to. One manager recounted her experience from a previous facility where a film had been made of care practices and showed to care staff. She reported that staff found visual representation of local practice a powerful driver of change.

As the project progressed, the use of evidence and of local data to support the evidence became more common place. Feedback from the nutrition assessments was an integral part of the project and encouraged staff to adopt and trial ways to continuously monitor residents' nutritional risk, to enact ways to maintain nutrition and hydration, and to prevent weight loss (or encourage weight gain). As staff initiated their own monitoring plans they used these as a way to gather and collate evidence for individuals (indicating trends over time) and for the facility as a whole. Plate waste data and food services survey data pointed to opportunities to respond to residents' preferences. Other forms of review included analysis of food handling, delivery of meals to residents, and the overall dining room experience. As changes were made staff reflected on the impacts of these changes on the residents. For instance one facility made a number of small but important changes to the dining room, to make it a more relaxed and friendly atmosphere. The subsequent evaluation noted that residents were more congenial and interactive, and that more residents were choosing to attend the dining room for meals.

Use of Best Practice

Nutrition Practice Development Plans were developed by each facility as part of the Participatory Action Research process. These Nutrition Practice Development Plans highlighted those issues identified as priority needs and opportunities for each facility, the planned activities, and how these changes related to the *Best Practice Food and Nutrition Manual for Aged Care Facilities*. A summary of Nutrition Practice Development Plans is provided as Appendix 3.

3.3.2 Impact on residents

The impact of the project on residents was assessed in a number of ways:

- Nutrition assessments
- Quality of Life Assessments
- Food Services Surveys
- Plate waste studies
- Resident interviews and focus groups

Nutrition Assessments

Nutrition assessments were undertaken at the start of the project and repeated at the middle and end of the 32 week plan. These assessments provided feedback to staff as to the nutrition needs of individual residents as well as providing an overall assessment of changes in resident nutrition at the facility level. The assessments included:

- Demographic information
- Malnutrition Screening Tool [73]
- Patient Generated Subjective Global Assessment (PG-SGA) [99]
- Anthropometry (knee height, weight, ulna length, mid arm circumference, body mass index (BMI), calf circumference)
- Lean body mass (Bioelectrical Impedance)
- Grip Strength

Full details of the results of these assessments are provided in Appendix 4, and a summary of the main findings is provided below.

Table 4 provides results of the baseline assessments for the nine facilities. The profiles for these facilities indicate that up to 15% of residents could be considered to be severely malnourished and 20%-60% of residents could be mildly malnourished (depending on the facility, the selection of residents, and/or the measure used). In many cases this malnutrition may be due to the resident's underlying physiological state, and may not be amenable to improvement. These data were provided to respective facilities to stimulate discussion and identify opportunities for improvements where these might be achieved. The improvements were not only to address malnutrition, but also to maintain good nutrition in those residents who might otherwise be at risk of developing poor nutrition.

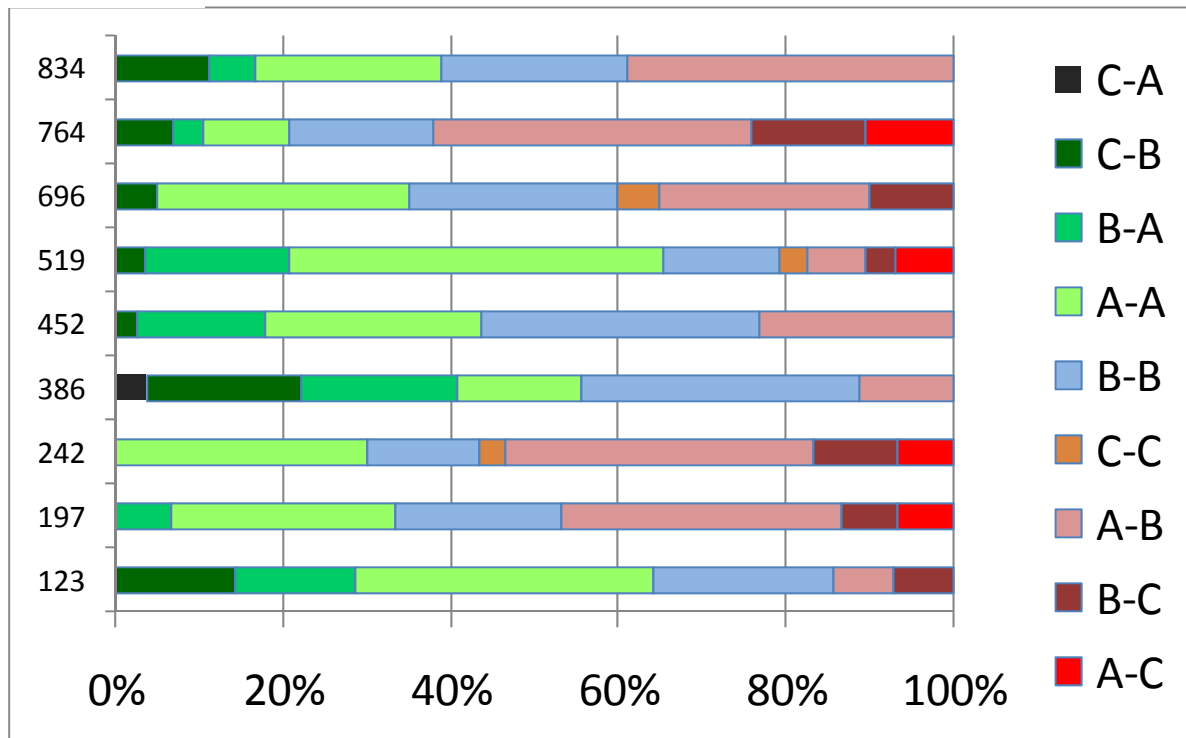
Figure 5 (and Tables 4.4a-i in Appendix 4) shows within resident change in SGA categories for each facility. Bars to the left of the graph indicate a favourable change in SGA category (e.g. C-B, B-A) or maintenance of a favourable SGA category (A-A). In most facilities, a favourable change or maintenance was observed for at least 30% of residents (except facility 764E) with the greatest favourable change being seen for facilities 123F and 519A. Bars on the right of the graph show an unfavourable change in SGA (A-C, B-C, A-B) or maintenance of poor nutrition (C-C). The greatest unfavourable change was seen for facilities 764E and 242G, but these data need to be considered in relation to broader indices of resident health and wellbeing. Where residents died or were unable to be included in the follow-up (d/m), it is not possible to classify the change in their nutrition as favourable or unfavourable.

Table 4: Baseline Nutrition Assessment profiles for nine facilities using the Malnutrition Screening Tool (MST), Subjective Global Assessment (SGA) categories and Patient Generated Subjective Global Assessment (PG-SGA) scores.

Measures	Category	Facility								
		123F	197D	242G	386G	452D	519A	696A	764E	834E
MST category (%)*	0-1 (Well nourished)	71%	55%	53%	83%	66%	61%	57%	34%	84%
	2-5 (Malnourished)	29%	45%	44%	17%	32%	32%	43%	59%	16%
	6 or above (Severely malnourished)	0%	0%	0%	0%	0%	0%	0%	0%	0%
Patient Generated Subjective Global Assessment (PG-SGA)	Mean	7	6	3.5	6.7	5.6	7.2	6.5	7.5	5.7
	Median	6	5.5	3	6	5	6	6	6	5.5
SGA category (%)*	A (Good nutrition)	38%	55%	78%	22%	47%	66%	54%	43%	63%
	B (Moderate malnutrition)	52%	45%	19%	61%	51%	27%	32%	50%	26%
	C (Severe malnutrition)	10%	0%	3%	17%	2%	7%	14%	7%	11%

* Percentages may be imprecise due to small numbers and incomplete assessments

Facility ID No.



Dead or missing at A3 excluded from percentages. Numbers Dead or missing at A3 for each facility are: Facility 123F = 4; 197D=5; 242G=4; 386G=7; 452D=6; 519A=10; 696A=7; 764E=12; 834E=0 dead or missing at A3

Figure 5: Within resident change in SGA categories for each facility.

Figure 6 shows the within resident change in PG-SGA scores for one facility (Figures 4.3a-i in Appendix 4 shows the within resident change in PG-SGA scores for each facility). In each plot, the red line shows the mean change in scores from Assessment 1 – Assessment 3 in each facility. The blue lines show zero change, and green lines show +/- 2 standard deviations of the mean change. The line below the graph shows the Assessment 1 PG-SGA for residents who died or otherwise could not be included at Assessment 3. Different symbols represent where the resident was living at Assessment 1 (nursing home NH, hostel, or dementia specific unit DSU). A change above the zero line indicates a positive change and a change below the zero line indicates a negative change in PG-SGA. A change of +/-5 was considered to be clinically significant by the expert dietitians on the research team. Note that a change in PG-SGA scores can occur without a change in the SGA category, and would indicate a change in nutrition-related symptoms without a change in nutrition status.

Most facilities show a mean change in PG-SGA scores that is close to zero. Some individuals show large changes in PG-SGA potentially indicating a significant change in their symptoms (although the statistical phenomenon of regression to the mean remains a possible alternative explanation).

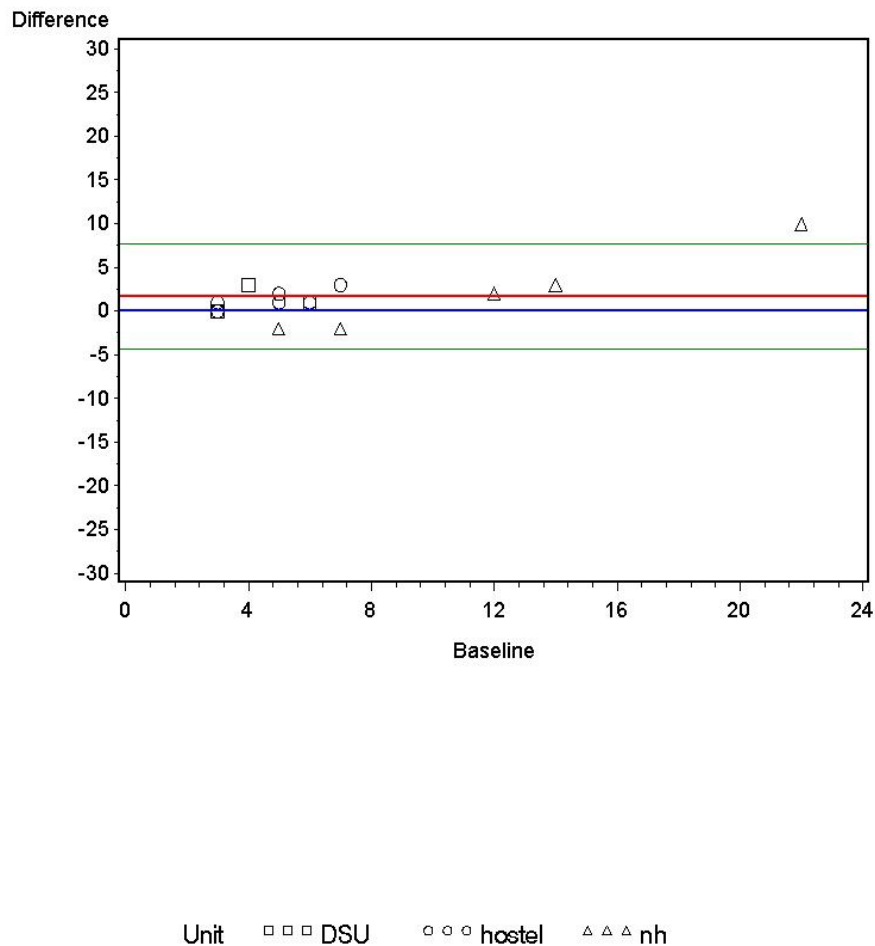


Figure 6: Within resident change in PG-SGA scores for each facility.
 'Bland-Altman' style plot for PGS comparing measurements for Assessments 1 and 3 (Diff = A1 – A3; positive values correspond to improved nutritional status) – Facility 123F

In order to gain an overall picture of the change in nutrition categories (SGA) and scores (PG-SGA) we created an overall point scoring system where residents were awarded:

- +2 points for SGA C-A (improved nutrition)
- +1 point for SGA C-B (improved nutrition)
- +1 point for SGA B-A (improved nutrition)
- +1 point for SGA A-A (maintained good nutrition)
- 0 points for SGA B-B (maintained mild malnutrition)
- -1 point for SGA C-C (maintained poor nutrition)
- -1 point for SGA B-C (worsening nutrition)
- -1 point for SGA A-B (worsening nutrition)
- -2 points for SGA A-C (worsening nutrition)
- +3 points for PG-SGA ≥ 15 (improved nutrition symptoms)
- +2 points for positive change in PG-SGA 10-14 (improved nutrition symptoms)
- +1 point for positive change in PG-SGA 5-9 (improved nutrition symptoms)
- 0 points for no change in PG-SGA
- -1 point for negative change in PG-SGA 5-9 (worse nutrition symptoms)
- -2 points for negative change in PG-SGA 10-14 (worse nutrition symptoms)
- -3 points for negative change in PG-SGA ≥ 15

The results of this scoring system are shown in Figure 7 and Table 5. Grey bars to the extreme left of each set in Figure 7 indicate residents who died or otherwise could not be assessed at Assessment 3. Yellow bars indicate a score of 0 (no change in nutrition status). Bars to the right of the yellow bars in each set indicate a positive change in nutrition category or PG-SGA scores. It should be noted that a zero change is not an undesirable outcome among this frail resident population who are at high risk of declining nutrition.

Five facilities showed a small positive change on these change scores, and one facility showed a change that was close to zero. Three facilities showed a small negative change. Facilities 123F, 386G, and 519A showed the greatest positive change. Facilities 242G and 764E showed the greatest negative change.

There were few differences on anthropometric measures (see Appendix 4 for full details). There were no significant differences in Body Mass Index (BMI) scores between facilities, between units within facilities or between Assessment 1 and Assessment 3. Highest mean BMI of 31.9 was recorded for the Dementia Specific Unit (DSU) of Facility 386G (1 resident), and the lowest mean BMI of 18.0 was recorded for the Nursing Home (NH) in Facility 764E. In most units the mean BMI was around 25 or lower, which is lower than desired in a frail aged population.

Figure 7: Change Scores for changes in SGA and PG-SGA for each facility.

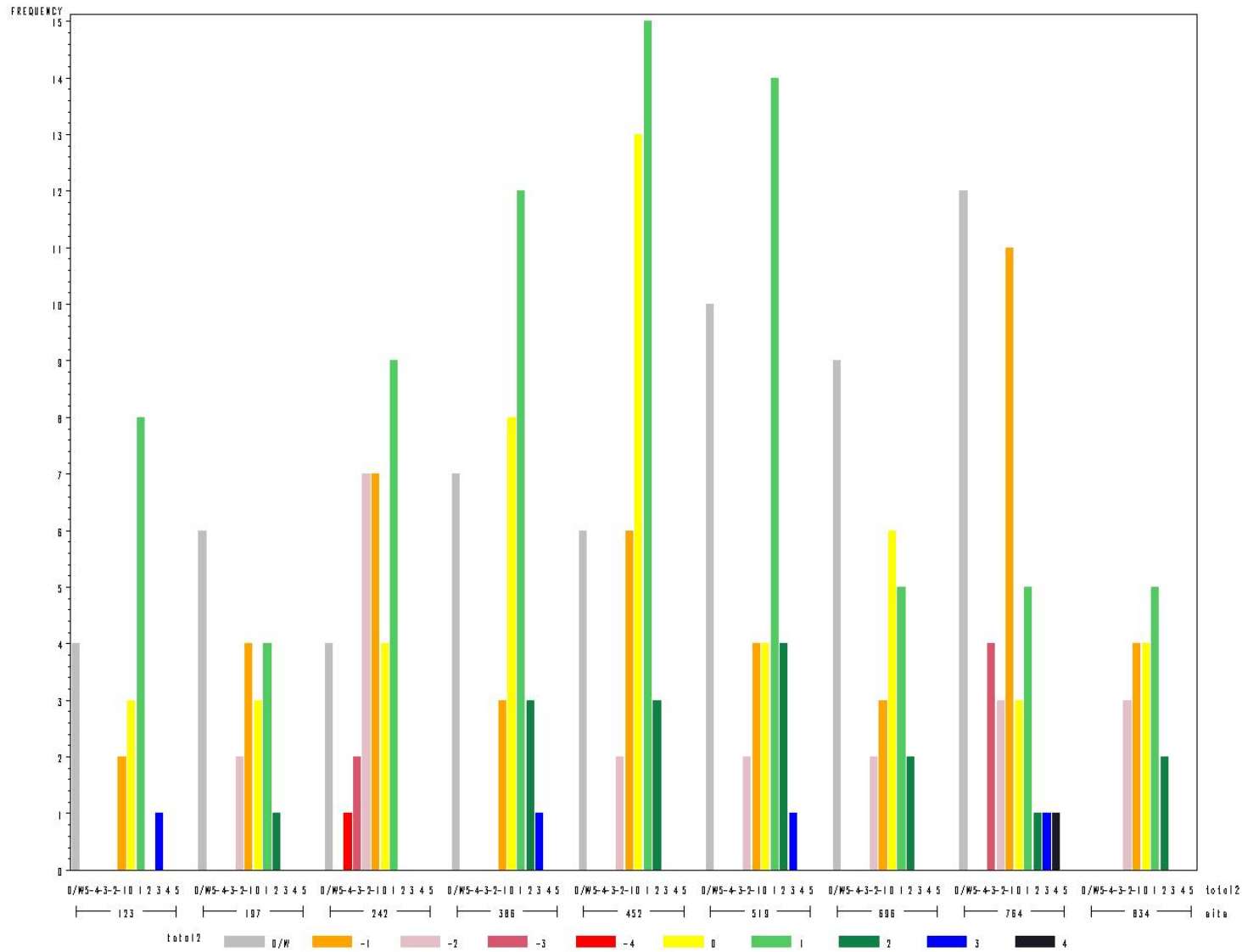


Table 5: Means and standard deviations for change scores for each facility.

FACILITY ID No.	Mean	SD
123F	0.64	1.01
197D	-0.14	1.23
242G	-0.73	1.46
386G	0.67	0.96
452D	0.28	1.00
519A	0.58	1.21
696A	0.11	1.18
764E	-0.52	1.74
834E	-0.06	1.30

(Dead/Missing scores not included)

There were few significant differences between A3 and A1 calf circumference and mid-arm circumference measures (mean differences were approximately 0) except for the DSU in Facility 764E where there was a negative mean change in mid-arm circumference of -2.8 cm and for the DSU in Facility 123F (-1.6 cm). Bioelectrical Impedance measures of lean body mass (Percentage change in free fat mass FFM) showed few significant differences between A3 and A1. Some positive changes were seen in Facilities 123F, 242G and 519A, and negative changes were seen in Facilities 386G and 834E. Measures of grip strength showed significant negative change (A3-A1) in a number of units, consistent with increasing frailty among the residents.

Table 6 summarises the overall results of the nutritional assessments for each facility. Consistently favourable results were seen in Facilities 123F and 519A. Facilities 386G, and 452D showed favourable results on most parameters in the table. Only one facility, Facility 764E, showed no favourable results on any parameter.

Table 6: Overall results of the nutritional assessments for each facility.

Facility ID Number	Favourable Change in SGA > 30% of residents	Favourable change in SGA > 40% of residents	Favourable change in SGA > 50% of residents	Positive Change scores *	Positive change in any anthropometric measure	Change in Food Service Surveys
123F	✓	✓	✓	✓	✓ FFM Negative mean change in mid-arm circumference (DSU)	-
197D	✓			Close to zero change		↓
242G	✓			Negative change	✓ FFM	↑
386G	✓	✓	✓	✓		↑
452D	✓	✓		✓		↓
519A	✓	✓	✓	✓	✓ FFM	↓
696A	✓			✓		↑
764E				Negative change	Negative mean change in mid-arm circumference (DSU)	-
834E	✓			Close to 0 change		NA

* composite of change in SGA and PG-SGA

Quality of Life Assessments

Quality of life scores and changes in Quality of life scores are shown in Appendix 5. There was a wide variation in scores and no clear pattern across facilities, between raters, or between assessments. Most facilities show a mean change in residents' DEMQoL scores that is close to zero. Some individuals showed large changes in DEMQoL, potentially indicating a significant change in their quality of life (although the statistical phenomenon of regression to the mean remains a possible alternative explanation).

Food Services Surveys

The administration of the Food Services Survey was coincident with the collection of data for Nutrition Assessments 1 and 3. The results of the Food Service Survey at Assessment 1 are provided in Tables 6.1-6.5 of Appendix 6. The vast majority of residents across all facilities felt that the food service at their facility was either very good or good. However, the survey did identify a number of areas for improvement across facilities.

While most residents felt they received enough food and were not hungry after or between meals, many residents responded that they were not getting enough food at least sometimes. Many residents felt they had limited choices in receiving preferred foods, the amount of food they received, and the variety of meals offered. There were differences between facilities in relation to how many residents felt able to choose where they sat while eating, with 50% of residents in one facility feeling they rarely or never had this choice. Most residents were able to add condiments to meals as they wished. However, the majority of residents could not always access snacks if wanted.

There was considerable variation between facilities in relation to perceptions of food quality, although the preponderance of responses was positive. While the majority of residents responded that meals tasted nice, a significant minority in one facility felt that their meals never or rarely had excellent and distinct flavours. Attitudes to the quality of meat were primarily positive, but there were mixed feelings about the quality of cooked vegetables, with notable proportions not liking the way these were cooked, and residents variously feeling these were either too hard or too soft. Of concern was the third of residents in one facility who felt that their hot meals were rarely or never at the right temperature, and the large minorities who were not happy with portion sizes. Most residents were positive about how their meals were presented.

Residents across facilities were predominantly happy with the dining room experience, including the quality of utensils and crockery, the meal times and the atmosphere in the dining room. There were some residents, however, who did not like the dining room atmosphere, those who needed more dining aids, or some who were not happy with the meal timetabling.

Figures 6.1a-i in Appendix 6 compares distribution of aggregate responses (mean of all items) for the food surveys for each facility at the time of Assessment 1 and Assessment 3. Responses range from Excellent (1) to Poor (5). Note, there was no second Food Services Survey for Facility 123F and 764E and there were no Food Services Surveys collected for Facility 834E where there was no hostel. Facility 242G, 386G and 696A showed an improvement in Food Services Scores.

Plate Waste Studies

The plate waste studies (Appendix 7) were undertaken at the request of participating facilities as part of their Nutrition Practice Development Plans. The studies were primarily used to inform the facilities as to food preferences and possible changes to menu options and servings, as well as the adequacy of nutritional intake for individual residents. However the data also provided useful insight into the residents' expressed preferences and nutritional intakes.

Figure 8 shows mean percentage plate waste for each unit in each facility for two different measurement points (Time 1 and Time 2). While there was variation across sites and units, there was a trend for T2 plate waste to be lower than Time 1 in all facilities. However, it should be noted that some plate waste is desirable. Ideally plate waste should be between 5-20%. Low plate wastes indicate that residents may not have enough to eat; high plate wastes indicate that residents may not like a particular meal item or may have poor appetites at these meal times.

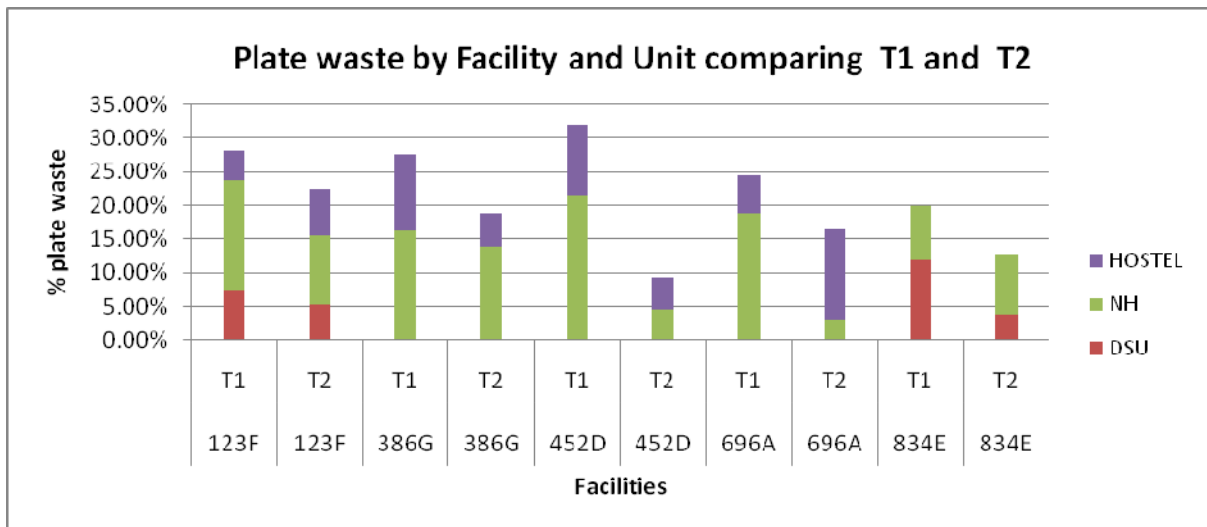


Figure 8: Mean percentage plate waste for each unit in each facility for two different measurement points Time 1 (T1) and Time 2 (T2).

Figures 9a-c show the mean percentage plate waste (averaged across all facilities) for items within each meal, for hostels (4 units, Figure 9a), nursing home units (5 units, Figure 9b) and DSU (5 units, Figure 9c). These figures show very low plate waste for cereal, hot breakfasts, fruit, juice, cold lunch options and dessert. The data indicate that servings of these food items could be increased. Higher plate wastes are seen for lunch (main, starch and vegetables) and dinner options. These options could be further reviewed to assess their fit with patient preferences and appetite.

Figures 9a-c: Mean percentage plate waste for items within each meal at time 2 (T2) (averaged across all facilities).

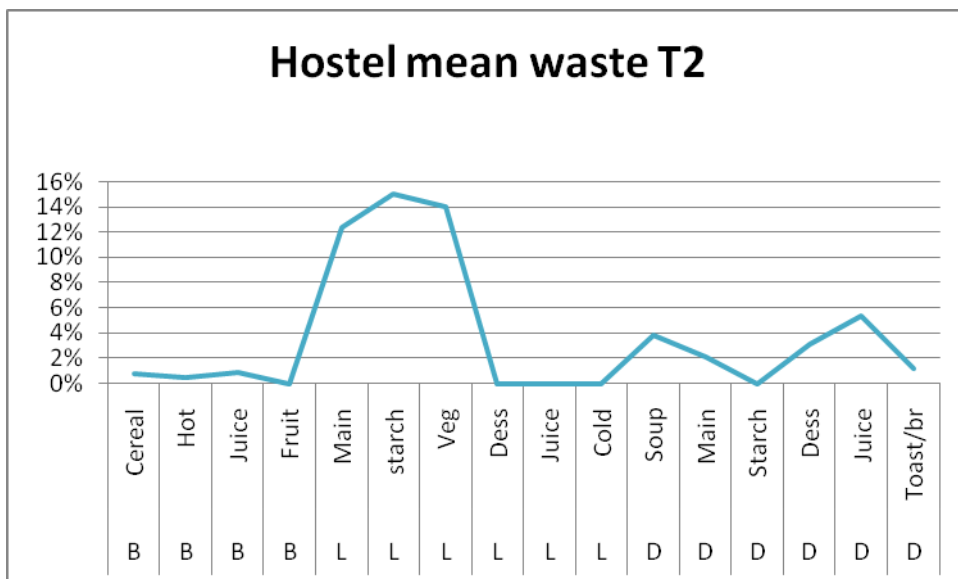


Figure 9a: Hostel.

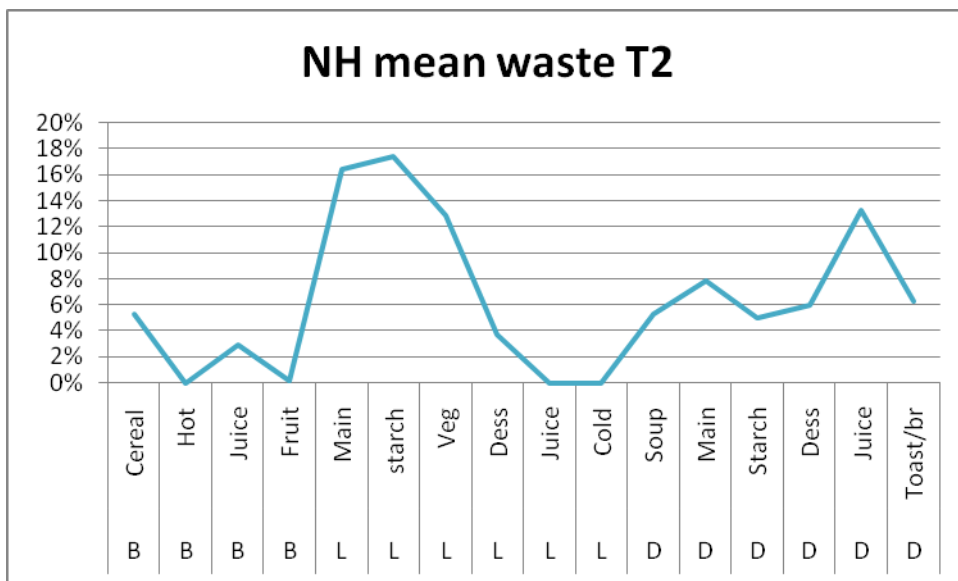


Figure 9b: Nursing home.

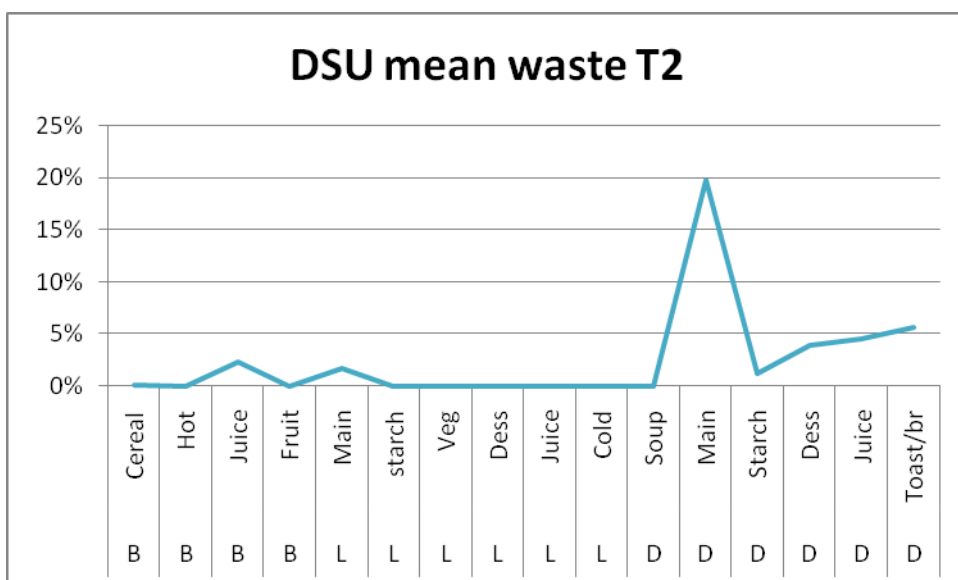


Figure 9c: Dementia Specific Unit (DSU).

Focus Groups and/or Individual Interviews with Residents: Residents were invited to discuss the meals and meal times at the facility, with an emphasis on positive and negative aspects of both. Interviews were conducted at the beginning of the project in each facility (initial interviews) and at the end of the 32-week implementation period (review interviews).

Initial Interviews with residents generally reflected the results of the food services survey. Residents were generally accepting of the food they received. As one resident puts it:

“...we can eat what we get, its lovely, nothing to do all day, I’ve been looking for a job like this for years”.

Some residents appeared very satisfied with their meals, and breakfast, fish and chips, and desserts were identified as favourites. Soups and sandwiches were also identified as preferences by some residents.

"...it's all quality food, most of the foods I like, I quite enjoy it..."

"breakfast... has been the main meal of the day"

Many residents felt that there was sufficient quantity, choice and variety of foods.

"the variety there so you'd never starve to death on it.."

"you'd have to be a horse to eat all the salad"

Some residents commented that the meals and choices were limited and were not consistent with their beliefs and preferences.

"I know what I have (for breakfast) but I can't understand it, cornflakes"

In some cases the meals were not appropriate to the person's cultural background, or consistent with their beliefs about healthy food. For instance, one woman who had diabetes was concerned that the food was not appropriate for a diabetic diet. (There is a common misconception that residents with diabetes should be on strict diets, whereas strict diabetic control is not the nutritional goal for people in aged care). Another resident was concerned about the effect of meals on her cholesterol.

Some residents commented that food was bland or did not taste like they would cook at home, or that it was not hot by the time they received it. There were comments about vegetables being "overcooked" or "under done". Meat was sometimes described as tough or grissly.

Some residents felt that the meal servings were too large and asked for smaller servings.

"(if) they give me a big meal there I don't want to eat it"

A number of residents commented that they'd like to have some alcoholic beverages.

"I like it on barbecue day because I get a bottle of beer..."

Puree meals were identified as a problem in some cases:

"there's nothing to bite on..."

"Sometimes it's a little bit watery..."

Some resident commented on the timing of meals, that breakfast was too early, or that there was a long gap between the evening meal and breakfast.

Residents generally recognised there were limits on what the facility could provide and that there were some restrictions that applied such as not being able to have fresh greens in salads. In addition, residents noticed that the quality of the meal often depended on who was cooking that day. They also recognised the difficulties associated with the food production processes.

“when I first came to the facility I realised food wise it was never going to taste as good as home cooked food purely and simply because here we’re cooking for so many.”

“... the food has a rough trot”

There were a few comments about the dining room atmosphere as being not particularly social or lively, or needing more music, and there was some concern about medications being dispensed at meal times. Having people with high care needs at the dining table, or people who were “sick” was sometimes off putting. Other people really enjoyed being in the dining room as a place of entertainment and activity.

“You’ll hear plenty of laughter and talking.”

Review Interviews: The themes outlined above were also identified at the second interview. For the most part, residents did not seem to be particularly aware that a project had been undertaken or that changes had occurred, even those who had been directly involved in the nutrition assessments. However, many residents who were the main focus of the changes in practice and those with highest need could not be interviewed (e.g. those with swallowing difficulties who require puree meals). In addition, residents may not have observed changes to administrative tasks (e.g. accurate recording and charting of residents’ weights).

When prompted, some residents did acknowledge that there had been changes. For instance, in one facility there had been substantial changes to the dining room set-up with staff noticing large differences in dining room atmosphere and resident participation at meal times. These changes were not identified by the residents until they were prompted.

“(music) makes it a lot more friendly, creates an atmosphere.”

Changes in food quality were also noticed by some residents. For example, at one facility, substantial improvements to the fish and chips meal were acknowledged. At other facilities, residents commented that more choices were provided on the menu (these changes were implemented across one organisation). However, residents felt that their preferences were sought too far ahead of time, and this resulted in food wastage.

“The first night they started it they threw out 12 salads and the next night they threw out 20... (the residents) didn’t want them, they’d ordered them... they changed their mind.”

Residents were also asked how they felt about the meals compared to other activities in which they participate. Most residents looked forward to their meals, viewing it as an essential part of their day and part of their routine.

“... we talk to everybody, hello everybody and they all come in and they’re waving to me and everybody else will come in and wave and I said I’m going to get an automatic arm so I can just wave it, it’s quite happy.”

“I go from force of habit I suppose, I don’t think about why I’m hungry because I can’t say I am hungry I just go because it’s meal time and my body has to be fed whether I feel hungry or not.”

3.3.3 Impact on staff

Interviews with key facility staff: During the interview, staff were asked to identify nutrition / hydration problems that they believed could be the focus of their intervention. This process prompted staff to reflect on practice at their facilities. This was subsequently built on during

the Nutrition Meetings where a range of issues were identified and considered. This process entailed a number of benefits for staff.

Firstly, it prompted staff to think about:

- What should be occurring in relation to specific topics;
- What would be required to move practice to match this; and
- Whether and how this might be feasible at their facility.

Hence, staff were engaged with a problem identification and problem-solving process. Some staff were familiar with such an approach, others were not, but for all it was an iterative and ultimately productive process. Thus, enhanced problem-solving experience was one outcome for facility staff. Given their positive experience of the project, it is anticipated that this will have resulted in enhanced self-efficacy for problem-solving as well as enhanced skills.

Secondly, the process entailed discussion of nutrition-related problems at the facilities. Often, facility staff did not have specific knowledge or expertise to address these. Nutrition Meetings included a lot of information-giving from the University dietitian and nurse members to facility staff. Hence, informal learning was a major element of these meetings and a benefit for facility staff. Sometimes, staff had the necessary information but lacked confidence to apply it. Again, the project provided a medium for a positive, self-affirming experience and enhanced self-efficacy. Finally, to a varying extent, the project offered an opportunity for staff across the range of occupations in facilities to work together. Where this opportunity was taken up, it was clear that inter-occupational working relationships benefited (especially those between care and catering staff).

More broadly, staff who were involved with the project have experienced a process of practice development. This experience will have provided them with a resource to tap for future practice development work in their facilities. For facility staff who did not attend the Nutrition Meetings, the priority that was accorded nutrition and hydration resulted in increased attention to nutritional practice and diffusion of project-related information. Hence, facility staff who were not involved in meetings reported during review interviews that they were now more aware of nutritional issues in their residents, and why they mattered.

The interviews provide evidence as to how the project raised the importance of nutrition and hydration as areas of concern for staff, and encouraged them to work together for best practice.

“... they’re saying well you know this isn’t good enough so we act on it a lot quicker. Yeah and I think because their involved in everything I think they feel that they have the right to sort of step up and say a little bit more.... “

“I think its always increased awareness and the fact that you can change things ... [staff] are more able to respond to what residents want. I think that’s important. I think here just a general awareness about fluids particularly in this hot weather is vital... probably become a bit more aware of fluid intake.”

“... we certainly do not have any at risk residents that are not identified. So I think that’s, it’s partially as a result of the project, because we sort of already started monitoring ourselves anyway, but because we’re looking at it much closer now we’re sort of really on the ball with it”

"[its] not just a simple act of weighing a person every month and writing it down, looking at what they are writing and why they are writing it. And looking at the difference of what there was last month to this month."

"Everyone's been glad and their happy that they've participated and I think it's made everyone so much more aware of you know a little bit of weight loss to us maybe nothing but when you think of our residents who many of them come in as low weight yeah, the awareness of everyone concerned and the importance of monitoring..."

It was particularly important that the involvement of staff was extended beyond the care staff to include catering staff.

"Really well, they were really pleased that they were involved in the project and they were asked their opinion, and that made it much easier to run the project through the kitchen rather than seeing it as a nursing job, it became a facility job. So that worked really well, yeah getting the kitchen staff involved"

"I've liaised with the educator and the kitchen staff at introducing little extras, at morning tea and various times and to be aware of which residents we've given the kitchen staff a list of residents that we consider at risk. And like we've only dealt with high care so majority of the days during the week like 5 out of 7 days a week we have the same person doing morning and afternoon tea. And she has really come on board and kept it at an accurate record of what she's given out to the residents and I believe the nursing staff have done a similar one. As far as watching what's been eaten I mean you can give something to someone but whether they eat it is another thing and also that same person happens to be on the lunchtime wash up. So therefore she is also seeing which trays are coming back and what those residents if their eating, their meals and that so yeah that's another thing that's been really good cause she's very resident orientated, fortunately and yeah its helped that she's felt that way to start with."

"I'm surprised how well its, yeah I mean I hoped that it would run well but no I'm just really pleased with my kitchen staff. They've really taken it onboard and without their monitoring yeah well we wouldn't have no results really."

Staff were also encouraged and empowered to collect and respond to their own local data

"... its good that the staff actually wanted to get behind it, you know and start their own little surveys"

Overall, staff were positive and enthusiastic about the changes that occurred.

"... it is easier than we thought, much easier than we thought and we're helping our residents at the same time."

"you get varying levels of understanding of what the project means. But ... when you go up there and say we're talking about the nutrition project a lot of the light bulbs go on and say oh yes, yes, yes. And there always keen for feedback, you know how the trial went, how the residents went, whether it was good and whether they did the right thing and all that kind of stuff yeah so there always keen to get that verbal feedback as well. Knowing that they, that they have achieved something good."

"... the staff were really involved and they were quite excited and happy that they had not put their hands up or to complain yeah they were well settled so it was rather everyone was a little bit excited about the whole adventure."

3.3.4 Impact on the residential aged care facilities

Changes in Culture

There were major changes in culture within the facilities. For instance, there was an increased emphasis on staff training in most facilities. In some facilities, there was also a complete review of facility operations – including nutrition. In many facilities there was an emphasis on training staff to value measurement accuracy (e.g. assessing residents' weights), and to record, report and respond accurately to this information.

A big advantage of the project was that it elevated the importance of nutrition and hydration as essential components of care.

“...now weight-loss is considered a priority whereas before they might've postponed it or passed it on. It's now become a priority along with other clinical issues which is a good thing.”

Staff were also encouraged to think about how other care needs might impact on residents' nutrition (and vice versa). For instance, staff members were encouraged to consider the nutritional needs of residents with dementia, and how food and nutrition may be affecting the behavioural responses of these residents.

There was also a general shift in how staff thought about food. This change enabled review of processes for food handling and also for the management of staff.

The use of local data provided strong support for change and for ongoing monitoring of change. As well as considering the data provided by the university team members, the project encouraged facilities to collect their own data.

The change in culture was not restricted to care staff. Where catering staff were engaged in the project there were dramatic changes in their attitudes towards trialling new approaches, and they were rewarded by positive feedback from residents. Pureed food moulds were a challenge for some catering staff, but the change in culture and attitudes that evolved during the project meant that staff were prepared to trial and reinvent this process to meet the needs of the facility and the residents.

The role of champions within nutrition teams

It was important to identify champions in each facility, but responsibility for change was not solely vested in one person. Other members of the team were important and the greater the representation and engagement across the facility, the better the project progressed.

Improved systems

A number of systems were developed and adopted as part of the project. These include systems for:

- Weighing residents
- Recording weights and monitoring change
- Responding to change in weight or increased nutrition risk
- Menu planning and assessing residents' preferences
- Processing and providing meals
- Staff rosters (including care and catering staff).

A Tool Kit was developed that accumulated the approaches, strategies and tools developed through the Participatory Action Research process (see Section 3.2).

Structural changes

- Changes to the dining room environment
- Purchase of equipment for weighing residents and for preparing/heating food
- Access to formal training for catering staff.

3.3.5 Overall Coherence of data

Data from all sources for each facility were overviewed to relate changes in practice to evaluation results.

Facility 123F demonstrated a favourable outcome in resident nutrition. This facility underwent a major overhaul of all systems, including nutrition. The use of local data provided strong support for better observance of nutrition needs and appropriate responses. The facility took a clinical approach to nutrition. A pathway for managing “behaviours of concern” was developed but not trialled within the project timeframe.

Facility 197D demonstrated little change in nutrition. There was also decreased satisfaction on food surveys, however the practice development changes did not focus on the hostel residents (who completed food surveys). The changes focussed on at-risk people in the nursing home and involved few people. So, while a good system for nutrition screening and support was developed, this system was not applied across the facility during the project. However, the system was adopted by other facilities in the project and by the organisation. The screening and support procedures are now standard practice.

Facility 242G showed improved SGA for some residents and an improvement in some anthropometric measures. There was a large improvement on the food surveys. This facility applied the nutrition screening and support protocol for a very large group of residents. A large number of residents were placed on supplements. These supplements were initially in the form of high energy foods (e.g. Mars Bars) but these were later changed to include standard commercial supplements in response to process difficulties and taste fatigue and the facility felt that some snacks were inappropriate.

Facility 386G showed improvements in SGA for more than 50% of residents and positive change scores. Food satisfaction ratings were high to begin with, and improved over the course of the project. The project timing in this facility coincided with the introduction of a new regional menu which had been strongly influenced by the nutrition guidelines (through direct input by Caroline Bunney, one of the authors of the *Best Practice Food and Nutrition Manual for Aged Care Facilities* [1]). The new menu included more food options, and more nutrient dense foods. A number of other approaches to improving nutrition were also tried, such as moulded pureed meals, but were not fully implemented during the project period.

Facility 452D showed improvements in SGA for more than 50% of residents and positive change scores, but a decrease in food satisfaction. The main facility wide changes were changes to menus (e.g. more eggs) and improved communication between residents and catering staff. Processes to improve meal temperatures were also implemented. Better crockery and coloured plates (e.g. blue for visually impaired people) were also trialled. A snack program was developed and implemented towards the end of the project. The decrease in food satisfaction was consistent with residents’ interview feedback in that there was little variety in the menu. This facility was also limited by ‘cook chill’ catering processes.

Facility 519A showed favourable changes in nutrition. Food survey scores showed a slight decrease, but were quite high at both time points. This facility made major changes to the provision of meals. The facility put a lot of effort into indentifying residents preferences through food surveys, taste testing, and seeking residents own favourite recipes. The menus

were changed to include fresh-cooked items and new equipment was purchased and commissioned to allow these items to be prepared on site. These changes focussed on the nursing home so would not be reflected in food service surveys. Catering staff rosters were reviewed and catering staff participated in a training program. However these activities occurred at the end of the project.

Facility 676A showed favourable change in SGA for >30% of residents, positive change scores and an increase in food satisfaction scores. The facility screened all residents and educated staff on these procedures. The facility also trialled puree moulds and placed orders so the food moulding processes could be implemented. (Moulds were still on order when the project concluded). A *Salmonella* outbreak occurred in the middle of the project, disrupting staff and affecting resident outcomes.

Facility 764E This facility did not show a favourable change in nutrition scores. The facility focussed on reviewing and improving the cook chill process and changing staff rosters for better mealtime processes. The facility experienced major external events and challenges during the project including the extended absence and subsequent resignation of the catering manager, an influenza outbreak with high mortality rate, and extended absence of the care manager due to illness.

Facility 834E showed a favourable change in SGA for 30% of residents. The facility implemented substantial structural and cosmetic changes to the dining room, applied the screening and monitoring protocol and developed a computer program to assist this. A program was developed and trialled for residents in the dementia specific unit, however the implementation of this program was interrupted due to influenza outbreak and staff vacancies. It should also be observed that all residents in this facility were classified as high care.

3.4 Dissemination

Approaches to dissemination included posters within facilities, staff and resident meetings, newsletters to facility staff and residents, and conference presentations (see Appendix 8).

At the conclusion of the project, representatives from all facilities, the two aged care organisations and other stakeholders were invited to Newcastle for a “mini conference” (5th and 6th November 2009). The aims of this meeting were:

- To provide feedback on the project
- To allow facility staff opportunity to present their individual projects and results
- To encourage sustainability
- To launch and review prototype tools that arose from the project.

A program for the meeting is included as Appendix 9.

Now that the project is completed we intend to submit papers for publication in scientific journals so that the results can be viewed by a wider audience and subject to peer review. The list of papers for publication include:

- Does the PARIHS framework ‘fit’ in residential aged care?
- Improving nutrition and hydration in residential aged care: staff perspectives on the art of the possible.
- Residents’ perspectives on the meals and the dining experience in aged care.
- What features influence processes and outcomes of implementation of best practice within residential aged care?

- User involvement in service development: perspectives of residents in aged care in the EBPRAC Nutrition and Hydration project.
- What is the impact of 'context' for implementation of best practice within residential aged care?
- Is care Person-Centred? To what extent has the Person-Centre Care ethos been adopted by aged care staff?
- The effect of a Participatory Action Research collaboration around nutrition care practice on the nutrition of residential aged care residents.
- Changes in quality of life in response to a nutrition intervention in residential aged care.
- DemQOL as a measure for quality of life outcome in residential aged care.
- Measuring nutrition in the residential aged care setting.
- Assessment of plate waste in residential aged care.

3.5 Sustainability

The entire project has been framed in such a way as to maximise chances for sustainability of the projects. Our adoption of Participatory Action Research as the approach to use, through which to frame all intervention elements, was a deliberate choice, supported by evidence suggesting that this method of implementing change has a good chance of producing sustainable change. This follows from its characteristics of:

- collaborative working, such that all processes and actions are discussed between university and facility implementation team members in an open fashion;
- mutual respect and learning at all levels; and
- recognition and valuing the contribution of all staff;

Further, we have deliberately situated this project within a strong facilitatory, rather than instructional, approach such that all key project decisions about work at the facilities have been made by facility staff, with the support of university team members. We have encouraged ownership of the project by facility staff at all stages, and have concluded the 'Active Intervention' phase with plans for activity continuance.

4 Discussion and conclusions

This project supported the development and implementation of best practice nutrition and hydration practice in nine residential aged care facilities throughout NSW. The project successfully used Participatory Action Research as a means to support development of practice within the facilities in line with the *Best Practice Food and Nutrition Manual for Aged Care Facilities* [1]. Change in nutrition care was achieved to some degree within all facilities, and in all but one facility, a favourable change or maintenance in resident nutrition markers was observed for at least 30% of residents. This project enhanced staff awareness and knowledge about nutrition issues for residents of aged care facilities, helped to develop useful tools for monitoring and intervening with under nutrition, promoted structural change within facilities and worked towards ensuring sustainable change in nutrition care practice. This was achieved within the context of a setting where staff turnover is endemic and one third of the facilities were subject to a resident health crisis (influenza or salmonella events). Thoughtful support of local ideas and experience, the enthusiasm of facility staff, and the committed flexibility of the project team were the keys to the success of this project. Further considerations of project achievements are discussed below.

Resident outcomes: This project generated considerable improvements in clinical care for residents, reflected in improved or maintained nutrition status for many residents across the life of the project. In all but one facility, a favourable clinical change or maintenance was observed for at least 30% of residents. Maintenance of nutrition status in this frail population should be seen as a positive outcome.

When change scores (generated from the change in nutrition categories (SGA) and change in PG-SGA scores for each resident within each facility) were considered, five facilities showed a small positive change, one facility showed a change that was close to zero, and three facilities showed a small negative change. When the overall results of the nutritional assessments for each facility was summarised, consistently favourable results were seen in two facilities, two facilities showed favourable results on most parameters, and only one facility showed no favourable results on any parameter. Some individuals in all facilities showed large changes in nutrition status as measured by PG-SGA, potentially indicating a significant change in their symptoms

Where change was unfavourable, the broader indices of resident health and wellbeing need to be considered. For example, the facility with the least favourable change scores experienced major external events and challenges during the project including the extended absence and subsequent resignation of the catering manager, an influenza outbreak with high mortality rate, and the extended absence of the care manager due to illness.

From the qualitative interview data, for the most part, residents did not seem to be very aware that a project had been undertaken or that changes had occurred, even those who had been directly involved in the nutrition assessments. In most cases, however, residents who were the main focus of the practice changes and those with highest need could not be interviewed. When prompted, some residents did acknowledge that there had been changes.

Staff outcomes: This project achieved some major improvements for staff, by enhancing their knowledge and skills and supporting their access to and use of the best available evidence in their everyday practice. The project had a major impact on the way staff considered nutrition and hydration, their ability to seek and process information, and their willingness, confidence and capability to trial new approaches. A big factor in the success of the project was that it elevated the importance of nutrition and hydration as essential components of care. It was also evident that while the project had its initial impact on staff involved in the nutrition meeting, impacts for other staff in the facility happened as practices were rolled out and more staff were engaged.

The project also encouraged staff to use evidence and to seek local data to support the evidence. Feedback from the nutrition assessments was an integral part of the project and encouraged staff to adopt and trial ways to continuously monitor resident's nutritional risk and to enact ways to maintain nutrition and hydration and to prevent weight loss (or encourage weight gain). As staff initiated their own monitoring plans they used these as a way to gather and collate evidence for individuals (indicating trends over time) and for the facility as a whole. Plate waste data and food services survey data pointed to opportunities to respond to residents preferences. Other forms of review included analysis of food handling, delivery of meals to residents, and the overall dining room experience. As changes were made staff reflected on the impacts of these changes on the residents.

System outcomes: This project resulted in several system level outcomes within facilities and some features of the project were adopted at the organisational level including training for catering staff and use of screening and monitoring protocols.

Structural changes undertaken within facilities in response to the project included changes to the dining room environment, purchase of equipment for weighing residents and for preparing/heating food, and access to formal training for catering staff.

As the project rolled out it became apparent that a number of facilities wanted to adopt and trial procedures developed by other facilities in the project. This influence allowed for tools and procedures developed during the project to be successively trialled and reinvented. These tools were further refined for inclusion in the Tool Kit for Best Practice Nutrition and Hydration in Aged Care that accompanies this report.

Community outcomes: The progress and preliminary outcomes of this project have been successively disseminated throughout the life of the project. Presentations on the project have received positive feedback from all forums where presented.

Enablers of success

There were several key factors that contributed to the success of this project: thoughtful support of local ideas and experience, the enthusiasm of facility staff, and the committed flexibility of the project team.

From the start the project team placed a high value on sustainability of activities beyond the life of the project. To this end we purposively focused on the professional development of facility staff, and facilitated, supported, and resourced them to conduct all project activities, where feasible. A Participatory Action Research framework, which relies on effective partnerships between stakeholders, was an obvious choice for facilitating this practice development approach. The theoretical underpinning of the project, deriving from adult learning theories, social influence models, and marketing approaches, also supported these partnerships for practice development. The Participatory Action Research approach enabled the development of close working partnerships in a very collaborative and positive way based on mutual respect for the contribution of all team members. The Assessment teams spent large periods of time at each site and became integrated into the sites during this time. Members of the research team also spent long periods on site undertaking staff interviews. The relationships and insights built up at the early interview stage provided the positive basis for the Nutrition Meetings (the main vehicle for practice development interactions between the project team and facility staff).

Overall there was very high engagement by facilities. All facilities responded enthusiastically to the project and made an effort to review their current practices, respond to local evidence, and to develop plans for dealing with priority needs and opportunities within their context of care. The use of local data provided strong support for change and for ongoing monitoring of change. As well as considering the data provided by the project team, the project encouraged facilities to collect their own data.

The University team remained flexible to the dynamic nature of facility priorities and timetables. Residential aged care facilities are complex and diverse settings, complicated by their multiple roles of residents' home, staff's workplace and business organisations. The extent to which project plans were able to be operationalised within the project time frame did vary across facilities. Frequently, reasonably well developed plans were stalled by staff absences or changes, emergent events such as influenza epidemics, or by other unforeseen circumstances. The project team unfailingly planned and reorganised to meet the needs of the facility, providing full support even where facility needs clashed with the project timetables and objectives.

Barriers to success

Resident barriers: There were some barriers related to residents that limited the project achievements and the ability to measure project success. The baseline assessments established that up to 15% of residents could be considered severely malnourished and 20%-60% of residents could be mildly malnourished (depending on the facility, the selection of residents, and/or the measure used). This indicated considerable scope for improvement of resident outcomes. However, in many cases this malnutrition may be due to the resident's underlying physiological state, and may not be amenable to improvement in response to strategies introduced throughout the project. Additionally, in most cases, the residents who were the main focus of the practice changes were those with highest need and therefore the most frail residents, who often could not be interviewed or assessed and so changes affecting these residents would not be reflected in the evaluation.

Staff barriers: There were several staff-related issues that created challenges to supporting practice change in facilities. Multiple and frequent changes of key facility staff members slowed the progress of projects at several facilities, so that some changes were not fully implemented within the project timeframe, and potential impact could therefore not be measured. Although engagement with key staff such as catering managers was important for influencing practice change, not all key staff attended nutrition meetings in all facilities. While the project presented opportunities for staff professional development, this entailed an unfamiliar way of working for most facility staff. Facility staff varied in the speed and scope of response to the opportunity offered by the project's Participatory Action Research framework to develop skills in problem identification and problem solving and strategies for initiation and implementation of changes in their local working practices.

Facility staff shortages were an ongoing issue for the project. While the project was able to provide funding to backfill staff for project activities, this was not always possible, as many facilities were already making maximal use of flexible casual workers and additional shifts for which their staff were available, just to provide daily establishment staffing levels.

Many 'frontline' facility staff have limited knowledge of principles and practices of nutrition and hydration issues affecting residents. For example, there was considerable resistance to providing appropriate and resident preferred snack foods to residents, in the belief that standard commercial supplements were superior. The project identified a need for staff training in these particular aspects of nutrition and worked with each facility to identify specific training needs and means to address these. Additionally, facility staff not directly involved in the project were often unaware of the purpose of the Nutrition Assessments, despite posters promoting the project and the involvement of key staff members.

System barriers: There were many system barriers to implementation of project strategies. Aged care facilities are not homogenous entities, and the character and characteristics of individual facilities needs to be understood before practice change can be supported. Staff and residents within each facility are from a diversity of cultures and backgrounds and staff have a range of skills. Furthermore, there is an essential tension derived from the facility being simultaneously residents' home, staff's workplace and a business.

Organisational and structural elements associated with facility business often affected responsiveness to this project. These elements included the legal and organisational framework within which facilities operated: for example, professional and food hygiene standards, staffing and turnover, resident dependency, contracts and food suppliers. Many facilities did not have control over menus or food preparation, as these were determined and provided at a regional level. The food budget was also a principal factor in limiting some of the changes that might be made.

The organisational climate also influenced the model of teamwork that operated within each facility. Attendance at nutrition meetings was influenced by the business model of the individual facility, and there was variation in the degrees to which food service, clinical care and facility management processes worked together to plan and implement changes within each project.

The need to give priority to accreditation-related activities and the introduction of the new Aged Care Funding Instrument (ACFI) tool in the early stages of the project limited staff ability to engage with projects at some points.

Frequently, reasonably well developed practice development plans were stalled by staff absences or changes, emergent events such as influenza epidemics, or by other unforeseen circumstances.

Physical features of the facilities were also important, and local building works had an impact in some instances. The physical location of the facilities was particularly important for facilities in more rural and regional areas.

There were also some delays in ordering and obtaining equipment - in particular, puree moulds that needed to be sourced from the United States.

Barriers to evaluation: There were also some specific challenges around the evaluation and implementation of the project. The project team had some issues with providing timely turn around of assessment data for feedback to support facility staff in their nutrition planning. Project processes had to be revised, and research staff had to be trained to achieve optimal outcomes. There were some difficulties communicating with some facilities, and information has been difficult to obtain from facilities in some cases often due to staffing changes and staff availability. There were also delays in receiving completed surveys and audits from facilities. These delays meant that surveys and audits were not completed at the appropriate point in the study timeline.

Conducting the project across geographically distant facilities, combined with the complexities of multi-site working created particular challenges for the project team. The project team was required to undertake multiple tasks at multiple sites, across distance, often simultaneously. An Operations Co-ordinator was employed to reduce this burden of this challenge by co-ordinating travel arrangements, accommodation, and car bookings for project staff travelling to facilities throughout NSW. Conducting regular teleconferences with facilities has also addressed this issue.

Staff illness within the research team, especially Nutrition Assessors and data entry personnel was an ongoing challenge. As Nutrition Assessors were unable to enter the facility if unwell, some Assessments needed to be rescheduled until staff had fully recovered. A Senior Nutrition Assessor was appointed to oversee nutrition assessments and recruit and train additional qualified staff to call upon if required. We also employed additional data entry personnel so that delays in this area could be minimised.

Lessons learnt

The project did provide a huge amount of information for the improvement of nutrition and hydration in residential aged care, including that:

- facility staff and management are enthusiastic about improving nutrition and hydration in aged care.
- information about residents' preferences and plate waste can provide facilities with useful data to help in reviewing practices.

- a number of changes can be made to the way that food is prepared and presented, even in facilities where most food is provided by outside providers using cook-chill processes.
- facilities can consider moulding pureed meals and these moulding processes can be incorporated into catering practices.
- monitoring of residents' weights can be used within facilities to identify residents at risk, but facilities need a method to help them to undertake this systematically and accurately, and to respond to the needs of those residents who are higher risk.
- positive changes in some resident's nutrition and hydration can be achieved.

There were also some important learnings for the project team that we expect would be useful for others working with facilities to achieve practice change:

- engage and consult with senior management and enlist their support early in the project.
- engage and consult with key front-line staff opinion leaders and enlist their support early in the project.
- engage across the range of staff who have influence in the relevant area of care.
- all project dissemination material, whether paper-based, verbal or electronic, needs to be framed in language and content that is consistent with facility aims and priorities, in formats familiar to facility staff.
- all activities must be grounded within the resource needs of facilities, staff needs, and other constraints.
- respect the skills, experience and expertise of staff members across the spectrum who are working within difficult workplaces and demonstrating considerable dedication to what they do.
- work within what is perceived to be feasible, whilst seeking avenues to make feasible that which may not immediately appear so.
- providing resources to facilities as 'seed corn' and to 'back fill' time for the project is necessary but may not be sufficient to enable active engagement.
- lessons from other settings about ways of implementing best practice guidelines need to be considered with great caution, due to the unique characteristics of the residential aged care setting and individual facilities.
- a project such as this carries very substantial administrative requirements to ensure that plans are turned into activities with all necessary support in place in timely fashion.
- given a challenging work environment and a workforce that deal with multiple demands on their time, practice development time frames must acknowledge competing priorities and be structured accordingly.
- allow an adequate 'active implementation' phase. Short implementation time frames pose very substantial challenges for an environment that is:
 - a) not accustomed to initiation of change
 - b) hugely impacted in their everyday practice by a wide range of factors outside their control
 - c) dependent upon a very small number of key people who may, for example, resign or take sickness or compassionate leave, or be seconded by the organisation to other areas at short or no notice.

- Ensure that project management structures are water tight ahead of time. All aspects of the project will benefit from pilot-testing ahead of time. Adequate time should be allowed for the development and re-invention of these processes.

Sustainability

From inception, the project team placed a high value on sustainability of activities beyond the life of the project. The Participatory Action Research approach to change purposively focused on the professional development of facility staff, and facilitated, supported, and resourced them to conduct all project activities, where feasible. Our concluding interviews with each facility indicated that facilities were still continuing to advance their projects and to maintain those changes they had already achieved.

Some features of the project were adopted at the organisational level including training for catering staff and use of screening and monitoring protocols and are therefore likely to be sustained within the facilities involved in this project and disseminated across the organisation.

Conclusions

This project supported the development and implementation of best practice nutrition and hydration practice in nine residential aged care facilities throughout NSW, using a Participatory Action Research approach. It went some way to achieving the overall aim of the Encouraging Best Practice in Residential Aged Care (EBPRAC) Program to improve evidence-based clinical care for aged care residents, and to enable nationally consistent application of clinical practice in residential aged care.

The project achieved impacts at the resident, staff and system levels. Considerable improvements in clinical care for residents were achieved, reflected in improved or maintained nutrition status for many residents across the life of the project. In all but one facility, a favourable clinical change or maintenance was observed for at least 30% of residents.

The project also achieved some major improvements for staff, by enhancing their knowledge and skills and supporting their access to and use of the best available evidence in their everyday practice. The project had a major impact on the way staff considered nutrition and hydration, their ability to seek and process information, and their willingness, confidence and capability to trial new approaches. There were major changes in culture observed during the study, which was not restricted to care staff. There was also a general shift in how staff thought about food. Throughout the course of the project, the use of evidence and of local data to support the evidence became common place. As changes were made staff reflected on the impacts of these changes on the residents.

A major impact of the project was that it elevated the importance of nutrition and hydration as essential components of care, both at the facility level and at the organisation level. Some features of the project were adopted at the organisational level including training for catering staff and use of screening and monitoring protocols. A Tool Kit was developed that accumulated the approaches, strategies and tools developed through the Participatory Action Research process, in consultation with facility staff. The tool kit, which not only provides information on how to plan for change within a facility, but also provides tools and strategies for screening and monitoring nutrition and hydration, and for implementing changes, is a resource which can be disseminated Australia wide to improve clinical practice in nutrition and hydration.

5 Recommendations

A primary recommendation arising from this project would be that aged care facilities are encouraged to consider ways in which they can improve their food service practices and improve nutrition and hydration in aged care. The Tool Kit for Best Practice Nutrition and Hydration in Residential Aged Care that accompanies this report accumulates those practices that facilities felt were most important to promote and also most feasible to implement. They include that facilities should:

- Recognise nutrition and hydration as important parts of care.
- Recognise how the nutritional needs of older people differ from those of other adults.
- Develop a plan for improving nutrition and hydration that addresses local priorities and concerns and is based on best practice (such as *Best Practice Food and Nutrition Manual for Aged Care Facilities* [1]), review of local data, and staff and residents' experiences. This plan can then be trialled, evaluated and refined using the *Plan, Do, Study, Act* cycle.
- Seek resident preferences regarding meals and meal schedules, and implement changes that reflect these preferences.
- Monitor plate waste using a simple plate waste tool.
- Monitor residents' weights to identify residents at risk of malnutrition, by recording regular and accurate weights.
- Respond to the needs of those residents who are higher risk of malnutrition by checking for underlying causes, and by increasing the nutrient intake by offering high energy foods and/or commercial supplements.
- Consider changes to staff rosters to allow better catering skill mix, and better support for residents at meal-times.
- Consider changes to the dining environment to create a more congenial atmosphere at meal-times.
- Consider using food moulds to create more appealing pureed meals.
- Consider programs for residents with high nutritional needs such as those with dementia.
- Consider training programs for staff, including catering staff.

However, these changes may be difficult to initiate and promote in aged care where day to day care imperatives and staff shortages may not allow time for reflection and reinvention. This project had the advantage of external advisors and facilitators who could assist facility staff to plan and trial best practice approaches.

We also recommend that practice development approaches within facilities:

- be supported by credible, known local leaders
- allow time for development of collaborative, trusting and collegial working relationships
- allow time for development of understanding of what all partners want and need, and their ability and willingness to negotiate to achieve this
- engage all levels of facility staff, residents and carers
- assist facility staff to identify areas of need and opportunities for practice involvement
- provide resources and avenues for facilities to act on areas of need

- provide continuous feedback on planning and progress towards goals
- maintain good communication all along the way – and perseverance to achieve this.

Tools to support other facilities and those working with them to develop best practices in nutrition and hydration are included in the Tool Kit for Best Practice Nutrition and Hydration in Residential Aged Care that accompanies this report.

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