

Best practice approaches to minimise functional decline in the older person across the acute, sub-acute and residential aged care settings: Update 2007

Developed by the Clinical Epidemiology and Health Service Evaluation Unit, Melbourne Health. Previously commissioned on behalf of the Australian Health Ministers' Advisory Council (AHMAC) by the AHMAC Care of Older Australians Working Group.

This version updated by the Victorian Government Department of Human Services.

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Disclaimer

Clinical practice guidelines are just one element of good health care decision making, which also takes into account patient/resident preferences and values, clinician values and experience, and the availability of resources.

These guidelines are not a definitive statement, but rather constitute a general guide to be considered in preventing functional decline in older people. Some flexibility will be required to adapt these guidelines to specific settings, local circumstances and individual patient/ resident needs.

Every attempt was made to ensure the accuracy of the contents of these guidelines at the time of publication. In addition, the authors have made every effort to identify all the current, relevant guidelines, systematic reviews and randomised controlled trials. However, the authors acknowledge they might not have identified some relevant literature.

The Clinical Epidemiology and Health Service Evaluation Unit or any person who has contributed to the guidelines development do not accept liability or responsibility for any loss damage, injury or expense arising from any errors of omission in the contents of these guidelines.

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Abbreviations used in this document

ADL	activities of daily living
FIM	functional independence measure
FIT	functional incidental training
IRR	incidence rate ratio
ITT	intention to treat
MMSE	mini-mental state examination
n	sample size
NNT	number needed to treat
OR	odds ratio
RCT	randomised controlled trials
RR	relative risk
WMD	weighted mean difference

Introduction

In November 2004, the Clinical Epidemiology and Health Service Evaluation Unit, Melbourne Health, in collaboration with a clinical reference group and multidisciplinary advisory group developed the “Best practice approaches to minimise functional decline in the older person across the acute, sub-acute and residential care settings”. The document was commissioned on behalf of the Australian Health Ministers’ Advisory Council (AHMAC) by the AHMAC Care of Older Australians Working Group and can be found at www.health.vic.gov.au/acute-agedcare/functional-decline-manual.pdf.

The current literature review was conducted to provide an update of the evidence provided in the above mentioned clinical practice resource in the following domains: cognition and emotional health; mobility, vigour and self-care; continence; nutrition; and skin integrity. The review has updated the recommendations by extending the literature search to 26 June 2007. It provides an update of the links to care domain specific guidelines that can be used in conjunction with the main document, and a summary of meta-analyses, systematic reviews and randomised controlled trials. A separate document providing detailed information regarding the development of the resource update can be found at www.health.vic.gov.au/acute-agedcare.

Objectives

The overall objectives of this review are:

- to present the current evidence of interventions for the prevention and minimisation of functional decline in the care domains of: cognition and emotional health; mobility, vigour and self-care; continence; nutrition; and skin integrity
- to develop recommendations based on the current evidence
- to update the links to care domain specific guidelines.

Cognition and Emotional Health 1

Additional links to cognition and emotional health guidelines

Current guidelines addressing aspects of delirium, dementia and depression include:

- Clinical Epidemiology and Health Service Evaluation Unit Melbourne Health on behalf of the Australian Health Ministers' Advisory Council (AHMAC), by the AHMAC Health Care of Older Australians Standing Committee 2006, *Clinical practice guidelines for the management of delirium in older people*. Viewed 2 August 2007 www.health.vic.gov.au/acute-agedcare/
- Australian Society for Geriatric Medicine 2006, 'Position statement no. 13: Delirium in older people'. *Australasian Journal on Ageing*. 25(2):104-8.
- NSW Department of Health 2006, *Guidelines for working with people with challenging behaviours in residential aged care facilities – using appropriate interventions and minimising restraint*. Viewed 2 August 2007 www.health.nsw.gov.au/policies/gl/2006/pdf/GL2006_014.pdf
- Potter, J and George, J on behalf of the Guideline Development Group convened by the British Geriatrics Society in conjunction with the Royal College of Physicians 2006, 'The prevention, diagnosis and management of delirium in older people: concise guidelines'. *Clinical Medicine*. 6(3):303-8.
- Scottish Intercollegiate Guidelines Network 2006, 'Management of patients with dementia. A national clinical guideline' (*SIGN publication; no. 86*). Viewed 2 August 2007 www.sign.ac.uk/pdf/sign86.pdf
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- Collaboration of the NSW Centre for Mental Health and the Faculty of Psychiatry of Old Age, RANZCP, NSW Branch for primary care health professionals 2001, *Consensus Guidelines for Assessment and Management of Depression in the Elderly*. Viewed 2 August 2007 www.health.nsw.gov.au/policy/cmh/publications/depression/depression_elderly.pdf
- Cook IA, on behalf of the American Psychiatric Association 2004, *Guideline watch: Practice guideline for the treatment of patients with delirium*. Viewed 2 August 2007 www.psych.org/psych_pract/treatg/pg/DeliriumWatch_081104.pdf

Updated summary and recommendations

Several new studies of varied methodological quality were identified and have been summarised below. The meta-analysis by Woods et al. (2005) was rigorously conducted whereas the analysis conducted by Sitzer et al. (2006) had a number of limitations. Trials included in both the meta-analyses tended to be of suboptimal quality and underpowered, and findings suggested further research is required. Although two systematic reviews of delirium and depression interventions have been attempted, the heterogeneity and poor quality of the studies included meant that a proper meta-analysis could not be performed. The two randomised controlled trials (RCTs) were of relatively low quality.

Dementia

A meta-analysis of four RCTs (total of 144 participants) assessing the effect of reminiscence therapy (RT) on older people with dementia demonstrated some evidence that RT reduces caregiver strain ($p=0.003$) and improves patient cognition (mini-mental state examination (MMSE) at follow-up weighted mean difference (WMD) of 4.37, $p=0.02$). (Level I, [1])

According to the meta-analysis of 17 randomised and non-randomised controlled trials with a total of 563 participants, cognitive training (restorative or compensatory strategies) may have some benefit (small to medium overall effect) to cognitive and functional abilities of people with Alzheimer's disease. (Level III-1, [2])

- There is some evidence to support the use of reminiscence therapy to reduce caregiver strain and improve cognition in older people with dementia.
- There is limited evidence to support the use of cognitive training to improve cognition and functional abilities in people with Alzheimer's disease.

Delirium

A systematic review of six RCTs (total of 833 participants) for preventing delirium in hospitalised patients identified only one study that was sufficiently powered for further analysis. The analysis showed there was some evidence that a proactive geriatric consultation in patients undergoing hip fracture surgery is of benefit in reducing delirium incidence (number needed to treat (NNT)=six patients to prevent one case of delirium), however the effect size was not significant once adjusted for dementia and activities of daily living (ADL) function. (Level 1, [3])

This same study was included in the systematic review by Weber et al. (2004), which was identified in the previous guideline document.

- There is some evidence to support geriatrician pre- and post-operative assessment of older orthopaedic surgery inpatients.

Vitamin B12, folic acid and cognition

An RCT (195 participants) of low quality reported that oral supplementation with vitamin B12 alone or in combination with folic acid taken for 24 weeks did not improve cognition among older people. (Level II, [4])

- Further evidence is required to support the use of vitamin B12 with or without folic acid for improving cognition in older people.

Depression and emotional health

A systematic review of eight RCTs and two clinically controlled trials (total of 1166 participants) assessed the effectiveness of brief (<12 weeks in duration) interventions to prevent depression in older subjects, such as life review and cognitive-behavioural educational techniques. Although only two of the trials were of good quality, they concluded that some types of brief interventions appear to have the potential to prevent depression in older people (median relative risk (RR) 61 per cent). (Level III-1, [5])

- There is limited evidence to support the use of brief duration interventions, such as life review and cognitive-behavioural education, to prevent depression in older people.

Exercise and emotional health

An RCT (224 participants) assessed the effects of three exercise programs run twice weekly for six months on participants' perceived health, quality of life, vitality and depression. Compared with the control group there was a small but significant decline in one quality of life measure (dementia quality of life aesthetics sub-score only) among those in the strength training group, and a significant decline in quality of life, perceived health and vitality scores in the combined training group. The clinical benefit of exercise on the emotional health of older people living residential care is unclear. (Level II, [6])

- There is no evidence to support the use of strength (resistance or functional) training exercises to improve quality of life or emotional wellbeing in older people living in residential care.

Additional links to mobility, vigour and self-care guidelines

Current guidelines addressing falls include:

- Registered Nurses' Association of Ontario 2005, *Nursing best practice guideline. Prevention of falls and fall injuries in the older adult*. Viewed 23 July 2007 www.rnao.org/bestpractices/PDF/BPG_Falls_rev05.pdf
- National Institute for Health and Clinical Excellence 2004, Clinical practice guideline for the assessment and prevention of falls in older people. Viewed 23 July 2007 www.guidance.nice.org.uk/CG21/guidance/pdf/English

Updated summary and recommendations

Several studies were identified that assessed falls and fracture prevention, and exercise interventions. These have been described in detail below. A number of RCTs were of low quality and subject to bias due to inadequate allocation concealment, lack of assessor blinding and intention to treat (ITT) analysis.

Falls and fracture prevention

A meta-analysis reported that multifaceted approaches to preventing falls in hospital reduced the incidence of falls by 18 per cent, but did not have an effect on the incidence of fractures or of falls among fallers. In care homes the use of hip protectors was the only single intervention found to reduce the rate of hip fractures (33 per cent reduction). Pooled analysis of eight RCTs set in care homes found there was no significant effect on falls incidence from multifaceted interventions and no single intervention was shown to be effective in the hospital setting. The limitations of this well-conducted review include the heterogeneity of study settings, participants, and that components of the interventions varied. (Level III-2, [7])

- There is good evidence to support the use of multifaceted approaches to reduce falls rate in hospital settings.
- Hip protectors may be used in residential care settings to reduce the incidence of hip fractures.

In a low-quality randomised controlled study (313 participants) assessing a multifactorial intervention to prevent falls in older people with recurrent falls attending emergency departments, falls were reduced by 36 per cent in the intervention group compared with the conventional care group. However, there were no differences between the groups in the proportion of subjects who fell again. This study lacked analyses that looked at time to first fall, and incidence rate ratios (IRR) of falls. (Level II, [8])

- There is limited evidence to support the use of a multifactorial intervention to prevent falls in people experiencing recurrent falls who attend emergency departments.

Specialist wards

A moderate-quality RCT (199 participants) demonstrated that a specialised geriatric orthopaedic ward could significantly reduce falls incidence (IRR 0.38, $p=0.06$) and fall-related injuries in inpatients after a femoral neck fracture, when compared with conventional care on an orthopaedic ward. (Level II, [9])

- There is some evidence to support the use of specialist geriatric orthopaedic wards to reduce falls incidence and fall-related injuries among post-operative hip fracture inpatients.

Vitamin D supplements

Three recently published RCTs (two of good quality and one of low quality) assessed the use of vitamin D supplements in **residential care facilities**.

An Australian-based multicentre trial (625 participants) reported a significant reduction in the rate of falls (IRR=0.73) in participants receiving a vitamin D supplement compared with the control group. There were no differences in time to first fall, or in odds of ever falling or ever sustaining a fracture. Subgroup analysis of subjects with 50 per cent or higher compliance with treatment revealed a further reduction in the rate of incident falls and a lower risk of sustaining a fall, but no significant reduction in fracture incidence. There were a high number of drop outs from death or illness, and a change in the manufacturer's dose of vitamin D from 10,000 IU weekly to 1,000 IU daily during the course of the study. (Level II, [10])

A further moderate quality RCT (124 participants) reported outcomes following the use of varying doses of vitamin D. In keeping with the Australian study, participants receiving the high dose vitamin D (800 IU) had a significantly lower (72 per cent) falls IRR than the control group. These differences were not seen in the groups receiving lower doses of vitamin D 200, 400 or 600 IU and there were no significant differences in time to first fall when groups receiving vitamin D were compared with the control group. (Level II, [11])

One low quality RCT (3717 participants) in which participants were randomly allocated by residential care unit (cluster design) reported no evidence that vitamin D supplementation (with calcium) prevents falls or fall-related fractures. (Level II, [12])

- There is good evidence to support the use of vitamin D supplementation (daily dose 800–1000 IU) for the prevention of falls in older people in residential care.

Exercise interventions

One high-quality meta-analysis of RCTs set in acute hospitals found evidence that multidisciplinary interventions that included exercise reduced in-hospital length of stay (small effect), cost of hospital stay and increased the proportion of patients directly discharged to home (small effect). However, pooled analysis of two exercise-only RCTs (396 participants) showed no significant change in functional measures or discharge destination and pooling of three trials (total of 696 participants) showed that exercise alone did not influence acute hospital length of stay. (Level I, [13]).

- There is good evidence to support the use of multidisciplinary interventions that include a component of exercise to reduce in-hospital length of stay, increase the proportion of patients directly discharged to home and reduce costs of stay for older acute hospital inpatients.

A number of studies have assessed exercise interventions in **residential care facilities**.

A low-quality systematic review of 16 RCTs reported a positive effect of physical training on muscle strength, mobility and range of movement but contradictory evidence regarding gait, ADLs, balance and endurance. Authors reported the trials were heterogeneous in the type of interventions and outcome measures, although they were tabulated according to type of physical training and with regard to seven assessment variables. No meta-analysis was performed. (Level I, [14])

There is some evidence to support an exercise intervention (one hour, twice a week for 12 months) for ambulatory nursing home residents with Alzheimer's disease to slow the decline in ability to perform activities of daily living (6.7 per cent benefit relative to control group), and improve walking speed. There was no effect on nutritional status, behavioural disturbance or depression measures. This RCT (134 participants) was of moderate quality. Of note were the five falls that occurred during the exercise sessions. (Level II, [15])

Assessment of three types of exercise (45–60 minutes, twice weekly for six months) in an RCT (224 participants, 4 groups) suggested functional-skills training or a combination of resistance and functional-skills training improved some functional measures but only in those who attended at least 75 per cent of exercise classes (97 participants). There were no significant differences between exercise groups and controls reported in the ITT analysis. This study was of moderate quality and had the potential to be underpowered due to small sample sizes and moderately high drop-out rates. (Level II, [16])

An RCT (191 participants, 4 groups) of moderate quality reported that when compared with those in the control activity groups, all those receiving the exercise intervention (high-intensity functional exercise program) showed small but significant improvements in self-pace gait speed immediately after the intervention period (three months). This improvement was sustained at six months along with improvements in balance and lower limb strength. (Level II, [17])

There is weak evidence from an RCT of low quality (59 participants) to suggest range of motion exercise interventions targeting residents following a stroke (supervised or with assistance provided) will improve activity function (small change in mean difference of ADL subscale of functional independence measure (FIM) – clinical significance not discussed), perception of pain, and depressive symptoms. (Level II, [18])

- There is some evidence to support the use of an exercise intervention to slow the decline in ADL function and improve walking measures in nursing home residents with Alzheimer's disease. It is recommended that close supervision be provided during exercise sessions to reduce the risk of falls.
- There is some evidence to support the benefit from exercise interventions provided at least twice weekly for older people in residential care settings.
- Further evidence is required to support the use of a protein supplement following an exercise session.

Ward-based interventions

Interventions based in the emergency department

A poor-quality systematic review of 27 studies (six RCTs, two non-RCT's, and 19 observational studies) evaluated interventions for older people discharged from the emergency department. Three of the trials found that the use of a specially trained nurse to perform a geriatric assessment and component of home-based care had positive effects on functional status ($p < 0.05$). A pooled analysis was not performed, and all studies had methodological flaws. Although the authors included observational studies, only the eight clinical trials underwent an assessment of methodological quality. (Level III-2, [19])

A poor-quality RCT evaluating the effectiveness of geriatric assessment provided by an aged care nurse in an emergency department showed no significant effect on hospital admission rates, length of stay, or functional decline during the hospitalisation. (Level II, [20])

- There is limited evidence to support specialist geriatric nursing assessment and home-based services to improve functional outcomes for older people discharged from the emergency department.

Specialist geriatric wards

One RCT was unable to show evidence that the treatment of acutely sick, frail older patients on a geriatric evaluation and management unit was of long-term benefit to their function, symptoms of depression or general wellbeing when compared with patients on general medical wards (MW). There was some evidence that at three months post discharge mortality was higher in the MW group, but at 12 months mortality was the same across both groups. There were a number of methodological flaws in this trial such as the high drop-out rates, the lack of ITT analysis, the limited statistical measures reported, the lack of reporting of power calculations, and it was unclear if assessors had been blinded to the treatment allocation. (Level II, [21])

- Further evidence is required to support the use of geriatric evaluation and management units for the management of acutely sick, frail older patients.

Additional links to continence guidelines

Current guidelines addressing aspects of continence include:

- Registered Nurses' Association of Ontario 2005 (Revised), Nursing best practice guideline. *Prompting Continence Using Prompted Voiding*. Viewed 27 June 2007 www.rnao.org/Page.asp?PageID=924&ContentID=813
- Registered Nurses' Association of Ontario 2005 (Revised), *Nursing best practice guideline. Prevention of constipation in the older adult population*. Viewed 27 June 2007 www.rnao.org/bestpractices/PDF/BPG_Prevent_Constipation_rev05.pdf
- Scottish Intercollegiate Guidelines Network 2004, *Management of urinary incontinence in primary care*. Viewed 23 July 2007 www.sign.ac.uk/pdf/sign79.pdf
- National Institute for Health and Clinical Excellence 2007, *Faecal incontinence: the management of faecal incontinence*. Viewed 23 July 2007 www.nice.org.uk/CG49

Updated summary and recommendations

Three RCTs and one well-conducted systematic review have been summarised below. Most trials included in the systematic review and RCTs had significant methodological limitations including lack of statistical power, ITT analysis, adequate allocation concealment, and the majority were subject to bias due to lack of assessor blinding.

Urinary incontinence

A systematic review of seven trials (399 participants) reported that there was very little evidence from stroke-specific trials for the prevention and management of incontinence to guide practice for managing adults who have suffered a stroke. Two trials provided some evidence that specialist professional input through structured assessment and management of care may reduce urinary incontinence after a stroke (RR=0.77 and 0.06). The seven studies identified in the review lacked homogeneity to allow pooling of data. (Level III-1, [22])

- There is some evidence to support the use of specialist professional input through structured assessment and management of care to reduce urinary incontinence in adults after stroke.

The use of habit training with an electronic monitoring device did not show a significant improvement in the frequency or severity of urinary incontinence for the duration of an acute hospital admission compared with standard habit training. At one month post discharge there was a significant reduction in the severity of incontinence in the intervention group, but data from 12 of the participants was missing in this analysis. Authors reported issues with the use of the device that the trial was underpowered (41 participants) and further trials are required. (Level II, [23])

- Further evidence is required to support the use of habit training with an electronic monitoring device to reduce incontinence during or after a period of acute care hospitalisation.

Continence and mobility

Two RCTs (total of 337 participants) assessed functional incidental training (FIT) that involved the use of prompted toileting, toileting assistance, encouragement to drink fluids as well as endurance and strengthening exercises provided by additional staff. Both trials were set in nursing homes but varied in their intervention duration, follow-up time, and some of the outcomes measured. There were significant improvements in upper limb strength and endurance following FIT in both trials. One trial also reported improvements in median timed walking (improvement in 6m walk by 1.5 and 1.6 sec compared with a decline in the control group, $p < 0.01$), lower limb strength, and all urinary continence measures ($p < 0.01$), but no changes were seen in measures of faecal incontinence. (Level II, [24, 25])

- There is some evidence to support the use of functional incidental training in nursing homes to improve endurance, strength, and reduce urinary incontinence. The use of this intervention may be associated with additional staff cost implications.

Additional links to nutrition guidelines

Current guidelines addressing aspects of nutrition include:

- National Institute for Health and Clinical Excellence 2006, Developed by National Collaborating Centre for Acute Care. Nutrition support in adults: oral nutrition support, enteral tube feeding and parenteral nutrition. Viewed 2 August 2007 www.guidance.nice.org.uk/CG32/guidance/pdf/English
- Australian and New Zealand Intensive Care Society Clinical Trials Group endorsed project 2005, Evidence-based guidelines for nutritional support of the critically ill: results of a bi-national guideline development conference. Carlton (Australia). Viewed 2 August 2007 www.evidencebased.net/files/EBGforNutSupportofICUpts.pdf

Updated summary and recommendations

A number of recently conducted meta-analyses and RCTs assessing nutritional interventions were identified and have been summarised below. Although the two meta-analyses were rigorously conducted many of the trials included had methodological limitations specifically regarding allocation concealment, assessor blinding and ITT analysis that would increase the risk of bias. Similarly, the two RCTs discussed below share these limitations. The RCT by Miller et al. (2006) was of good quality as it adequately addressed these aspects of the methodology.

Nutritional supplementation

A meta-analysis of 21 RCTs and quasi-RCTs (1727 participants) reported some evidence to support the use of nutritional supplementation in older people recovering from hip fracture. Both oral multinutrient supplements and high-protein-containing supplements did not have an effect on mortality, but significantly reduced unfavourable outcomes (combined outcome of mortality and survivors with medical complications) by 48 per cent and 22 per cent respectively. High-protein supplements were also found to reduce length of stay in rehabilitation settings. There was no evidence that nasogastric tube feeding with or without oral supplements; or vitamin supplements; or the use of dietetic assistants had an effect on mortality or complications. (Level III-1, [26])

A meta-analysis (25 trials; 6852 participants) of RCTs and quasi-RCTs demonstrated that oral nutritional supplements improved nutritional status, reduced mortality (odds ratio (OR)=0.66) and reduced complications for undernourished hospitalised older patients, but not for older people living at home or for well-nourished older patients in any setting. Interestingly, meta-analysis of 12 trials (5991 participants) with clearly concealed randomisation resulted in a significant reduction in mortality favouring treatment (OR=0.84). Pooled subgroup analysis

from 38 trials showed that nutritional supplements also produced a small but consistent weight gain in older people in all settings. (Level I, [27]).

- There is good evidence to support the use of oral multivitamin and high-protein supplements for the prevention of unfavourable outcomes in older people recovering from hip fracture.
- There is some evidence to support the use of high-protein-containing supplements to reduce length of stay for older people in inpatient rehabilitation and other high-risk settings.
- There is good evidence to support the use of oral nutritional supplements (protein and energy) for reducing mortality and complications, and for improving nutritional status in undernourished hospitalised older patients and may be considered for those who would benefit from weight gain.

High-carbohydrate food

Evidence from this small RCT (34 participants) suggests that the use of a high-carbohydrate dinner (HCD) in nursing home residents with Alzheimer's disease increased food and energy intake ($p < 0.01$), but did not lead to a change in group body weight. Higher consumption of carbohydrates did not affect the intake of protein. Authors reported the need for further studies assessing the long-term response to HCD. (Level II, [28])

- There is limited evidence to support the use of high-carbohydrate dinners for nursing home residents with Alzheimer's disease.

Feeding assistance

A poor-quality cluster RCT (592 participants) examining the effectiveness of health care assistants trained to provide additional support with feeding of acutely ill older hospitalised patients, found no effect on the improvement in nutritional status, hospital length of stay, or mortality. However there was a significant reduction in the need for intravenous antibiotics, and on average 50 per cent less need for subcutaneous over intravenous fluids in patients receiving the intervention. This trial lacked adequate allocation concealment and blinding of outcome assessment. (Level II, [29])

- Further evidence is required to support the use of specialist nutrition support provided by trained health care assistants for acutely ill older inpatients.

Nutritional supplementation and exercise

Evidence from this small RCT (100 inpatients, 4 groups) following lower limb fracture found that the use of oral nutritional supplements did not have any significant effect on physical performance or quality of life, but that patients receiving resistance training without concurrent nutritional support had significantly different mean percentage weight change (lost more weight; $p = 0.029$) over 12 weeks compared with those in the group receiving both exercise and nutritional supplementation. (Level II, [30])

- There is limited evidence to support the use of resistance training, used in combination with nutrition supplementation, to improve weight gain in older, nutritionally at-risk inpatients following a lower limb fracture.

Additional links to skin integrity guidelines

Current guidelines addressing aspects of skin integrity include:

- Registered Nurses' Association of Ontario 2007 (Revised), *Nursing best practice guideline. Assessment and Management of Stage I - IV Pressure Ulcers* Viewed 2 August 2007 www.rnao.org/Storage/29/2371_BPG_Pressure_Ulcers_I_to_IV.pdf
- Royal College of Nursing of London 2005, *The management of pressure ulcers in primary and secondary care: A Clinical Practice Guideline*. Viewed 2 August 2007 www.rcn.org.uk/publications/pdf/guidelines/rcn_guidelines.pdf
- Queensland Health, Queensland Government 2004, *Pressure ulcer prevention and management resource guidelines*. Viewed 2 August 2007 www.health.qld.gov.au/quality/Publication/pressure_mgt2004.pdf

Updated summary and recommendations

Six studies were identified and their findings have been summarised below. Although the meta-analyses and systematic reviews were well conducted, many of the trials included had methodological limitations that increased the risk of bias due to inadequate randomisation methods, assessor blinding and ITT analysis. The additional two RCTs share these limitations.

Support surfaces

A meta-analysis of 41 RCTs assessing the effect of support surfaces for pressure ulcer prevention demonstrated that, compared with standard foam mattresses, alternative foam mattresses were effective in reducing pressure ulcer incidence in people at risk by 60 per cent. There was some evidence from one RCT* that pressure-relieving overlays on the operating table reduces (by 47 per cent) postoperative pressure ulcer incidence. However there was insufficient evidence to draw conclusions on the value of seat cushions, limb protectors and various constant low-pressure devices. (Level I, [31]).

* *This same study was included in the systematic review by Cullum et al. (2004), which was identified in the previous guideline document.*

In a more recent systematic review in which an additional seven studies were identified that assessed support surfaces, the findings of the above meta-analysis were further supported. (Level I, [32]) This review is discussed further below.

An RCT (1720 participants) comparing the use of an interface pressure-decreasing mattress (Kliniplot mattress) with the use of a standard mattress found no evidence of a reduction in pressure sore incidence or severity of pressure sores, but a significant difference in the

median time for the development of pressure sores. A potential issue was that ‘randomisation by bed’ was used. (Level II, [33])

- There is strong evidence to support the use of appropriate pressure-relieving support surfaces and strategies – in particular alternative foam mattresses and pressure-relieving overlays to reduce the risk of pressure ulcers for patients at high risk.
- There is some evidence to support the use of pressure-relieving overlays on the operating table to reduce postoperative pressure ulcer incidence.

Repositioning

An RCT (235 participants) compared repositioning alternately for two hours in a lateral position and four hours in a supine position, with repositioning every four hours and found that more frequent repositioning did not reduce the incidence of pressure ulcers or their severity. (Level II, [34])

Reddy et al. (2006) identified two trials (884 participants) that evaluated repositioning interventions and found only weak evidence to support the use of turning patients every four hours combined with the use of a specialised foam mattress compared with turning every two hours on a standard hospital mattress. No meta-analysis of these trials was performed due to study heterogeneity. (Level I, [32])

- There is limited evidence to support the use of turning patients every four hours combined with the use of a specialised foam mattress to reduce the development of pressure ulcers.

Topical skin care

A systematic review of 11 studies (one systematic review, three RCTs and seven non-RCTs) evaluating the effectiveness of topical skin care interventions for residents of aged care facilities, reported that the evidence favouring topical skin care agents was poor and inconclusive. The authors were unable to perform meta-analysis as the included studies were heterogeneous, with studies conducted against different comparators, measuring different outcomes or presenting data in different formats. (Level III-2, [35])

Topical skin care was also assessed in the systematic review by Reddy et al. (2006) as discussed below.

Nutrition, mobility and skin integrity

As well as support surfaces and repositioning, the systematic review by Reddy et al. (2006) looked at other interventions that targeted impaired mobility, impaired nutrition and impaired skin health for the reduction of pressure ulcer incidence. There was some evidence that optimising nutritional status (from one large RCT of low quality, risk of pressure ulcer development was 57 per cent greater in the control group) and weak evidence that moisturising the sacral skin has an effect on the prevention of pressure ulcers. (Level I, [32])

Nutrition and skin integrity

A systematic review of 15 clinical trials and cohort studies (total number of 3216 participants) assessed the impact of enteral nutritional support on pressure ulcer incidence in high-risk adult patients. Results from the individual studies showed a trend towards improved healing of existing pressure ulcers. The review also highlighted the need for further research

to confirm this trend. Comparative analysis with the data from non-randomised studies was not performed. (Level III-2, [36])

A meta-analysis of the five RCTs (1325 participants) found that enteral nutritional support, particularly with high protein contents, could significantly reduce the incidence of pressure ulcers (NNT 19.25 patients to prevent one pressure ulcer). (Level I, [36])

- There is good evidence to support the use of enteral nutritional supplements such as oral high-protein supplements for reducing the risk of pressure ulcers in patients who are at risk.
- There is weak evidence to support the use of sacral skin moisturising to prevent the incidence of pressure ulcers in patients at risk.

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