Australian and New Zealand Guideline for Hip Fracture Care

Improving Outcomes in Hip Fracture Management of Adults

September 2014





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Disclaimer: This document is a general guide to appropriate practice, to be followed subject to the clinician's judgment and patient's preference in each individual case. The guideline is designed to provide information to assist decision making and is based on the best evidence available at the time of development of this publication.

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Publication Approval



Australian Government

National Health and Medical Research Council

This guideline was approved by the Chief Executive Officer of the National Health and Medical Research Council (NHMRC) on 24 June 2014, under Section 14A of the *National Health and Medical Research Council Act 1992*. In approving this guideline the NHMRC considers that it meets the NHMRC standard for clinical practice guidelines. This approval is valid for a period of 5 years.

NHMRC is satisfied that it is based on the systematic identification and synthesis of the best available scientific evidence and makes clear recommendations for health professionals practising in an Australian health care setting.

This publication reflects the views of the authors and not necessarily the views of the Australian Government.

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The Guideline was drafted by Professor Jacqueline Close and Ms Lesley Gillespie on behalf of the ANZHFR Steering Group and based at Neuroscience Research Australia (NeuRA). We acknowledge the time and support provided by staff at NeuRA and the use of the facilities to host meetings.









Endorsements

The following professional bodies and organisations have formally endorsed the Australian and New Zealand Guideline for Hip Fracture Care:

Australasian College for Emergency Medicine

Australasian Faculty of Rehabilitation Medicine

Australian and New Zealand Orthopaedic Nurses Association

Australian and New Zealand Society for Geriatric Medicine

Australian Orthopaedic Association

Carers NSW

New Zealand Orthopaedic Association

Osteoporosis Australia

Osteoporosis New Zealand

Royal Australasian College of Surgeons



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The Australian and New Zealand Guideline for Hip Fracture Care is designed to help professionals providing care for people with a hip fracture to deliver consistent, effective and efficient care. Every person with a hip fracture should be given the best possible chance of making a meaningful recovery from a significant injury and strategies should be put in place to reduce the occurrence of future falls and fractures. The recommendations reflect the journey of a person with a hip fracture and take into account their perspective, as well as the perspective of their family and carers.

- The person with the hip fracture should be an active partner in any decisions made in the hip fracture journey.
- Family/carers should also be active partners unless the person with the hip fracture does not consent to their involvement. Family/carers will be particularly important if the person is unable to make decisions.
- The person with the hip fracture and their family/carers should be kept informed about the care they receive. Information and advice should be provided verbally as well as in printed form.
- Use of professional interpreters is encouraged and printed information should be available in relevant community languages.
- An orthopaedic surgeon and geriatrician should work in partnership to provide the care for someone with a hip fracture.
- The diagnosis of a hip fracture should be made in a timely manner.
- Prompt assessment and effective management of pain is critical to the experience of the person with a hip fracture.
- If surgery is the chosen approach, then it should be undertaken on the day of or day after initial presentation.
- The person with the hip fracture should be medically optimised prior to surgery being undertaken.
- The choice of surgical procedure should reflect the best evidence available.
- People should be offered the opportunity to sit out of bed and start the process of walking again the day after surgery taking weight on the affected limb as pain permits.
- The opportunity to walk and regain function should be available at least daily.
- Rehabilitation should be offered to people with the potential to achieve goals relating to improvements in function.
- Even if a hip fracture occurs in a person who is close to death, the main aims are to minimise suffering (with or without surgery) and meet the patient's needs and wishes.

The Australian and New Zealand Guideline for Hip Fracture Care is designed to help professionals providing care for hip fracture patients to deliver consistent, effective and efficient care. The ultimate goal is to ensure that every hip fracture patient is given the maximum chance of making a meaningful recovery from a significant injury. Recommendations contained in the Guideline originate from the NICE Clinical Guideline – *The Management of Hip Fracture in Adults.*¹ Using the internationally agreed ADAPTE process,² the NICE Clinical Guideline was modified by the Australian and New Zealand Hip Fracture Guideline Adaptation Committee to reflect the Australian and New Zealand context. Each recommendation is assigned a type of recommendation as defined in the *Procedures and Requirements for Meeting the 2011 NHMRC Standard for Clinical Practice Guidelines.*³ In addition, each evidence-based recommendation is then given an overall evidence grade based on NHMRC guidance.⁴

Definition of types of recommendations

Type of recommendation	Definition
Evidence-based recommendation	Recommendation formulated after a systematic review of the evidence, with supporting references provided
Consensus-based recommendation	Recommendation formulated in the absence of quality evidence, when a systematic review of the evidence has failed to identify any studies meeting the inclusion criteria for that clinical question
Practice point	A recommendation that is outside the scope of the search strategy for the systematic evidence review, based on expert opinion and formulated by a consensus process

Definition of NHMRC grades of recommendations

Grade of recommendation	Description
А	Body of evidence can be trusted to guide practice
В	Body of evidence can be trusted to guide practice in most situations
С	Body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution

Summary of recommendations

Type of recommendation	Recommendations	Evidence grade	Relevant section in Guideline
	Diagnosis and pre-operative care		
Consensus-based recommendation	Offer magnetic resonance imaging (MRI) if hip fracture is suspected despite negative anteroposterior pelvis and lateral hip X-rays. If MRI is not available within 24 hours or is contraindicated, consider computed tomography (CT).	-	3.1
Consensus-based	Assess the patient's pain:		
recommendation	 immediately upon presentation at hospital and 		
	• within 30 minutes of administering initial analgesia and		
	 hourly until settled on the ward and 		
	 regularly as part of routine nursing observations throughout admission. 		
	Offer immediate analgesia to patients presenting at hospital with suspected hip fracture, including people with cognitive impairment.		
	The choice and dose of analgesia should be age appropriate with close monitoring for associated side effects.		
	Ensure analgesia is sufficient to allow movements necessary for investigations (as indicated by the ability to tolerate passive external rotation of the leg), and for nursing care and rehabilitation.		
	Offer paracetamol every 6 hours unless contraindicated.		
	Offer additional opioids if paracetamol alone does not provide sufficient pain relief.		
	Caution is advised when considering the use of non-steroidal anti-inflammatory drugs in what is predominantly an older population.		
Evidence-based recommendation	Consider adding nerve blocks if systemic analgesia does not provide sufficient pain relief, or to limit opioid dosage.	С	3.2
Practice point	Nerve blocks should be administered by trained personnel.	-	3.2
Practice point	Do not use nerve blocks as a substitute for early surgery.	-	3.2
Evidence-based recommendation	Perform surgery on the day of, or the day after presentation to hospital with a hip fracture.	С	3.3

Practice point	Identify and optimise correctable co-morbidities immediately so that surgery is not delayed by: • anaemia • anticoagulation • volume depletion • electrolyte imbalance • uncontrolled diabetes • uncontrolled heart failure • metabolic derangement • correctable cardiac arrhythmia or ischaemia • acute chest condition or exacerbation of chronic chest	-	3.3
	conditions		
Consensus-based recommendation	Offer patients a choice of regional or general anaesthesia after discussing the risks and benefits.	-	4.1
Consensus-based recommendation	Consider intraoperative nerve blocks for all patients undergoing surgery.	-	4.1
Consensus-based recommendation	Schedule hip fracture surgery on a planned list or planned trauma list where an appropriately skilled team is available to undertake the procedure.	-	4.2
	Operative intervention		
Evidence-based recommendation	Perform replacement arthroplasty (hemiarthroplasty or total hip replacement) in patients with a displaced intracapsular fracture.	С	5.1
Consensus-based recommendation	Use a femoral stem design other than Austin Moore or Thompson stems for arthroplasties.	-	5.1
Evidence-based recommendation	 Offer total hip replacement to patients with a displaced intracapsular fracture who: were able to walk independently out of doors with no more than the use of a stick and are not cognitively impaired and are medically fit for anaesthesia and the procedure. 	С	5.1
Consensus-based recommendation	Use cemented stem implants in patients undergoing surgery with arthroplasty.	-	5.2
Consensus-based recommendation	Both extramedullary sliding hip screw devices and intramedullary nails are suitable for use in patients with trochanteric fractures above and including the lesser trochanter (AO classification types A1 and A2).	-	5.3
Consensus-based recommendation	Use an intramedullary nail to treat patients with a reverse oblique fracture.	-	5.3
Evidence-based recommendation	Use an intramedullary nail to treat patients with a subtrochanteric fracture.	В	5.3
Practice point	Operate on patients with the aim to allow them to fully weight bear (without restriction) in the immediate post-operative period.	-	5.4

	Post-operative mobilisation strategies		
Evidence-based recommendation	Unless medically or surgically contraindicated, mobilisation should start the day after surgery. Offer patients a physiotherapy assessment.	C	6.1
Consensus-based recommendation	Offer patients mobilisation at least once a day and ensure regular physiotherapy review.	-	6.2
	Models of care		
Evidence-based recommendation	From admission, offer patients a formal, acute orthogeriatric service that includes all of the following:	В	7.1
	 regular orthogeriatrician assessment 		
	 rapid optimisation of fitness for surgery 		
	 early identification of individual goals for multidisciplinary rehabilitation to recover mobility and independence, and to facilitate return to prefracture residence and long-term wellbeing 		
	 early identification of most appropriate service to deliver rehabilitation 		
	 continued, coordinated, orthogeriatric and multidisciplinary review and discharge planning liaison or integration with related services, including falls prevention, secondary fracture prevention, mental health, cultural services, primary care, community support services and carer support services. 		
Practice point	If a hip fracture complicates or precipitates a terminal illness, the multidisciplinary team should still consider the role of surgery as part of a palliative care approach that:	-	7.1
	 minimises pain and other symptoms 		
	establishes patients' own priorities for rehabilitation		
	 considers patients' wishes about their end-of-life care. 		
Practice point	Healthcare professionals should deliver care that minimises the patient's risk of delirium and maximises their independence, by:	-	7.1
	 actively looking for cognitive impairment when patients first present with hip fracture 		
	 reassessing patients to identify delirium that may arise during their admission 		
	 offering individualised care in line with 'Delirium' (NICE clinical guideline 103). 		
Practice point	Nutritional status should be assessed early in the hospital stay and reassessed during the course of the admission. Tailored interventions should be implemented.	-	7.1

Evidence-based	Consider early supported discharge provided the patient:	С	7.2
recommendation	is medically stable and		
	 has the mental ability to participate in continued rehabilitation and 		
	 is able to transfer and mobilise short distances and 		
	 has not yet achieved their full rehabilitation potential, as discussed with the patient, carer and family. 		
	If unable to meet the criteria for early supported discharge, consider in-patient rehabilitation for those in whom further improvement with a structured multidisciplinary programme is anticipated.		
Practice point	Patients admitted from residential aged care facilities should not be excluded from rehabilitation programmes in the community or hospital, or as part of an early sup- ported discharge programme.	-	7.2
	Patient and carer perspective		
Practice point	Offer patients (or, as appropriate, the carer and/or family) information about treatment and care including:	-	8.1
	• diagnosis		
	• aims of care		
	choice of anaesthesia		
	 choice of analgesia and other medications 		
	surgical procedures		
	possible complications		
	post-operative care		
	rehabilitation programme		
	future fracture prevention		
	healthcare professionals involved in their care		
	how to care for the patient, especially after discharge		
	 support and services to assist the carer/family. 		
	Information should be available in a range of media and in appropriate languages.		
Practice point	Patients (or, as appropriate, the carer and/or family) should be involved in all key decisions in the hip fracture journey. This should include the use of professional interpreters where required and be done in a culturally sensitive manner. Issues to address include:	-	8.1
	 the pros and cons of operative versus non-operative intervention 		
	• goals and limitations of treatment including resuscitation		
	 palliation and end of life care. 		



1.1 Background

A hip fracture is a devastating event for many older people. There were an estimated 16,518 hip fractures among Australians aged \geq 40 years in 2006-07⁵ and 3803 among New Zealanders in 2007.⁶ All too often, hip fracture represents the final destination of a thirty year journey fuelled by decreasing bone strength and increasing falls risk.⁷ Whilst rate of hip fracture appears to be falling, the changing demography is such that the absolute number of people being admitted to our hospitals will continue to increase for the foreseeable future. Recent projections for New South Wales based on 12 years of prior hip fracture data show the potential impact the changing demography will have on the number of people being hospitalised in the future with a hip fracture.



Figure 1.1: Observed (filled markers) and projected hip fracture hospitalisations for two projection scenarios – NSW, Australia. Dashed lines represent projected hospitalisations assuming that fracture rates are held at 2011 levels (rate of change = 0). Solid lines with open circles represent projected hospitalisations under the assumption that the rate of change (1.8 % decline per year) continues into the future.

The two scenarios in Figure 1.1 show the number of men and women by age group likely to be hospitalised for a hip fracture in the future based on either a) a continued decline in rate of hip fracture consistent with what has been seen in New South Wales over the last 12 years (best case) or b) that hip fracture rate is sustained at the 2011 rate (worst case).

The rate of hip fracture may be decreasing in Australia and New Zealand but an Australian Institute of Health and Welfare (AIHW) report provides data to demonstrate a higher and

increasing rate of hip fracture in Aboriginal and Torres Strait Islander populations with indigenous men twice as likely to fracture their hip compared to non-indigenous males (relative risk (RR) 2.01, 95% confidence interval (CI) 1.70 to 2.54).⁵ Indigenous women are also at increased risk of hip fracture (RR 1.26, 95% CI 1.07 to 1.47) and both male and female indigenous people are more likely to fracture at a younger age.

On the other hand, the incidence of hip fracture in the Maori and Pacific Islanders aged 60 and over in Auckland between 1991 and 1994 was 25% to 50% lower than in the European population, and the incidence rates were similar for men and women.⁸

In the event of a person sustaining a hip fracture and leading to hospitalisation, the quality of hip fracture care has been shown to be dependent upon orthopaedic and geriatric service configurations.⁹ In the absence of effective systems of care, key markers of quality of care - including time to surgery, peri- and post-operative complication rates, readmission rates and length of stay - have been demonstrated to vary considerably.¹

Across the world, professional organisations, patient societies and policymakers have recognised the need and opportunity to improve the quality of hip fracture care. In both the United Kingdom¹⁰ and the United States,¹¹ professionally led guidelines advocate similar models of integrated orthopaedic-geriatric co-care. The British Orthopaedic Association (BOA) and the British Geriatrics Society (BGS) led the development of a National Hip Fracture Database (NHFD). The NHFD has become the largest ongoing audit of hip fracture care and secondary prevention in the world, with the care of 61,508 hip fracture presentations during 2012 documented in the 2013 annual report.¹² The work of the NHFD is supported by the availability of high quality clinical guidelines produced by the UK National Clinical Guideline Centre for the National Institute for Health and Care Excellence¹ and national standards of care.^{10,13} This combination of guidelines, standards of care and the mechanism to provide ongoing evaluation has enabled the Department of Health in England to create an incentive mechanism to reward hospitals that deliver high quality care. Reward is dependent on meeting all of the following criteria:

- surgery within 36 hours
- shared care by surgeon and geriatrician
- care protocol agreed by geriatrician, surgeon and anaesthetist
- assessment by geriatrician within 72 hours
- pre- and post-operative abbreviated mental test score assessment
- geriatrician-led multidisciplinary rehabilitation
- secondary prevention of falls
- bone health assessment.

In the 2013 NHFD report, 60% of patients recorded in the database achieved these criteria.¹² A

trend analysis presented in the 2013 NHFD report also demonstrates year-on-year improvements in time to surgery, pre-operative assessment by geriatricians, secondary fracture prevention, a substantial reduction in length of stay and a significant reduction in 30 day mortality.

Cognisant of the work going on internationally and the desire to improve outcomes for hip fracture patients in Australia and New Zealand, a number of key professional societies and organisations, led by a partnership between the Australian and New Zealand Society of Geriatric Medicine (ANZSGM) and the Australian Orthopaedic Association (AOA), have formed the Australian and New Zealand Hip Fracture Registry Steering Group and subsequently a Guideline Adaptation Committee with responsibility for developing the Australian and New Zealand Guideline for Hip Fracture Care.

Representation includes:

- Australian and New Zealand Society for Geriatric Medicine (ANZSGM)
- Australian Orthopaedic Association (AOA)
- Australasian College of Emergency Medicine (ACEM)
- Australasian Faculty of Rehabilitation Medicine (AFRM)
- Australian and New Zealand Bone and Mineral Society (ANZBMS)
- Australian and New Zealand College of Anaesthetists (ANZCA)
- Australian and New Zealand Orthopaedic Nursing Association (ANZONA)
- New Zealand Orthopaedic Association (NZOA)
- Osteoporosis Australia (OA)
- Osteoporosis New Zealand (ONZ)
- Royal Australasian College of Surgeons (RACS)

Agreed goals from the first meeting of the ANZ Hip Fracture Registry Steering Group included:

- 1. The need to develop and endorse an Australian and New Zealand Guideline for the care of hip fracture patients.
- 2. The development and endorsement of nationally agreed quality standards for hip fracture care for Australia and New Zealand to allow for benchmarking nationally and internationally.
- 3. The development of a minimum dataset and consistent data dictionary for comparison of performance.
- 4. The development of a website to share good practice.
- 5. The establishment of a consumer advocacy group to develop a better understanding of the key quality indicators of care from a patient and carer perspective and the need for a registry from a consumer perspective.

- 6. Undertake a baseline audit of services for hip fracture care across Australia and New Zealand and then repeat annually to monitor change.
- 7. Pilot a minimum dataset in a small number of hospitals.

Evidence of variation in practice exists following the 2012 facility level audit of all 116 public hospitals across Australia and New Zealand operating on hip fracture patients. Fifty-four per cent of hospitals reported having an organised geriatric service for hip fracture care and 38% had formal joint care admission policies between orthopaedic surgery and geriatric medicine. Thirty-three per cent of hospitals have fast track protocols for hip fracture patients in the emergency department and 27% have scheduled operating time on trauma lists for hip fracture patients. Fracture liaison services were not widely available (15%) and on discharge, 72% of hospitals had access to public orthopaedic clinics, 41% to falls clinics and 34% to osteoporosis clinics. Of note, 63/116 (54%) of hospitals report already collecting data in some format relating to hip fracture care.

Evidence of variation in processes and outcomes at a patient level also exists. In New South Wales, a recent study looking at time to surgery using linked data shows marked variation between hospitals in the number of patients undergoing surgery within 2 calendar days of admission to hospital (Figure 1.2).

Figure 1.2: Percentage of hip fracture procedures commenced within first two days⁺, NSW public hospitals, 1 July 2000 to 30 June 2011. Adjusted for age, sex and comorbidity of patient.⁺⁺



⁺ Partial day experienced on day of admission counted as a full day.

⁺⁺ Adjustment made by indirect standardization. Expected values generated by logistic regression and 95% confidence intervals shown for estimates.

The data also shows marked variation in 30 day mortality across hospitals, with a suggestion that some of the observed difference is not within the realms of normal statistical or clinical

variation. There is also some evidence from this State-level data that 30 day mortality is significantly lower in hospitals that offer a formal orthogeriatric service (Figure 1.3).





This Guideline represents the first of a number of steps towards improving the care of hip fracture patients across Australia and New Zealand and focuses on the care of those who have sustained a hip fracture. However, it should not be overlooked that much can be done to reduce falls and fractures with a substantial evidence base available to guide practice and shape intervention.

1.2 Purpose of this Guideline

The purpose of the Guideline is to provide clear and concise evidence-based recommendations on a number of aspects of hip fracture care, which if applied, are likely to lead to improved outcomes for the patient as well as delivering cost-effective care. The Guideline is adapted from an existing high quality current guideline¹ and modified for the Australian and New Zealand context. The anticipation is that it will form the basis for developing measurable standards of care for hip fracture patients in Australia and New Zealand.

The Guideline makes recommendations around structures and processes of care as well as direct clinical intervention and is designed to reflect the journey of the hip fracture patient,

targeting the large number of departments, specialists and other clinical staff involved in their care. It predominantly focuses on care in the acute and subacute hospital setting but also acknowledges the role of rehabilitation in the home environment and the importance of models of service delivery that support seamless transitions in care.

1.3 Intended users

The Guideline is intended for use by the large number of clinical staff involved in the care of hip fracture patients. This includes specialists (emergency medicine physicians, anaesthetists, surgeons, geriatricians, general physicians and rehabilitation physicians) as well as nurses and allied health professionals. It is also of relevance to those with managerial and administrative roles which impact on the organisation and delivery of care. Patients, their families and carers may also find this Guideline of use and there are plans to produce a summary document which articulates the recommendations in a manner that is appropriate for patients and their family/ carers.

1.4 Scope of the Guideline

The ANZ Hip Fracture Guideline covers a number of areas of care that are specific to a hip fracture patient. This includes the pre-, peri- and post-operative phases of management of patients with a hip fracture and the rehabilitation phase of care. It does not assume that all patients with a hip fracture will or should undergo surgery but acknowledges that for the majority this is the likely trajectory for care. The Guideline provides evidence-based, relevant, up-to-date information to assist health care professionals involved in the care of these patients with the aim of improving outcomes.

The Guideline Adaptation Committee (the Committee) agreed on the scope and purpose of the proposed Guideline at its first meeting in December 2012. There was a desire not to develop a guideline de novo when existing high quality guidelines could be adapted for the Australian and New Zealand context. The Committee agreed on the clinical questions to be addressed based on the guideline for hip fracture management produced for the UK's National Institute for Health and Care Excellence (NICE).¹ A number of other existing guidelines were considered but after assessing these using the AGREE II instrument¹⁴⁻¹⁶ it was felt that the NICE Guideline offered high quality, current and directly applicable recommendations. Limited resources also influenced the ability to generate new clinical questions.

1.5 Target population

The target population was the same as that in the NICE Guideline.¹

- a) Adults aged 18 years and older presenting to the health service with a clinical diagnosis (firm or provisional) of fragility fracture of the hip. The strict definition of a fragility fracture is one caused by a fall from standing height or less. For the purposes of this guideline, the definition is slightly more flexible to encompass all hip fractures judged to have an osteoporotic or osteopenic basis.
- b) People with the following types of hip fracture: intracapsular (displaced), and extracapsular (trochanteric and subtrochanteric).
- c) Those with comorbidity strongly predictive of outcome, and those without such comorbidity. The influence (if any) of advanced age or gender on clinical decision making, management and outcome will be specifically evaluated.

The following groups were excluded:

- a) People younger than 18 years.
- b) People with fractures caused by specific pathologies other than osteoporosis or osteopenia as these would require more condition-specific guidance e.g. metastatic bone disease.

1.6 Healthcare setting

- a) Hospital settings where pre-operative, operative, and post-operative acute and subacute care are undertaken.
- b) Community, hospital and other care settings, as well as an individual's own home, where rehabilitation is undertaken.

1.7 Clinical issues within the scope of the guideline

The clinical issues considered and the recommendations arising from the ANZ Hip Fracture Guideline are divided into the following subheadings:

- Diagnosis and pre-operative care.
- Peri-operative care.
- Operative intervention.
- · Post-operative mobilisation strategies.
- Models of care.
- Patient and carer perspectives.

The following topics are not directly covered in this guideline, but related guidance is referred to in Section 10:

- a) Primary and secondary prevention of falls and fractures.
- b) Management of osteoporosis.
- c) Prevention and management of pressure injury.
- d) Prevention and management of delirium.
- e) Prophylaxis for venous thromboembolism.
- f) Prevention and management of infection at the surgical site.
- g) Nutritional support.
- h) Selection of prostheses for hip replacement.
- i) National hospital standards of care.

1.8 Main outcomes

- a) Requirement for surgical revision.
- b) Short-term and long-term mortality.
- c) Length of stay in hospital.
- d) Length of time before community resettlement/discharge.
- e) Place of residence (compared with baseline) 12 months after fracture.
- f) Short-, medium- and long-term functional status.
- g) Short-, medium- and long-term quality of life.

1.9 Economic aspects of hip fracture care

The Committee was of the view that there were a number of aspects of hip fracture care that warranted further economic evaluation taking into account the Australian and New Zealand context. Where possible, data have been extrapolated from the original NICE Guideline but there is also recognition that the organisation of health care and the models supporting practice in Australia and New Zealand are sufficiently different to justify future research in this area. Equally, health economic analyses undertaken to date have tended to focus on the component parts of hip fracture care with a limited attempt to take a more global view of overall cost of care.



2.1 Introduction to the ADAPTE methodology

Consistent with the desire to utilise existing high quality guidelines, the Committee used the ADAPTE methodology to produce a hip fracture guideline for Australia and New Zealand.

"**The ADAPTE Collaboration** is an international collaboration of researchers, guideline developers, and guideline implementers who aim to promote the development and use of clinical practice guidelines through the adaptation of existing guidelines. The group's main endeavour is to develop and validate a generic adaptation process that will foster valid and high-quality adapted guidelines as well as the users' sense of ownership of the adapted guideline."²

ADAPTE has been designed to reduce duplication of effort in the development of guidelines, and facilitates the adaptation of one or more high quality guidelines produced in one country or setting for use in a different context. The ADAPTE process consists of three phases: set-up, adaptation, and finalization (Figure 2.1). The ADAPTE documentation includes tools to support each phase.²



Figure 2.1: Summary of the ADAPTE process

2.2 Phase 1: Set up

The ANZHFR Steering Group established a working group based at Neuroscience Research Australia consisting of a Co-Chair of the ANZHFR Steering Group (JC), a research fellow (JD) and a methodologist (LG).

A Guideline Adaptation Committee (the Committee) was established consisting of members of the ANZHFR Steering Group and the working group, along with additional representation from professional groups involved in hip fracture management in Australia and New Zealand and consumer and carer representation (see *Appendix II* for membership). In order to facilitate professional endorsement and implementation of the guideline, some clinicians on the Committee were nominated by professional bodies involved in hip fracture management. Terms of reference were agreed (see *Appendix III*). The role of the Committee was determined as follows:

- · identify a high quality guideline for adaptation
- agree the clinical questions to be addressed in the guideline
- · identify and consider new evidence derived from updated literature searches
- translate the evidence into clinically appropriate recommendations for care
- use a formal consensus process for decision making where there is disagreement
- · identify areas which might be used as measurable quality indicators
- · identify areas where more research is required
- formulate the guideline, and plans for review and update
- ensure that the guideline is a useful and implementable resource for clinicians, managers and patients, and that the guideline is relevant to the Australia and New Zealand healthcare context
- facilitate the dissemination of the guideline through respective professional bodies and societies.

2.3 Phase 2: Adaptation

2.3.1 Scope and purpose

The Committee agreed on the scope and purpose of the proposed guideline at its first meeting in December 2012. The purpose, intended users, scope, and target population have been defined in Sections 1.2, 1.3, 1.4, and 1.5 respectively. The Committee also agreed on the clinical questions to be addressed, based on the guideline for hip fracture management produced for the UK's National Institute for Health and Care Excellence (NICE).¹ The clinical issues within the scope of the guideline are highlighted in Section 1.7 and the detailed clinical questions are listed in *Appendix IV*. The Committee determined that all but two of the original NICE

questions would be covered in the ANZ Hip Fracture Guideline. A recommendation on surgical approach for hemiarthroplasty was not made as it was felt that any such recommendation in the absence of good evidence would not be generalisable or sustainable. The evidence identified in the NICE guideline was of very low quality. No recommendation was made on the effectiveness of an informal carer as this was not felt to be something that clinical teams providing care for hip fracture patients had the ability to influence or change. Evidence was also lacking.

Members of the Committee received no reimbursement for their involvement. Processes were put in place for handling conflict of interest (see *Appendix V*). The NHMRC form for disclosure of potential conflicts of interest was completed by each member of the Committee.

Although the NICE guideline had been selected for adaptation, it was felt that the additional assessments included in the ADAPTE process should be carried out prior to customization. This provided additional confidence that the source guideline was developed rigorously, and also provided in-depth familiarisation with the guideline. All assessments were carried out independently by two members of the working group (LG and either JD or JC). Any disagreements were resolved by discussion or third party adjudication. Having agreed on the clinical questions, the working group then followed the steps outlined in the ADAPTE process. These are detailed in the Technical Report available at *www.anzhfr.org/guidelines*, and included the following stages:

- assessment of guideline currency
- assessment of guideline consistency
- evaluation of search strategies and selection of evidence
- evaluation of scientific validity
- assessment of acceptability and applicability of the recommendations.

2.3.2 Search for guidelines

The Australia and New Zealand Hip Fracture Guideline Adaptation Committee was familiar with the comprehensive guideline produced for the UK's National Institute for Health and Care Excellence¹ but, to be transparent in their selection of a guideline to adapt, searches were carried out to identify additional guidelines for consideration and comparison (see Technical Report at *www.anzhfr.org/guidelines* for details). These had to be comprehensive i.e. not just relating to specific aspects of hip fracture management, published in English, and developed between 2006 and 2013 in order to be clinically relevant and current. Guidelines focussing on clinical issues not covered by the scope of the guideline were excluded e.g. prevention of fragility fractures, or prophylaxis for venous thromboembolism. Searches were completed on March 6th 2013.

Four comprehensive guidelines were identified: one produced by the Association of Anaesthetists of Great Britain and Ireland (AAGBI),¹⁷ an Australian guideline last updated in

2008 and published in the Medical Journal of Australia (MJA),¹⁸⁻²⁰ a guideline published by the Scottish Intercollegiate Guidelines Network (SIGN),²¹ and one produced for the National Institute for Health and Care Excellence (NICE).¹

2.3.3 Assessment of identified guidelines

Identified guidelines were assessed using AGREE II, a validated instrument designed to assess the methodological rigour and transparency with which a guideline has been developed.¹⁴⁻¹⁶ This tool is widely accepted and recommended for assessing guidelines as part of the ADAPTE process. AGREE II consists of 23 key items organised into 6 domains, followed by an overall assessment. Details of this can be found in the accompanying Technical Report available at *www.anzhfr.org/guidelines.*

The three members of the working group completed the online training tools for AGREE II available at *www.agreetrust.org*. Each guideline was then assessed independently by two (AAGBI) or three (NICE, SIGN and MJA) people using the online facility at that website. Assessors made use of the full guidelines and any additional documentation available online such as development manuals and technical reports.

Scaled scores were calculated and are presented graphically to provide a simple and clear measure of comparison (see Figure 2.2).

2.3.4 Selection of a guideline to adapt

The scaled AGREE II scores differentiated between the four guidelines in terms of the process of development and quality of reporting, with the NICE guideline achieving the highest scores. The NICE guideline also achieved the highest 'overall assessment', with all three assessors assigning a score of 6/7. All assessors independently recommended the guideline for use, with modifications to reflect the Australian and New Zealand context.



Domains

Figure 2.2: Scaled AGREE II scores by domain for assessed guidelines

NICE Clinical Guideline - The management of hip fracture in adults

Originally setup in 1999 as the National Institute for Clinical Excellence, and then as the National Institute for Health and Care Excellence in 2005, NICE is a UK-based Non-Departmental Public Body accountable to the Department of Health in England and Wales. Its role is to provide national guidance and advice to improve health and social care through a number of mechanisms including the development of clinical guidelines and quality standards in care. The clinical guidelines are derived from the best evidence available and the recommendations reflect the synthesis of the evidence undertaken by independent committees.

In 2011, NICE published its guideline on the management of hip fracture in adults.¹ The guideline was produced for NICE by the National Clinical Guideline Centre. The National Clinical Guideline Centre (NCGC) is a multidisciplinary health services research team funded by NICE. The guideline produced recommendations on a number of aspects of hip fracture care. Quality standards were developed subsequent to the publication of the guideline¹³ and an evidence update was undertaken in 2012, and published in 2013.²² The purpose of the evidence update was to identify any new literature that might change the recommendations made in the original guideline. The evidence update led to no changes to the existing NICE recommendations and possibly reflects the fact that this is not a rapidly expanding area in medicine, and is of relevance in terms of frequency of future updates.

2.3.5 Customization

Searches of the literature

Search for evidence

Details of the search for evidence and search strategies for each clinical question are available in the full NICE Guideline (see Section 3.2.1 and Appendix D).¹ Multiple databases were searched up to the end of August 2010 for the NICE Guideline, and searches were extended from September 2010 to October 2012 for the Evidence Update.²² No additional searches for evidence were undertaken for the ANZ Hip Fracture Guideline as hip fracture management is not an area of rapidly expanding research.

Searches relating to CALD, Indigenous peoples, and local (Australian and New Zealand) issues

MEDLINE, Embase and CINAHL were searched in June 2013 to identify issues relating to hip fracture care in Indigenous peoples, those from rural and remote settings, and those from culturally and linguistically diverse populations in Australia and New Zealand. Details can be found in the Technical Report available at *www.anzhfr.org/guidelines*.

Achieving consensus on recommendations

Prior to the second meeting of the Guideline Adaptation Committee, a list of all the recommendations from the original NICE Guideline to be included in the Australian and New Zealand Guideline were sent to all Committee members. For each recommendation,

the following information was included: recommendation, clinical/guideline question(s), population, intervention, comparisons, outcomes, search strategy, review strategy, evidence statements, ADAPTE assessments (Tools 14 & 15),² other considerations and final recommendation. See *Appendix VI* for an example of material sent out to the Committee in advance of the meeting.

The Committee met for the second time in April 2013 to consider the recommendations and to customize the guideline for use in Australia and New Zealand. Each recommendation was discussed in turn. Members were asked to identify issues relating to the applicability and acceptability of the recommendations for Australia and New Zealand from their professional or lay perspectives.

Decisions were taken to either accept individual recommendations without making any changes to the wording, or to change the wording to accurately reflect the Australian and New Zealand context. Consensus was defined as a decision reached by the Committee as a whole. Majority view reflects a failure to reach consensus but a view that was reached by the majority of the Committee. Where consensus was not reached, a summary of the differing views is reported. Consensus was achieved for the wording of all recommendations apart from the recommendation relating to the management of extracapsular fractures above or including the lesser trochanter (AO classification types A1 and A2).

"Use extramedullary implants such as a sliding hip screw in preference to an intramedullary nail in patients with trochanteric fractures above and including the lesser trochanter (AO classification types A1 and A2)."

Assessment of recommendations

The developers of the NICE Guideline had assessed the quality of the evidence for each outcome using an adaptation of the GRADE framework: 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group (*www.gradeworkinggroup.org*). For detailed methods relating to the use and reporting of GRADE assessments see Section 3.3.3 in the full NICE Guideline.¹

The ANZ Guideline Adaptation Committee carried out no additional assessments of quality at study level. In subsequent sections, the NICE evidence statements supporting each recommendation are provided, along with the GRADE assessments. Sections of the NICE Guideline containing the full GRADE profiles are referred to.

Each recommendation was assigned a level of recommendation as defined in the *Procedures* and *Requirements for Meeting the 2011 NHMRC Standard for Clinical Practice Guidelines* (see Table 2.1).³ The Guideline includes evidence-based recommendations, consensus-based recommendations, and practice points.

Table 2.1: Definition of types of recommendations

Type of recommendation	Definition
Evidence-based recommendation	Recommendation formulated after a systematic review of the evidence, with supporting references provided
Consensus-based recommendation	Recommendation formulated in the absence of quality evidence, when a systematic review of the evidence has failed to identify any studies meeting the inclusion criteria for that clinical question
Practice point	A recommendation that is outside the scope of the search strategy for the systematic evidence review, based on expert opinion and formulated by a consensus process

In addition, each evidence-based recommendation was assigned an overall grade (see Table 2.2) using the NHMRC's Evidence Statement Form (see *Appendix VII*).⁴ See Technical Report available at *www.anzhfr.org/guidelines* for further details.

Table 2.2: Definition of NHMRC grades of recommendations

Grade of recommendation	Description
А	Body of evidence can be trusted to guide practice
В	Body of evidence can be trusted to guide practice in most situations
С	Body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution

Preparation of draft guideline

After the April 2013 meeting, the draft Guideline and Technical Report were prepared following NHMRC guidance.³ The draft document listing all the recommendations and supporting information was circulated to the Committee in September for further comment. All comments were subsequently collated and a number of changes made to the supporting information and minor changes to the recommendations. The minor changes made to the recommendations reflected feedback from Carers NSW and was agreed to by the Committee through electronic communication.

2.4 Phase 3: Finalization

The Guideline has been through a rigorous external review process including a period of public consultation, review by a methodological expert and content experts. Feedback has been incorporated into the Guideline. It has also been assessed by two reviewers independent of the guideline development process (A/Prof Clare Robertson and Dr Agnes Wilson), using the AGREE II Instrument.¹⁶ Details of the finalization process are included in the Administrative Report. A Dissemination Plan has also been developed. Both documents are available at *www. anzhfr.org/guidelines.*

2.5 Future updating of the Guideline

Future updating of the Guideline will reflect the NHMRC recommendation that clinical guidelines are reviewed and revised no more than five years after initial publication. Given that the Guideline is an adapted version of the NICE Guideline, it is anticipated that updates will reflect any further updates undertaken by the UK National Clinical Guideline Centre for the National Institute for Health and Care Excellence. New clinical questions may be developed in future revisions of the Guideline.

3.1 Imaging options in occult hip fracture

Background

A small number of hip fractures (approximately 3% to 4%) are not apparent on plain anteroposterior (AP) and lateral radiographs of the hip. This figure assumes the radiographs are of satisfactory quality. Where AP and lateral imaging in a position of comfort fails to demonstrate a fracture, a third film centred on the hip with the hip in 10 degrees of internal rotation should be undertaken.

Where there is continuing clinical suspicion of a hip fracture, further imaging should be performed. The purpose of further imaging is to ascertain in a timely manner whether there is a fracture of the hip so that an appropriate management plan can be developed.

Clinical question In patients with a continuing clinical suspicion of hip fracture, despite negative radiographic findings, what is the clinical and cost-effectiveness of additional imaging (radiography after at least 48 hours, radionuclide scanning (RNS), ultrasound (US) and computed tomography (CT)), compared to magnetic resonance imaging (MRI), in confirming, or excluding, a hip fracture?		
Consensus-based recommendation	Offer magnetic resonance imaging (MRI) if hip fracture is suspected despite negative anteroposterior pelvis and lateral hip X-rays. If MRI is not available within 24 hours or is contraindicated, consider computed tomography (CT).	

Summary of the NICE Guideline findings

MRI is considered to be the reference standard as it is judged to have the best sensitivity (100%) and specificity (93-100%). This is dependent on the skill of the interpreting radiologist. No studies were identified comparing additional plain radiographs after 48 hours to MRI. Two studies with a total of 99 subjects (not RCTs) compared radionuclide bone scan with MRI. Only one study (30 participants) was identified that compared ultrasound to MRI. See *Appendix VIII* for references. No studies were identified that directly compared CT with MRI in the original NICE guideline. No cost-effectiveness studies were identified relating to the diagnostic accuracy of any imaging modalities compared to MRI for occult hip fracture.

NICE evidence statements ⁺	GRADE assessment
The sensitivity of bone RNS compared to MRI ranged from 75% to 98%; specificity was 100%. This means that the fracture will have been missed in 2% to 25% of people who have a fracture, and all that had a positive scan do actually have a fracture.	Low quality
No studies were identified on the cost-effectiveness of the diagnostic accuracy of RNS compared to MRI in the diagnosis of occult hip fractures.	NA
Ultrasound has a sensitivity of 100% and a specificity of 65% when compared to MRI. This means that ultrasound identifies all people with a fracture, but 35% of people with a positive result do not actually have a fracture (false positives).	Low quality
No studies were identified on the cost-effectiveness of the diagnostic accuracy of ultrasound (US) compared to MRI in the diagnosis of occult hip fractures.	NA

3 Diagnosis and pre-operative care

No studies were identified directly comparing the diagnostic accuracy of CT with MRI and NA that meet the inclusion criteria.

No studies were identified on the cost-effectiveness of the diagnostic accuracy of CT compared NA to MRI in the diagnosis of occult hip fracture.

*Supporting information is available in the full NICE Guideline Sections 5, 17.1 (Appendix E), and 19.1 Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and identified one systematic review (22 studies) of MRI and CT for the diagnosis of occult hip fractures.²³

The NICE Evidence Update Advisory Group concluded that the findings from the updated search were consistent with the original recommendation in the NICE Guideline.

Considerations for Australia and New Zealand

The Committee considered that the recommendation around imaging is appropriate and no modifications are indicated for the Australian and New Zealand context.

The Committee is aware that access to MRI is not universal in Australia and New Zealand, and in some cases patients would need to be transferred long distances to access MRI. This may not be clinically appropriate and has the potential to cause unnecessary pain and discomfort during the transportation process. The Committee also acknowledges that even in facilities where MRI does exist, timely access to MRI can be an issue and CT may provide a more rapid diagnosis for the patient and the treating team.

The Committee recognises that advances in CT imaging, and particularly 3D volumetric reconstruction, have the potential to improve the diagnostic accuracy of CT over time.

Cultural and linguistic considerations

If English is not the first language of a patient, the treating team should ensure that the patient is informed about planned tests using either family or an interpreting service. All hospitals should have access to professional interpreting services and this includes interpreting services for those who are deaf. This is particularly important when screening for suitability for an MRI and around the issue of informed consent.

Patient, family and/or carer considerations

Timely and accurate diagnosis is essential for the patient and their family and/or carer. Multiple forms of imaging requiring repeated transfers to the X-ray department can lead to unnecessary pain and discomfort. Prolonged bed rest whilst awaiting imaging can lead to an increased risk of complications including pressure injury, thromboembolic disease and pneumonia.

Economic considerations

Using data obtained from the Australian Medicare Benefits Schedule Online²⁴ the cost of a CT of the hip (item number 56619) is AUD 220.00 and that of an MRI hip (item number 63322) is AUD 403.00. Both item numbers assume the scanner used is less than 10 years old.

Delay in accessing further imaging has the potential to increase time to diagnosis, time to surgery and ultimately length of stay in hospital. The costs associated with the increased complications seen with prolonged bed rest should also be considered.

Should the recommendation be developed into a quality standard?

The Committee did not consider this recommendation to be one against which a quality standard should be developed.

Further research

The Committee supports the research question recommended by NICE in this area:

"In patients with a continuing suspicion of a hip fracture but whose radiographs are normal, what is the clinical and cost effectiveness of computed tomography compared to magnetic resonance imaging, in confirming or excluding the fracture?" See additional comments in Section 9.

3.2 Analgesia

Background

Pain is a significant feature of a hip fracture, causing discomfort and distress to the person and their family and/or carer. From a patient perspective it is one of the most important aspects of the hip fracture experience to get right.

Surgical intervention is often the most effective form of analgesia for a patient with a hip fracture and is one of the main drivers to timely access to surgery. However, during the initial assessment period when a decision is being made around management options including surgical intervention, it is crucial to ensure that pain is adequately controlled. Equally, pain that is not adequately managed in the post-operative phase can delay mobilisation and increase the chances of complications associated with immobilisation. Pain management should be pre-emptive and the choice and dose of analgesia should be age appropriate with close monitoring for associated side effects.

Delirium and dementia are common in people with a hip fracture and the presence of either or both can impact on a person's ability to articulate the fact that they are in pain. Inadequate analgesia is associated with an increased risk of developing a delirium. Clinicians providing care for patients who are unable to adequately express themselves need to be vigilant in identifying when someone is pain. Pain scales exist to support staff in the identification of symptoms and signs associated with pain in people with altered cognition.^{25,26}

Analgesia can be administered locally or systemically, and a range of agents are available particularly for systemic administration. Systemic agents range from simple paracetamol through to the opioid containing analgesic agents and can be administered by the oral, sublingual, topical, subcutaneous, intramuscular or intravenous route. Concern about the risk of delirium should not be a deterrent to pain relief.

3 Diagnosis and pre-operative care

Local anaesthetics delivered to the local nerve supply of the hip in the form of a nerve block offers an alternative to systemic analgesia and has the potential to reduce the dose requirements of potent systemic analgesic agents. This may reduce unwanted side effects such as sedation, respiratory complications and delirium. The duration of effect of nerve blocks can be extended by the use of a continuous catheter infusion technique. This requires appropriately trained staff and patient management guidelines. Lack of trained staff and access to suitable equipment are the main barriers to providing regional anaesthesia for patients with hip fractures. Use of nerve blocks in the Emergency Department is still low with one recent paper from Australia reporting that only 7% of hip fracture patients receive a nerve block in the Emergency Department.²⁷

Two clinical questions in the NICE Guideline related to analgesia. These led to a number of recommendations for pain management. The clinical questions and supporting evidence are considered separately, but the relevance and implications for the Australian and New Zealand context are considered together.

Clinical question In patients who have or are suspected of having a hip fracture, what is the comparative effectiveness and cost effectiveness of systemic analgesics in providing adequate pain relief and reducing side effects and mortality?			
Consensus-based recommendation	Assess the patient's pain:		
	 immediately upon presentation at hospital and 		
	 within 30 minutes of administering initial analgesia and 		
	 hourly until settled on the ward and 		
	 regularly as part of routine nursing observations throughout admission. 		
	Offer immediate analgesia to patients presenting at hospital with suspected hip fracture, including people with cognitive impairment.		
	The choice and dose of analgesia should be age appropriate with close monitoring for associated side effects.		
	Ensure analgesia is sufficient to allow movements necessary for investigations (as indicated by the ability to tolerate passive external rotation of the leg), and for nursing care and rehabilitation.		
	Offer paracetamol every 6 hours unless contraindicated.		
	Offer additional opioids if paracetamol alone does not provide sufficient pain relief.		
	Caution is advised when considering the use of non-steroidal anti- inflammatory drugs in what is predominantly an older population.		

Summary of the NICE Guideline findings

The NICE Guideline did not identify any studies which looked at either the comparative effectiveness or cost effectiveness of systemic analgesia. The recommendations reflect consensus amongst the Guideline Development Group which considered pain control to be a "humanitarian necessity".

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and identified one systematic review of pharmacological and non-pharmacological interventions for the management of pain after a hip fracture.²⁸

The NICE Evidence Update Advisory Group concluded that the findings from the updated search were consistent with the original recommendation in the NICE Guideline.

Clinical question In patients who have or are suspected of having a hip fracture, what is the clinical and cost effectiveness of nerve blocks compared to systemic analgesia in providing adequate pain relief and reducing side effects and mortality?			
Evidence-based recommendation	Consider adding nerve blocks if systemic analgesia does not provide sufficient pain relief, or to limit opioid dosage		
Grade of recommendation	C		
Practice point	Nerve blocks should be administered by trained personnel.		
Practice point	Do not use nerve blocks as a substitute for early surgery.		

Summary of the NICE Guideline findings

The NICE guideline considered studies looking at any of the nerves supplying the proximal femur. A 2002 Cochrane review containing 17 randomised or quasi-randomised controlled trials and a total of 888 participants was identified as the only evidence source for this clinical question. Fifteen of these studies met the inclusion criteria defined in the protocol for this clinical question. See *Appendix VIII* for references.

Outcomes considered included: pre- and post-operative pain control, nausea and/or vomiting, anti-emetic use, wound infection, pneumonia, cardiac complications, pruritus, thromboembolic events, pressure injury, confusional state and mortality.

NICE evidence statements ⁺	GRADE assessment
There is a statistically significant but not clinically significant reduction in pain when using nerve blocks compared to systemic analgesia.	Low quality
There is a statistically significant but not clinically significant reduction in pneumonia when using nerve blocks compared to systemic analgesia.	Moderate quality
3 Diagnosis and pre-operative care

There is no statistically significant difference between nerve blocks and systemic analgesia in all other outcomes.	Low quality
No studies on the cost-effectiveness of nerve blocks for hip fracture patients were identified.	NA

*Supporting information is available in the full NICE Guideline Sections 7, 17.3 (Appendix E) and 19.3 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and identified one systematic review of pharmacological and non-pharmacological interventions for the management of pain after a hip fracture.²⁸

The NICE Evidence Update Advisory Group concluded that the findings from the updated search were consistent with the original recommendation in the NICE Guideline.

Considerations for Australia and New Zealand

The Committee considered that the recommendations around the use of systemic analgesia and nerve blocks are appropriate for the Australian and New Zealand context. However some minor changes were made to the wording of the recommendations. The Committee was of the view that the recommendations in relation to pain management should be applied irrespective of whether a person is undergoing surgery for a hip fracture and so reference to pre-operative and post-operative care have been removed. The wording of the recommendation in relation to use of non-steroidal inflammatory agents was also modified to reflect the need to be cautious with the use of these agents in a predominantly older population with co-existent disease, whilst acknowledging that for some hip fracture patients time limited use of NSAIDs may be clinically appropriate. It is recognised that paramedics play an important role in pre-hospital management of pain and whilst the recommendations were derived from evidence in the hospital setting, the principles underpinning the recommendations relating to the provision of effective systemic analgesia also apply to pre-hospital care and paramedicine.

NICE Guideline recommendations

Offer paracetamol every 6 hours pre-operatively unless contraindicated.

Offer additional opioids if paracetamol alone does not provide sufficient pre-operative pain relief.

Consider adding nerve blocks if paracetamol and opioids do not provide sufficient pre-operative pain relief, or to limit opioid dosage.

Offer paracetamol every 6 hours post-operatively unless contraindicated.

Offer additional opioids if paracetamol alone does not provide sufficient post-operative pain relief

Non-steroidal anti-inflammatory drugs (NSAIDS) are not recommended.

ANZ Guideline recommendations

The choice and dose of analgesia should be age appropriate with close monitoring for associated side effects.

Offer paracetamol every 6 hours unless contraindicated.

Offer additional opioids if paracetamol alone does not provide sufficient pain relief.

3 Diagnosis and pre-operative care

Consider adding nerve blocks if systemic analgesia does not provide sufficient pain relief, or to limit opioid dosage.

Caution is advised when considering the use of non-steroidal anti-inflammatory drugs in what is predominantly an older population.

The Committee acknowledges that there are education and training requirements around the use of nerve blocks and that this has resource implications. Nerve blocks are now commonly done under ultrasound guidance. Whilst this is an additional resource, it has the benefit of improved effectiveness and reduced adverse effects. This is relevant for staff in the Emergency Department, anaesthetics and acute pain services.

An NHMRC approved review of acute pain management was published by the Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine in 2010.²⁹ It provides comprehensive information on acute pain management including sections on assessment of pain, systemic and regional analgesia and specific sections on analgesia in the older person, in Aboriginal and Torres Strait Islanders, and different ethnic and cultural groups.

Cultural and linguistic considerations

Language should not be a barrier to appropriate assessment and management of pain. As pain management is a critical component of care, staff should routinely have available to them the translation of the word pain and appropriate pain scales in a number of languages commonly encountered in Australia and New Zealand to aid assessment and management. All hospitals should have access to professional interpreting services and this includes interpreting services for those who are deaf. A professional health care interpreter can assist with administering pain scales as well as providing clinicians with useful information about cultural beliefs about expression of pain. The review of acute pain management published by the Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine²⁹ makes specific reference to pain management in Indigenous populations. Perceptions and behavioural expression of pain need to be considered as these can impact on effective communication. Verbal descriptor scales (e.g. none, mild, moderate, severe) are suggested as superior to numerical and visual analogue scales in attempting to assess pain.

Renal failure is more common in Aboriginal and Maori populations and should influence choice of analgesic agents.

Patient, family and/or carer considerations

From a humane perspective, the Committee consider that management of pain is one of the most important aspects of care of a patient with a hip fracture. Failure to do so greatly influences the experience of what is already a distressing time for a patient and their family and/or carer. Specific input from the consumer and carer representatives highlighted that older people are often reluctant to report pain and that the presence of dementia and delirium are specific issues of concern. Council on the Ageing, New South Wales was explicit in the view that adequate pain management is the right of every patient.

Economic considerations

More work is required to look at the potential cost benefit of nerve blocks. Large registries may contribute to answering the question of the potential cost benefits of nerve blocks based on outcomes such as post-operative complications (delirium, pneumonia, thromboembolic disease) and overall length of stay.

Should the recommendation be developed into a quality standard?

The Committee consider the recommendations around analgesia to be important and consideration should be given to developing a standard around this aspect of care. However, the Committee also acknowledges the difficulty in identifying an appropriate measure that can be readily captured and translated into a suitable metric.

Further research

The Committee supports the research question recommended by NICE in this area:

"What is the clinical and cost effectiveness of pre-operative and post-operative nerve blocks in reducing pain and achieving mobilisation and physiotherapy goals sooner in patients with hip fracture?"

3.3 Timing of surgery

Background

The majority of patients with a hip fracture will be offered, and elect to undergo, surgical repair of the fracture. Timely access to surgical intervention once the patient is considered to be medically optimised is important both to the individual and to the efficient running of a service. Traditionally, hip fracture patients have not always been considered a priority group in accessing theatres and the injury itself is rarely life threatening. However, older people with a hip fracture frequently have multiple co-morbidities, limited physiological reserve and are prone to an increase in complications from prolonged bed rest. Periods of prolonged or repeated fasting are also not in the best interests of this population. Effective pain management contributes to the challenge of caring for hip fracture patients and surgery is one of the most effective forms of pain management in this population.

Clinical question In patients with hip (within 24, 36 or 48 pneumonia, pressu	o fractures what is the clinical and cost effectiveness of early surgery hours) on the incidence of complications such as mortality, re sores, cognitive dysfunction and increased length of hospital stay?
Evidence-based recommendation	Perform surgery on the day of, or the day after presentation to hospital with a hip fracture.
Grade of recommendation	C

3 Diagnosis and pre-operative care

Practice point	Identify and optimise correctable co-morbidities immediately so that surgery is not delayed by:
	• anaemia
	anticoagulation
	volume depletion
	electrolyte imbalance
	uncontrolled diabetes
	uncontrolled heart failure
	metabolic derangement
	 correctable cardiac arrhythmia or ischaemia
	 acute chest conditions or exacerbation of chronic chest conditions

Summary of the NICE Guideline findings

Ten observational studies were identified comprising 193,793 patients. See *Appendix VIII* for references. The NICE Guideline pooled data from seven studies that adjusted outcomes for confounding factors such as age and comorbidity. The three remaining studies that excluded patients deemed "unfit for surgery" formed a separate subgroup. Time to surgery was measured from time of admission and the cut-offs for delay were 24, 36 and 48 hours in the analyses.

No studies were included in the economic review. Instead, an analytical model was developed to look at the impact of additional half-day operating lists to increase the number of patients operated on within 48 hours and this was compared against a non-investment strategy.

Outcomes considered included early and late mortality, length of hospital stay, mobility, medical and surgical complications, and change in level of accommodation.

NICE evidence statements ⁺	GRADE assessment
Studies adjusting for confounders	
Early surgery (<24h) when compared to late surgery shows:	
a) a statistically significant and clinically significant reduction in mortality	Very low quality
b) a statistically significant and clinically significant reduction in pressure ulcers	Low quality
c)no statistically significant difference in return to independent living	Low quality
d) no statistically significant difference major complications	Low quality
Studies adjusting for confounders	
Early surgery (<36h) when compared to late surgery shows:	
a) a statistically significant and clinically significant reduction in pressure ulcers	Low quality
b) a statistically significant, but not clinically significant increase in return to independent living	Very low quality
c)no statistically significant difference in mortality at 4 months	Very low quality

3 Diagnosis and pre-operative care

Studies adjusting for confounders

Early surgery (<48h) when compared to late surgery shows:

a)	a statistically significant and clinically significant reduction in mortality	Very low quality
b)	a statistically significant and clinically significant increased return to independent living	Very low quality
c)	a statistically significant and clinically significant reduction in pressure ulcers	Low quality
d)	a statistically significant and clinically significant reduction in major and minor complications.	Very low quality
St	udies that excluded patients unfit for surgery	
Ear	ly surgery (<24h) when compared to late surgery shows:	
a)	a statistically significant, but not clinically significant reduction in major post-operative complications	Very low quality
b)	no statistically significant difference in mortality	very low quality
St	udies that excluded patients unfit for surgery	
Ear	ly surgery (<48h) when compared to late surgery shows:	
a)	a statistically significant, and clinically significant reduction in mortality at 1 year	Very low quality
b)	a statistically significant, and clinically significant reduction in patients changing residence (more dependent)	Very low quality
c)	a statistically significant, and clinically significant reduction in increased return to origi nal residence	Very low quality
d)	no statistically significant difference in mortality at 30 days	Very low quality
Inv op thr sec	esting in adding extra operating lists as a way to increase the proportion of patients erated within 48 hours from admission is only marginally above the £20k/QALYs eshold in the first year of implementation, but becomes clearly cost-effective from the cond year onwards.	NA

*Supporting information is available in the full NICE Guideline Sections 6, 17.2 (Appendix E), and 19.2 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and identified one systematic review and meta-analysis looking at the association between delay in surgery and mortality.³⁰

The NICE Evidence Update Advisory Group concluded that the findings from the updated search were consistent with the original recommendation in the NICE Guideline.

Considerations for Australia and New Zealand

The Committee felt that there were geographical and operational considerations specific to Australia and New Zealand that needed to be taken into account in the wording of this recommendation.

NICE Guideline recommendation

Perform surgery on the day of, or the day after admission to hospital with a hip fracture.

ANZ Guideline recommendation

Perform surgery on the day of, or the day after presentation to hospital with a hip fracture.

The changed wording reflects the fact that a number of people with a hip fracture in Australia, and to a lesser extent New Zealand, present to a hospital that does not perform surgery for hip fracture, which will therefore necessitate transfer to an operating hospital. The Committee felt that it was important, particularly from a humane perspective, to ensure that the recommendation and any standard of care that arose from the recommendation include the time spent at a referring hospital. Clear processes should exist to ensure safe and timely transfer of patients to a hospital able to perform surgery so as to ensure rural and remote populations are not disadvantaged in terms of equitable access to surgery.

The Committee was of the view that timing of surgery also needed to take into account the availability of an appropriately skilled clinical team to undertake the procedure (see Section 4.2 on surgeon seniority).

Minor modifications were made to the list of correctable conditions that should be addressed in advance of surgery. A more general term of "metabolic derangement" was added, and "acute chest infection" was changed to "acute chest condition" to encompass non-infective acute chest conditions.

Cultural and linguistic considerations

All hospitals should have access to professional interpreting services and this includes interpreting services for those who are deaf. This is particularly important around the issue of informed consent. Language should not be a barrier to ensuring timely access to surgery. Fasting in some community groups means abstaining from specific foods only and it may be necessary to ensure that the patient is advised about what fasting means in the context of preparation for major surgery. An interpreter should be used to explain the reason for fasting to the patient and their family. The use of Indigenous health workers and liaison staff is strongly encouraged specifically to help with translation of words, adaptations of concepts and to ensure that Indigenous peoples remain connected with their respective physical, spiritual and cultural connections whilst in the hospital.

Patient, family and/or carer considerations

Timely access to the operating theatre for definitive treatment is important for a patient immobilised and in pain from a hip fracture. The time between the initial event leading to the fracture is stressful both from a physiological and emotional perspective and is also distressing for family and carers. Being repeatedly fasted only to be told late in the day that surgery is cancelled due to lack of availability of theatre time is problematic and can impact on overall nutritional and cognitive status. Communication between the treating team, the patient and their family and/or carer is important so as to ensure that everyone is informed and aware of progress.

Equally, patients want to feel reassured that their risks of adverse peri- and post-operative outcomes have been appropriately identified, managed and, where possible, minimised. They also want to know that the whole team involved in the procedure has an appropriate level of expertise so as to maximise outcomes for them.

3 Diagnosis and pre-operative care

Capacity to give consent should be considered in people with dementia and staff should be aware of State and National legislation and policies which govern the process of consent for people unable to give informed consent. Capacity to consent should not lead to unnecessary delays to the operating theatre if surgery has been deemed the appropriate plan of management.

Economic considerations

It is highly likely that the estimates of cost derived from the UK which show the potential benefits of timely access to surgery are applicable to the Australian and New Zealand context. However, in the current Australian context where the model of funding of acute and subacute care is transitioning, the Committee consider this to be an opportune time for a full economic analysis of hip fracture care, which takes into account a number of opportunities around performance, capacity and cost. This work should also consider the implications of financial incentives such as those introduced in England with evidence of success. The contribution of the private sector should also be considered in any health economic modelling. In New Zealand the management of hip fracture remains almost exclusively within the public system. The Committee would also recommend a similar economic analysis be conducted within New Zealand to inform development of reimbursement mechanisms aligned to quality of care in the New Zealand context.

Should the recommendation be developed into a quality standard?

The Committee considered this recommendation to be one against which a quality standard should be developed. However, the Committee was strongly of the view that time to surgery should not be considered in isolation of other quality measures of care in this population and would not be supportive of surgery being undertaken at times when an appropriately skilled team was not available simply to meet a target.

Time to surgery should reflect the period of time between the initial diagnosis of the hip fracture and the anaesthetic start time.

Further research

The Committee supports the research question recommended by NICE in this area:

"What is the clinical and cost-effectiveness of surgery within 36 hours of admission compared to surgery later than 36 hours from admission in mortality, morbidity and quality of life in patients with hip fracture?"

The Committee recognises that this cannot be done as a randomised controlled trial but, with the emergence of a number of national registries across the world, it should be possible to answer this question with more certainty than currently exists in the literature. Consideration should be given both to timing of surgery and to having an appropriately skilled team available (see recommendation Section 4.2).



4.1 Anaesthesia

Background

Surgery is recommended for the majority of patients with a hip fracture. For most hip fracture patients, the goals will be both alleviating pain and maximising functional outcomes. However, for a small number, surgery may be a palliative intervention to alleviate symptoms. In order for surgery to proceed it is necessary for the patient to receive some form of anaesthesia – general or regional. Given the high risk nature of many hip fracture patients, the goal(s) of treatment should be determined pre-operatively and this should also include a documented care plan with defined limits of care. In some patients, the operative risks associated with anaesthesia may be sufficient to recommend against surgical intervention. Equally, in some patients the choice of anaesthesia is influenced by underlying co-morbidities or the use of antithrombotic agents. However for most patients, either regional or general anaesthesia could be offered.

Clinical question		
In patients undergoing surgical repair for hip fractures, what is the clinical and cost effectiveness of regional (spinal/epidural) anaesthesia compared to general anaesthesia in reducing complications such as mortality, cognitive dysfunction, thromboembolic events, post-operative respiratory morbidity, renal failure and length of stay in hospital?		
Consensus-based recommendation	Offer patients a choice of regional or general anaesthesia after discussing the risks and benefits.	
Consensus-based recommendation	Consider intraoperative nerve blocks for all patients undergoing surgery.	

Summary of the NICE Guideline findings

The NICE Guideline identified one Cochrane review which included 22 RCTs and a total of 2567 patients. See *Appendix VIII* for references. No additional studies were identified. A systematic review was also undertaken looking for patient preferences.

Outcomes considered included: patient preference, early mortality (up to one month), length of stay in hospital, vomiting, acute confusional state, pneumonia, myocardial infarction and thromboembolic events. The quality of the studies identified was felt to be of low quality and a number were felt to be old and not consistent with current anaesthetic and peri-operative practice making meaningful comparison of approaches difficult. This was also felt to be true for the economic consideration and no agreement was reached by the NICE Guideline Development Group regarding whether regional anaesthesia takes longer to administer than general anaesthesia.

Given the limited and low quality evidence to support one form of anaesthesia over another, the NICE Guideline Development Group agreed that patient preference and the expertise of the anaesthetist were important determinants for the approach to anaesthesia.

The evidence used to produce the recommendation around the use of intraoperative nerve blocks is covered in Section 3.2 on analgesia.

4 Peri-operative care

NICE evidence statements ⁺	GRADE assessment
There is a statistically and clinically significant reduction in early mortality (up to 1 month) in patients having regional anaesthesia compared to those having general anaesthesia.	Low quality
There is a statistically significant but not clinically significant improvement in post- operative confusion and reduction in incidence of deep vein thrombosis in patients receiving regional compared to general anaesthesia.	Low quality
There were no statistically significant differences in length of stay in hospital, vomiting, pneumonia, myocardial infarction and pulmonary embolism	Low quality
One study found general anaesthesia to be more costly than spinal anaesthesia.	Serious limitations

¹Supporting information is available in the full NICE Guideline Sections 8, 17.4 (Appendix E), and 19.4 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and no new evidence was found.

Considerations for Australia and New Zealand

The Committee considered that the recommendations around anaesthesia and intraoperative nerve blocks are appropriate and no modifications are indicated for the Australian and New Zealand context.

Cultural and linguistic considerations

Language should not be a barrier to offering patients choice. All hospitals should have access to professional interpreting services and this includes interpreting services for those who are deaf. The use of Indigenous health workers and liaison staff is strongly encouraged specifically to help with translation of words and concepts.

Patient, family and/or carer considerations

Patients should be involved in the decision as to which approach to anaesthesia is taken. They should be made aware of the potential risks and benefits of both general and regional anaesthesia so as to be able to make an informed decision about their care. In some patients this may include recommending against operative intervention. Defining the limits of care such as mechanical ventilation, renal replacement therapy and inotropic support should be discussed in advance of the procedure. Whilst this can be distressing for the patient and their family/carer, it is important that there is a shared understanding of a patient's wishes in advance of surgery, and of the options of care that are available and/or appropriate post-operatively.

In some patients, existing comorbidities or specific medication use may restrict the ability to offer choice.

Economic considerations

The respective costs of the agents used in the anaesthethic process are negligible when compared to the cost of operating theatre time including the cost of staff. Spinal anaesthesia may take longer to administer but it is unlikely that cost could or should be a determining factor in the approach taken to anaesthesia in hip fracture patients.

Should the recommendation be developed into a quality standard?

The Committee did not consider this recommendation to be one against which a quality standard should be developed.

Further research

The Committee supports the research question recommended by NICE in this area:

"What is the clinical and cost effectiveness of regional versus general anaesthesia on postoperative morbidity in patients with hip fracture."

4.2 Surgeon seniority

Background

Seniority is often indicative of greater knowledge, skills and experience. It is not an unreasonable expectation for a patient with a hip fracture to want the person operating to have the necessary skills and expertise to undertake the required procedure. Of course, performance and outcomes in this situation go beyond the skills of a single surgeon and what is required is a team including surgeons, anaesthetists and theatre staff that can work together efficiently and effectively to deliver a good outcome for each and every patient.

Clinical question What is the clinical in reducing the inc poor outcomes in t	and cost effectiveness of surgeon seniority (consultant or equivalent) idence of mortality, the number of patients requiring reoperation, and erms of mobility, length of stay, wound infection and dislocation?
Consensus-	Schedule hip fracture surgery on a planned list or planned trauma
based recom-	list where an appropriately skilled team is available to undertake the
mendation	procedure.

4 Peri-operative care

Summary of the NICE Guideline findings

The NICE Guideline identified three prospective studies comprising 2018 participants. See *Appendix VIII* for references. All studies were considered to be of very low quality.

NICE evidence statements ⁺	GRADE assessment
There is a statistically significant, but not clinically significant increased reoperation rate at 6 months with unsupervised junior orthopaedic registrars with less than 3 years experience than with experienced surgeons with more than 3 years experience.	Very low quality
There is no statistically significant difference between Swedish post registrars and registrars in dislocation rate at a median follow up of 2.3 years after hemiarthroplasty in patients with hip fracture.	Very low quality
There is no statistically significant difference between Swedish post registrars and registrars in dislocation rate at a median follow up of 2.3 years after total hip replacement in patients with hip fracture.	Very low quality
There was no evidence identified for mortality, mobility, length of stay or wound infection.	NA
No studies were identified on the cost-effectiveness of junior/less senior surgeon versus senior surgeon.	NA

^tSupporting information is available in the full NICE Guideline Sections 9, 17.5 (Appendix E), and 19.5 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and no new evidence was identified.

Considerations for Australia and New Zealand

The Committee had considerable discussion around the wording of the original NICE Guideline recommendation pertaining to the clinical question. A number of aspects were considered in relation to the Australian and New Zealand context.

Not all hip fracture patients in Australia and New Zealand will undergo surgery on a planned trauma list. This is particularly of relevance in smaller hospitals and those in more rural and remote settings. The Committee considered the important aspect of this recommendation to be the planning and scheduling of the procedure and the availability of an appropriately skilled team and not specifically the requirement for the procedure to be undertaken on a trauma list. By focusing on the requirement of having an appropriately skilled team, this also deals with the issue of time of day that surgery is undertaken and whether surgery is undertaken at weekends. This will vary between hospitals.

Surgery performed when surgeons have already worked long hours or who are sleep deprived has a higher risk and poorer patient outcomes.³¹ A position statement released by the Royal Australasian College of Surgeons entitled "Standards for safe working hours and conditions for fellows, surgical trainees and international medical graduates" (*www.surgeons. org*) acknowledges the risks associated with long working hours and provides a series of

recommendations to support better working practice.

The Committee also discussed the terms "seniority" and "appropriately skilled" as well as reflecting on the very limited evidence to support the original recommendation. Whilst seniority is often indicative of experience, the terms "seniority" and "appropriately skilled" are not synonymous. Seniority may not necessarily reflect expertise in the area of hip fracture care. The Committee felt that having an "appropriately skilled team" better reflected the goal of care and also highlighted the fact that a successful procedure involves a team rather than simply the operating surgeon. Not all hip fractures are of equal complexity from a medical, anaesthetic and surgical perspective and this should be considered in the planning of an appropriately skilled team and the timing of the procedure. The limited literature available suggests that technically more demanding hip fractures have higher rates of re-operation when undertaken by unsupervised junior surgeons.

NICE Guideline recommendation

Schedule hip fracture surgery on a planned trauma list.

Consultants or senior staff should supervise trainee and junior members of the anaesthesia, surgical and theatre teams when they carry out hip fracture procedures.

ANZ Guideline recommendation

Schedule hip fracture surgery on a planned list or planned trauma list where an appropriately skilled team is available to undertake the procedure.

Cultural and linguistic considerations

No specific cultural and linguistic considerations were identified.

Patient, family and/or carer considerations

Patients and their family and carers have an expectation that the team undertaking surgery for a hip fracture has the necessary skills and experience to undertake the procedure. Where a junior member of staff is involved in their care, the expectation is that there is adequate supervision and support for that team member from those with the necessary expertise.

Economic considerations

There is a paucity of cost data in this area and it is possible that large registries which include longer term follow up may be able to provide more data. From an Australian and New Zealand context, this work would be enormously challenging to undertake given the marked differences in hospital size and level of activity. For smaller hospitals and those in rural and remote settings, there will be a requirement to balance the measure of time to surgery against the availability of an appropriately skilled team to undertake a procedure. The short term gain around meeting a target on timely access to surgery may be lost in the longer term if there is a higher rate of re-operation when surgery is undertaken by a less skilled team. Modelling of a number of scenarios should be considered.

4 Peri-operative care

Should the recommendation be developed into a quality standard?

The Committee did not consider this recommendation to be one against which a quality standard should be developed.

Further research

No further research was suggested in the NICE Guideline. However further economic modelling for the Australian and New Zealand context is supported by the Guideline Adaptation Committee (see above).

5.1 Displaced intracapsular fractures

Background

This section refers specifically to displaced intracapsular fractures i.e. one in which the proximal fragment contains the femoral head with or without a portion of the femoral neck contained within the capsule.





Undisplaced intracapsular fracture

Displaced intracapsular fracture

Valgus impacted and undisplaced intracapsular fractures are not considered part of the clinical review question as they behave differently in terms of stability and risk of disruption to the blood supply to the femoral head. It is generally accepted that internal fixation is appropriate for these fracture types. A number of treatment options are available in the management of displaced intracapsular fractures including internal fixation, hemiarthroplasty and total hip replacement. The use of cement for the femoral stem is also considered.



Cemented hemiarthroplasty



Total hip replacement

Three clinical questions were posed for the NICE Guideline review process and the outcomes for each in terms of the NICE Guideline summary, evidence statements and NICE Evidence Update are considered separately for ease of interpretation. The recommendations derived from the evidence are grouped together at the end of the evidence review for all three clinical questions.

5.1.1 Internal fixation versus hemiarthroplasty

Clinical question

In patients undergoing repair for displaced intracapsular hip fractures, what is the clinical and cost effectiveness of internal fixation compared to hemiarthroplasty on mortality, surgical revision, functional status, length of stay, quality of life, pain and place of residence after hip fracture?

Summary of the NICE Guideline findings

A total of 13 RCTs were identified from a combination of a systematic review, which included 12 RCTs, and a further additional RCT found in the search. See *Appendix VIII* for references. The combined trials contained 2195 participants.

NICE evidence statements ⁺	GRADE assessment
There is a statistically and clinically significant decrease in patients who require reoperations with hemiarthroplasty than with internal fixation. The follow up varied between 1 and 5 years.	Low quality
There is a statistically significant, but not clinically significant, increase in patients who have a Barthel Index Score of 95 or 100 at 1 year with hemiarthroplasty compared to internal fixation, but there is no statistically significant difference at 2 years.	Moderate quality
There is a statistically significant, but not clinically significant, increase in patients who have a higher Harris Hip Score at 1 year with hemiarthroplasty compared to internal fixation, but there is no statistically significant difference at 2 years.	Moderate quality
There is a statistically significant, but not clinically significant, increase in patients who have a higher EQ-5D (EuroQol) score at 2 years with hemiarthroplasty compared to internal fixation, but there is no statistically significant difference at 1 year.	Moderate quality
There is no statistically significant difference between internal fixation and hemiarthroplasty in:	
a) mortality at 1 months	Low quality
b) mortality at 3 to 6 months	Low quality
c) mortality at 1 to 2 years	Moderate quality
d) the number of patients reporting pain at 1 year	Very low quality
e) the number of patients failing to return to the same residence at 1 to 3 years	Low quality
f) failure to regain mobility at 1 to 5 years and length of hospital stay.	Moderate quality
No RCT evidence was identified reporting on total time to resettlement in the community.	NA

Hemiarthroplasty is cost saving with respect to internal fixation.	Minor limitations
	Partial applicability

*Supporting information is available in the full NICE Guideline Sections 10.3, 17.6 (Appendix E), and 19.5 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and one study was identified that undertook a cost-utility analysis of hemiarthroplasty versus internal fixation in patients with a displaced intracapsular fracture.³²

The NICE Evidence Update Advisory Group concluded that the findings from the updated search were consistent with the original recommendation in the NICE Guideline.

5.1.2 Internal fixation versus total hip replacement

Clinical question

In patients having treatment for displaced intracapsular hip fracture what is the clinical and cost effectiveness of internal fixation compared to total hip replacement on mortality, number of reoperations, functional status, length of stay in hospital, total time to resettlement in the community, quality of life, pain and place of residence after hip fracture.

Summary of the NICE Guideline findings

One systematic review was identified comprising six RCTs and a total of 88 participants. Two additional studies were identified to inform the economic considerations. See *Appendix VIII* for references.

NICE evidence statements ⁺	GRADE assessment
There is a statistically and clinically significant decrease in patients who require reoperations with total hip replacement than with internal fixation. The follow up varied between 1 and 13 years.	Low quality
There is a statistically significant, but not clinically significant, increase in patients who reported pain at 1 year with internal fixation compared to total hip replacement.	Moderate quality
There is no statistically significant difference between internal fixation and total hip replacement in:	
a) mortality at 2 to 4 months,	Low quality
b) mortality at 12 to 18 months	Low quality
c) mortality at 2 years	Low quality
d) length of hospital stay.	Moderate quality
No RCT evidence was identified reporting functional status, quality of life, total time to resettlement in the community and place of residence after hip fracture.	NA

THR	is th	e dom	inant	strate	egy co	mpar	ed to intern	al fixat	ion (less	costly and m	ore eff	ective)		Minor limitati	ons
														Partial applica	bility
*									<i>c</i>	100 1700	,		1.40		<i>I</i> : 0.1

*Supporting information is available in the full NICE Guideline Sections 10.3, 17.6 (Appendix E), and 19.5 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012. No further studies were identified.

5.1.3 Hemiarthroplasty versus total hip replacement

Clinical question In patients having treatment for displaced intracapsular hip fracture what is the clinical and cost effectiveness of hemiarthroplasty versus total hip replacement on mortality, number of reoperations, functional status, length of stay in hospital, total time to resettlement in the community, quality of life, pain and place of residence after hip fracture.

Summary of the NICE Guideline findings

One systematic review was identified comprising seven RCTs and 734 participants. One study was identified to inform the economic considerations. See *Appendix VIII* for references.

NICE evidence statements [*]	GRADE assessment
There is a statistically significant, but not clinically significant, decrease in patients who reported pain and had a lower Harris Hip score for pain (indicating better function), at 1 year with total hip replacement compared to hemiarthroplasty.	Low quality
There is a statistically significant, but not clinically significant, increase in patients who have a lower Oxford Hip Score at 40 months (indicating better function), with total hip replacement compared to hemiarthroplasty.	Moderate quality
There is a statistically significant, but not clinically significant, increase in patients with total hip replacement compared to hemiarthroplasty who have a:	
a. higher Barthel Score (indicating better function) at 1 and 4 years	Low quality
b. a higher total Harris Hip Score at 1 and 4 years	Low quality
c. a higher Harris Hip Score for function at 1 year	Low quality
d. a longer self-reported walking distance at 40 months.	Moderate quality
There is a statistically significant, but not clinically significant, increase in patients who have a higher EQ-5D (EuroQol) score at 2 years with total hip replacement compared to hemiarthroplasty.	Moderate quality

There is no statistically significant difference between hemiarthroplasty and total hip replacement in:

a) mortality at 2 to 4 months	Low quality
b) mortality at 6 months	Moderate quality
c) mortality at 1 year	Low quality
d) mortality at 2 to 4 years	Low quality
e) number of reoperation at 8 to 48 months	Low quality
f) number of patients who fail to regain mobility at 1 to 4 years	Low quality
g) Hip Rating Questionnaire Score at 2 years	Moderate quality
h) Short Form 36 (SF 36) score	Moderate quality
i) length of hospital stay.	Moderate quality
No RCT evidence was identified reporting total time to resettlement after hip fracture for studies comparing total hip replacement and h	or place of residence NA emiarthroplasty.
THR is dominant compared to hemiarthroplasty.	Minor limitations
	Partial applicability

^tSupporting information is available in the full NICE Guideline Sections 10.3, 17.6 (Appendix E), and 19.5 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and one further RCT was identified, which looked at clinical and quality of life outcomes four years after either a hemiarthroplasty or total hip replacement.³³

The NICE Evidence Update Advisory Group concluded that the findings from the updated search were consistent with the original recommendation in the NICE Guideline.

Evidence-based recommendation	Perform replacement arthroplasty (hemiarthroplasty or total hip replacement) in patients with a displaced intracapsular fracture.
Grade of recommendation	C
Consensus- based recommendation	Use a femoral stem design other than Austin Moore or Thompson stems for arthroplasties.

Evidence-based recommendation	Offer total hip replacement to patients with a displaced intracapsular fracture who:
	 were able to walk independently out of doors with no more than the use of a stick and
	 are not cognitively impaired and
	 are medically fit for anaesthesia and the procedure.
Grade of recommendation	C

Considerations for Australia and New Zealand

The Committee considered that the recommendations are appropriate. Minor modifications are indicated for the Australian and New Zealand context.

Comment was made around the appropriateness of the recommendation in relation to arthroplasty in younger people (<55 years) as a number of surgeons would attempt reduction and internal fixation in the first instance. It is acknowledged that the evidence supporting the recommendation is largely derived from an older population and more evidence is required to make any specific recommendation around surgery for displaced intracapsular fracture in a younger population.

The recommendation made in the NICE Guideline around the use of a proven femoral stem design over an Austin Moore or Thompson stem listed suitable designs based on an Orthopaedic Data Evaluation Panel (ODEP) rating which is not commonly used in Australia and New Zealand. The Committee considered that the Australian Orthopaedic Association National Joint Replacement Registry (*https://aoanjrr.dmac.adelaide.edu.au*) and the New Zealand Joint Registry (*www.nzoa.org.nz*) would be appropriate sources of information from which surgeons in Australia and New Zealand can make informed decisions on implant selection. Given the problem of defining "proven", and comments received during peer review, the wording of the recommendation around stem design was revised.

The 2013 report from the Australian Orthopaedic Association National Joint Replacement Registry has for the first time reported outcomes on partial and total arthroplasty for hip fracture.³⁴ It demonstrates a higher mortality rate in people undergoing a partial arthroplasty when compared to a total hip replacement and acknowledges that this is almost certainly a reflection of case selection. Important data on revision rates for the different prostheses used for partial arthroplasty as well as changes in usage over time are reported. Use of cement in the stem of a total hip replacement is consistent with the literature and the additional cementing of the acetabular cup in older people (aged 80 years and above) appears to add additional benefit in relation to rates of revision.

The Committee is aware of the improvements in the design of prostheses over time. There is literature supporting the potential benefits of large head arthroplasty, in terms of rate of dislocation and functional outcomes. Again, monitoring of the respective Joint Registries is

recommended.

NICE Guideline recommendation

Use a proven femoral stem design rather than Austin Moore or Thompson stems for arthroplasties. Suitable designs include those with an Orthopaedic Data Evaluation Panel rating of 10A, 10B, 10C, 7A, 7B, 5A, 5B, 3A or 3B.

ANZ Guideline recommendation

Use a femoral stem design other than Austin Moore or Thompson stems for arthroplasties.

Cultural and linguistic considerations

No specific cultural and linguistic considerations were identified.

Patient, family and/or carer considerations

Patients are concerned primarily about long term outcomes from their surgery. They are less interested in how long the procedure takes and more interested in whether the surgery will alleviate their pain in the short and long term and also give them every chance of achieving a good functional outcome. The need for further surgery is not considered a good outcome.

Economic considerations

The economic evidence supports arthroplasty over internal fixation for displaced intracapsular fractures and this is based on reoperation rates at 12 and 24 months. It also supports a total hip replacement over a hemiarthroplasty in a defined population. Whilst the evidence is not directly from Australia or New Zealand, it is unlikely that the economic evidence would change for the Australian and New Zealand context.

Should the recommendation be developed into a quality standard?

The Committee considered this recommendation to be one against which a quality standard could be developed.

Further research

The Committee supports the research question recommended by NICE in this area:

"What is the clinical and cost effectiveness of large-head total hip replacement versus hemiarthroplasty on functional status, reoperations and quality of life in patients with displaced intracapsular hip fracture?"

5.2 Use of cement in arthroplasty

Background

The use of cement used in arthroplasty has the potential to secure the implant and reduce the need for revision secondary to loosening of the prosthesis. However, some concerns exist around the use of cement and the possibility of bone cement implantation syndrome. Bone cement implantation syndrome is a poorly understood phenomenon which is characterised by one or more of the following: hypoxia, hypotension, cardiac arrhythmias, increased pulmonary vascular resistance and cardiac arrest.³⁵ It can occur at a number of stages during an arthroplasty including during femoral reaming, insertion of cement or the prosthesis and at the time of reduction of the joint. Its exact aetiology and pathophysiology remain poorly understood as does an accurate figure of the true incidence of the syndrome.

The NICE Guideline considers a clinical question around the use of cement in arthroplasty and applies the question to two different groups: 1) use of cement in original Thompson designs of arthroplasty and 2) use of cement in newer designs of arthroplasty.

Clinical question In patients having repeffectiveness of a cerr reoperations, wound and total time to reserve residence after hip fr	olacement arthroplasty for hip fracture what is the clinical and cost nented stem versus an uncemented stem on mortality, number of healing complications, functional status, length of stay in hospital ettlement in the community, quality of life, pain and place of acture?
Consensus-based recommendation	Use cemented stem implants in patients undergoing surgery with arthroplasty.

Summary of the NICE Guideline findings

One systematic review comprising six RCTs and 899 participants was identified in relation to the clinical question around the use of cement in the original Thompson and Austin Moore designs of arthroplasty. One study was identified for inclusion in economic considerations. See *Appendix VIII* for references.

One RCT comprising 220 participants was identified in the search for the clinical question around the use of cement in the newer designs of arthroplasty. No cost effectiveness evidence was identified for this clinical question. See *Appendix VIII* for references.

NICE evidence statements ⁺	GRADE assessment
Use of cement in original Austin Moore and Thompson designs of arthroplasty	
There is a statistically significant, but not clinically significant, increase in patients who have a lower reduction in mobility score (less loss of mobility) at 12 months in cemented versus uncemented hemiarthroplasty.	Low quality

There is a statistically significant, but not clinically significant, decrease in patients who reported pain in cemented versus uncemented hemiarthroplasty at:	
a) 3 months	Low quality
b) 1 to 2 years.	Moderate quality
There was no significant difference in a pain score at 6 months	Low quality
There is no statistically significant difference in:	
a) peri-operative mortality	Low quality
b) mortality at 3 months	Low quality
c) 1 year	Moderate quality
d) failure to return home	Moderate quality
e) length of hospital stay	Low quality
f) number of patients requiring reoperations	Low quality
g) number of patients failing to regain mobility	Low quality
h) deep sepsis	Moderate quality
i) wound haematoma	Moderate quality
j) all medical complications combined.	Very Low quality
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture	NA
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement.	NA
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty.	NA NA Serious limitations
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty.	NA NA Serious limitations Partial applicability
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty. Use of cement in newer designs of arthroplasty	NA NA Serious limitations Partial applicability
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty. Use of cement in newer designs of arthroplasty There is no statistically significant difference in mortality at 30 days, 90 days, 1 year or 2 years.	NA NA Serious limitations Partial applicability Low quality
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty. Use of cement in newer designs of arthroplasty There is no statistically significant difference in mortality at 30 days, 90 days, 1 year or 2 years. There is no statistically significant difference at 1 year in:	NA NA Serious limitations Partial applicability Low quality
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty. Use of cement in newer designs of arthroplasty There is no statistically significant difference in mortality at 30 days, 90 days, 1 year or 2 years. There is no statistically significant difference at 1 year in: a) the number of patients requiring reoperations	NA NA NA Low quality
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty. Use of cement in newer designs of arthroplasty There is no statistically significant difference in mortality at 30 days, 90 days, 1 year or 2 years. There is no statistically significant difference at 1 year in: a) the number of patients requiring reoperations b) number of patients pain requiring medication	NA NA NA Low quality Low quality Low quality Low quality Low quality
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty. Use of cement in newer designs of arthroplasty There is no statistically significant difference in mortality at 30 days, 90 days, 1 year or 2 years. There is no statistically significant difference at 1 year in: a) the number of patients requiring reoperations b) number of patients pain requiring medication c) number of patients unable to walk without aids	NA NA NA Low quality Low quality Low quality Low quality Low quality Low quality
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty. Use of cement in newer designs of arthroplasty There is no statistically significant difference in mortality at 30 days, 90 days, 1 year or 2 years. There is no statistically significant difference at 1 year in: a) the number of patients requiring reoperations b) number of patients pain requiring medication c) number of patients unable to walk without aids d) Barthel Score of less than 19	NA NA NA NA Low quality
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty. Use of cement in newer designs of arthroplasty There is no statistically significant difference in mortality at 30 days, 90 days, 1 year or 2 years. There is no statistically significant difference at 1 year in: a) the number of patients requiring reoperations b) number of patients pain requiring medication c) number of patients unable to walk without aids d) Barthel Score of less than 19 e) Harris Hip Score	NA NA NA NA Low quality
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty. Use of cement in newer designs of arthroplasty There is no statistically significant difference in mortality at 30 days, 90 days, 1 year or 2 years. There is no statistically significant difference at 1 year in: a) the number of patients requiring reoperations b) number of patients pain requiring medication c) number of patients unable to walk without aids d) Barthel Score of less than 19 e) Harris Hip Score f) EQ-5D index score	NA NA NA NA NA Low quality
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty. Use of cement in newer designs of arthroplasty There is no statistically significant difference in mortality at 30 days, 90 days, 1 year or 2 years. There is no statistically significant difference at 1 year in: a) the number of patients requiring reoperations b) number of patients pain requiring medication c) number of patients unable to walk without aids d) Barthel Score of less than 19 e) Harris Hip Score f) EQ-5D index score g) EQ-5D visual analogue score.	NA N
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty. Use of cement in newer designs of arthroplasty There is no statistically significant difference in mortality at 30 days, 90 days, 1 year or 2 years. There is no statistically significant difference at 1 year in: a) the number of patients requiring reoperations b) number of patients pain requiring medication c) number of patients unable to walk without aids d) Barthel Score of less than 19 e) Harris Hip Score f) EQ-5D index score g) EQ-5D visual analogue score. h) deep wound sepsis	NA N
No RCT evidence was identified reporting quality of life, total length of stay to community resettlement or place of residence after hip fracture No RCT evidence was identified to suggest there is a safety issue with using cement. Cemented hemiarthroplasty is cost saving compared to uncemented hemiarthroplasty. Use of cement in newer designs of arthroplasty There is no statistically significant difference in mortality at 30 days, 90 days, 1 year or 2 years. There is no statistically significant difference at 1 year in: a) the number of patients requiring reoperations b) number of patients pain requiring medication c) number of patients unable to walk without aids d) Barthel Score of less than 19 e) Harris Hip Score f) EQ-SD index score g) EQ-SD visual analogue score. h) deep wound sepsis i) any wound infection	NA N

No RCT evidence was identified to suggest there is a safety issue with using cement.	NA
No studies were identified on the cost-effectiveness of cemented vs. uncemented stem (newer designs of arthroplasty). An NCGC cost analysis found that cemented stems are ± 171.79 cheaper than the newer design uncemented stems. This evidence has minor limitation and partial applicability.	Minor limitation Partial applicability

*Supporting information is available in the full NICE Guideline Sections 10.4, 17.7 (Appendix E), and 19.5 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and identified three additional studies that considered the use of cemented implants in patients undergoing surgery with arthroplasty.³⁶⁻³⁸ The studies comprised two RCTs (290 patients) and one cross-sectional analysis of 16,496 patients from the UK National Hip Fracture Database. Overall it was considered that functional outcomes and pain appear to be equivalent, but that risk of death may be lower with the use of cemented implants.

The NICE Evidence Update Advisory Group concluded that the findings from the updated search were consistent with the original recommendation in the NICE Guideline.

Considerations for Australia and New Zealand

The Committee considered that the recommendation around the use of cement is appropriate, but after detailed review of the evidence used to support the recommendation, downgraded it from an evidence-based recommendation to a consensus-based recommendation. The evidence to support the potential benefits of cement is derived from six RCTs looking at the use of cement in the older design of arthroplasty. Extrapolation of the results to the new designs was not felt to be appropriate. Consensus amongst the orthopaedic surgeons was achieved by modification of the level of evidence to a consensus-based recommendation. The wording of the original recommendation was also modified to clarify that the use of cement applies to the femoral stem. No mention is made to the use of cement in the acetabular component of a total hip replacement.

NICE Guideline recommendation

Use cemented implants in patients undergoing surgery with arthroplasty.

ANZ Guideline recommendation

Use cemented stem implants in patients undergoing surgery with arthroplasty.

Cultural and linguistic considerations

No specific cultural or linguistic considerations were identified.

Patient, family and/or carer considerations

Surgery which provides the best outcomes in the short, medium and long term is desirable.

Economic considerations

The Committee recognises that costs of prostheses and associated equipment vary markedly between hospitals and are dependent on locally negotiated prices. Whilst the newer cemented

stems tend to be cheaper than uncemented stems, this does not include the costs associated with the use of the cement and the equipment required to introduce the cement.

Should the recommendation be developed into a quality standard?

The Committee did not consider this recommendation to be one against which a quality standard should be developed.

Further research

No recommendation was made in relation to the need for further research.

5.3 Extracapsular fracture fixation

Background

Extracapsular fractures extend from the rim of the capsule of the femoral neck to 5cm below the lesser trochanter and are divided into three main fracture types: a) pertrochanteric, b) intertrochanteric (reverse oblique), and c) subtrochanteric.



Disruption of the blood supply to the femoral head is not a consideration when deciding on surgical options for management of an extracapsular fracture. The purpose of fixation is to restore stability of the intact femoral head and neck to the shaft of the femur. This is achieved by the insertion of a screw(s) through the neck and head of the femur and then by either securing the head and neck to the femur by way of a plate attached to the outside of the bone (extramedullary fixation) or by a nail inserted into the middle of the femoral shaft (intramedullary fixation). In addition, the choice exists between a short nail, or a long nail which spans the whole length of the femur.



Three clinical questions were posed in the NICE Guideline review process and the outcomes for each in terms of the NICE Guideline summary, evidence statements and NICE Evidence Update are considered separately for ease of interpretation. The recommendations derived from the evidence are grouped together at the end of the evidence review for all three clinical questions.

Clinical question

In patients undergoing repair for trochanteric extracapsular hip fractures what is the clinical and cost effectiveness of extramedullary sliding hip screws compared to intramedullary nails on mortality, surgical revision, functional status, length of stay, quality of life, pain and place of residence after hip fracture?

Summary of the NICE Guideline findings

The NICE Guideline in its review of the evidence for extracapsular hip fracture, took account, where possible, of whether the fractures were considered stable (intact lesser trochanter AO/OTA A1) or unstable (fracture between the trochanters, with displacement of the lesser trochanter or reverse oblique fractures AO/OTA A2 and AO/OTA A3).



A total of 21 studies, comprising 4336 participants, were identified and included in the review process. See *Appendix VIII* for references. No economic studies met the inclusion criteria for this question. The meta-analysis undertaken also included a sub-group analysis looking specifically at unstable trochanteric fractures, as well as a sensitivity analysis designed to take into account the change in design of devices over time.

NICE evidence statements ⁺	GRADE assessment
There is a statistically significant and clinically significant increase in operative or post-operative fracture of the femur with intramedullary implants compared to extramedullary implants for fixation of trochanteric extracapsular fractures.	Low quality
There is no statistically significant difference in mortality, reoperation, and mean mobility score with intramedullary implants compared to extramedullary implants for fixation of trochanteric extracapsular fractures.	High quality
There is no statistically significant difference in cut-out, infection, non-union and length of hospital stay with intramedullary implants compared to extramedullary implants for fixation of trochanteric extracapsular fractures.	Moderate quality
There is no statistically significant difference in pain, with intramedullary implants compared to extramedullary implants for fixation of trochanteric extracapsular fractures.	Low quality
No applicable evidence was identified regarding the cost-effectiveness of intramedullary vs. extramedullary implants.	NA

^tSupporting information is available in the full NICE Guideline Sections 10.6, 17.8 (Appendix E), and 19.5 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and identified one additional RCT which compared outcomes for trochanteric fractures with either a sliding hip screw or a particular type of intramedullary nail.³⁹

The NICE Evidence Update Advisory Group concluded that the findings from the updated search were consistent with the original recommendation in the NICE Guideline.

Clinical question

In patients undergoing repair for reverse oblique extracapsular hip fractures, what is the clinical and cost effectiveness of extramedullary sliding hip screws compared to intramedullary nails on mortality, surgical revision, functional status, length of stay, quality of life, pain and place of residence after hip fracture?

Summary of the NICE Guideline findings

No studies were identified to address this clinical question.

NICE evidence statements	GRADE assessment
No studies were identified investigating reverse oblique trochanteric extracapsular fractures.	NA
No cost effectiveness evidence was identified.	NA

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and no new studies were identified.

Clinical question

In patients undergoing repair for subtrochanteric extracapsular hip fractures, what is the effectiveness of extramedullary sliding hip screws compared to intramedullary nails on mortality, surgical revision, functional status, length of stay, quality of life, pain and place of residence after hip fracture?

Summary of the NICE Guideline findings

Four studies, comprising 149 patients, were identified and included in the review process. No economic evidence was identified. See *Appendix VIII* for references.

NICE evidence statements ⁺	GRADE assessment
There is a statistically significant and clinically significant decrease in non-union with intramedullary implants compared to extramedullary implants for fixation of subtrochanteric extracapsular fractures.	Moderate quality
There is no statistically significant difference in reoperation, cut-out and infection with intramedullary implants compared to extramedullary implants for fixation of subtrochanteric extracapsular fractures.	Low quality
There is no statistically significant difference in mortality, with intramedullary implants compared to extramedullary implants for fixation of subtrochanteric extracapsular fractures.	Very low quality
No economic evidence was identified.	NA

*Supporting information is available in the full NICE Guideline Sections 10.6, 17.8 (Appendix E), and 19.1 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and no new studies were identified.

Consensus-based recommendation	Both extramedullary sliding hip screw devices and intramedullary nails are suitable for use in patients with trochanteric fractures above and including the lesser trochanter (AO classification types A1 and A2).
Consensus-based recommendation	Use an intramedullary nail to treat patients with a reverse oblique fracture.
Evidence-based recommendation	Use an intramedullary nail to treat patients with a subtrochanteric fracture.
Grade of recommendation	В

Considerations for Australia and New Zealand

The Committee reached a majority view around the recommendation pertaining to the use of a sliding hip screw or an intramedullary nail for trochanteric fractures above and including the lesser trochanter (AO classification types A1 and A2). The Committee didn't feel it could recommend one approach over another on clinical grounds but is aware of significant cost differences in the available fixation devices. One committee member was of the view that the newer intramedullary nails were likely to produce better outcomes, but, in the absence of evidence to support this view, the Committee considered that the recommendation should be amended to reflect the lack of evidence in recommending one approach over another. Cost should be considered in the choice of fixation device (see 'Economic considerations' below). There was an acknowledgement that further research was required in this area.

NICE Guideline recommendation

Use extramedullary implants such as a sliding hip screw in preference to an intramedullary nail in patients with trochanteric fractures above and including the lesser trochanter (AO classification types A1 and A2).

ANZ Guideline recommendation

Both extramedullary sliding hip screw devices and intramedullary nails are suitable for use in patients with trochanteric fractures above and including the lesser trochanter (AO classification types A1 and A2).

The NICE Guideline did not produce a specific recommendation regarding management of reverse oblique fractures. No studies relating to treatment of reverse oblique fractures satisfied the inclusion criteria. Given that a clinical question and associated literature search had been undertaken, the Guideline Adaptation Committee felt it was appropriate to produce a consensus-based recommendation. The committee noted that these fractures are usually treated with intramedullary devices and considered this to be current best practice.

The Committee considered that the recommendation pertaining to the management of subtrochanteric extracapsular fractures is appropriate and no modifications are indicated for

the Australian and New Zealand context.

Cultural and linguistic considerations

No specific cultural or linguistic considerations were identified.

Patient, family and/or carer considerations

No specific considerations were identified.

Economic considerations

A review of the Australian Government approved prostheses list accessed on 15th Sept 2013 (*http://www.health.gov.au/internet/main/publishing.nsf/Content/health-privatehealth-prostheseslist.htm*) produced a range of costs for the following procedures:

- 1. Sliding hip crew: AUD 863 to AUD 1242 (one plate, one dynamic screw, and four standard screws)
- 2. Short intramedullary nail: AUD 1328 to AUD 1710 (one short IM nail, one lag screw, and one locking bolt)
- 3. Long intramedullary nail: AUD 1807 to AUD 2239 (one long IM nail, one lag screw, and two locking bolts)

The Committee acknowledges that hospitals have arrangements with different prostheses manufacturers whereby devices are supplied at a reduced cost.

Should the recommendation be developed into a quality standard?

The Committee did not consider these recommendations to be ones against which a quality standard should be developed.

Further research

The Committee supports the research question recommended by NICE in this area:

"What is the clinical and cost effectiveness of intramedullary versus extramedullary fixation on mortality, functional status and quality of life in patients with reverse oblique trochanteric hip fracture?"

An additional research question was added in this area:

"What is the role of the short nail when compared to the long nail on mortality, functional status and quality of life in patients with trochanteric hip fractures that do not extend into the subtrochanteric region?"

5.4 Post-operative weight bearing status

Background

The main goals of surgery in a hip fracture patient are to alleviate pain and maximise the chances of functional recovery. For each patient, these goals will differ and be highly dependent on their cognitive and physical function prior to the fracture. Commencing the rehabilitation process

as soon after surgery as possible is part of the process of maximising the opportunity to regain function. Any restriction on weight bearing status has the potential to affect recovery. Equally, failure of the prosthesis leading to further surgical intervention is not a desirable outcome.

Clinical question No clinical questic linked to the quest	n or research strategy was developed for this recommendation, but it is tion relating to early mobilisation.
Practice point	Operate on patients with the aim to allow them to fully weight bear (without restriction) in the immediate post-operative period.

Considerations for Australia and New Zealand

The Committee considered that the recommendation around unrestricted weight bearing post-operatively is appropriate and no modifications are required for the Australian and New Zealand context.

Unrestricted weight bearing involves the patient putting as much or as little weight through the affected limb as he/she is able in the post-operative period. It is usually referred to as "weight bear as tolerated". The treating team do not place restrictions on the patient. The Committee is aware of variation in clinical practice within and between hospitals in Australia and New Zealand with respect to the post-operative weight bearing instruction. There is also variation in the terminology used to restrict weight bearing including non-touch, partial and protected weight bearing. Many of the terms are difficult to operationalize due to a lack of a standardised definitions or because patients are unable to adhere to the instruction.

Notwithstanding the obvious benefits of unrestricted weight bearing in relation to early mobilisation, the Committee also acknowledges the need to derive more evidence in this area and specifically to ascertain if there is any justification for restricted weight bearing on longer term outcomes for hip fracture patients. In the interim, the Committee consensus view was that the default post-operative instruction given to patients should be either weight bear as tolerated or non-weight bearing if there was genuine concern about the fracture, the fixation or the likelihood of healing.

Cultural and linguistic considerations

No cultural and linguistic considerations were identified.

Patient, family and/or carer considerations

Most people who are admitted from home with a hip fracture express a clear wish to return home. From a patient perspective, early mobilisation and the opportunity to regain meaningful function is therefore paramount. Anything that delays this process and which can potentially increase the chances of complications is not considered in the best interests of the patient. Applying restrictions to weight bearing post-operatively is extremely difficult in people with dementia or in those who develop a delirium during their hospital stay. Prolonged hospitalisation is also a significant consideration for family and carers as time and travel to hospital can be both stressful and costly.

Economic considerations

Any restriction on weight bearing status has the potential to extend the period required for meaningful functional recovery. For some, this can involve prolonged hospitalisation and the increased risk of complications associated with hospitalisation and restricted mobility. All have the consequence of increasing the costs of hip fracture care.

Should the recommendation be developed into a quality standard?

The Committee did not consider this recommendation to be one against which a quality standard should be developed although variation in practice could be monitored at State or local level with a hip fracture registry.

Further research

In the absence of much evidence in this area and variation in current practice, the Committee proposed linking a hip fracture register to existing administrative datasets to explore the relationship between post-operative weight bearing status and clinical and economic outcomes.



6.1 Early versus delayed mobilisation

Background

Once a patient has undergone surgery for a hip fracture, key goals are to control pain, and maximise the individual's opportunity to restore function toward the premorbid level. Apart from the medium and longer term goals of the patient in relation to mobility and function, early mobilisation is also associated with short term gains related to a reduction in postoperative complications.

The process of regaining mobility and restoring function can start with something relatively simple such as moving from the bed to a chair with support. The ability to weight bear without restriction is critical to this process. Restricted weight-bearing in the post-operative phase greatly limits what a patient can achieve from a function and mobility perspective.

Clinical question In patients who have undergone surgery for hip fracture, what is the clinical and cost effectiveness of early mobilisation (<48 hours after surgery) compared to late mobilisation on functional status, mortality, place of residence/discharge, pain and quality of life?		
Evidence-based recommendation	Unless medically or surgically contraindicated, mobilisation should start the day after surgery. Offer patients a physiotherapy assessment.	
Grade of recommendation	C	

Summary of the NICE Guideline findings

One RCT comprising 60 patients was identified. See *Appendix VIII* for the reference. The study looked at the benefits of early mobilisation defined as a time to first walk with a physiotherapist within 48 hours of surgery.

NICE evidence statements ⁺	GRADE assessment
There is a statistically significant and clinically significant increase in independence to transfer at day 7 for patients who had early mobilisation compared to delayed mobilisation.	Moderate quality
There is a doubling in the distance walked at day 7 for patients who had early mobilisation compared to delayed mobilisation.	Moderate quality
There is no statistically significant difference between early versus delayed mobilisation for discharge destination or mortality.	Low quality
There is a statistically significant and clinically significant decrease in independence to step at day 7 for patients who had early mobilisation compared to delayed mobilisation.	Moderate quality
No studies were identified on the cost-effectiveness of early vs. delayed mobilisation.	NA

^tSupporting information is available in the full NICE Guideline Sections 11.2, 17.10 (Appendix E), and 19.6 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October

6 Post-operative mobilisation strategies

2012 and identified one Cochrane review comprising 19 trials and 1589 participants.⁴⁰ The studies considered various interventions including early mobilisation strategies.

The NICE Evidence Update Advisory Group concluded that the findings from the updated search were consistent with the original recommendation in the NICE Guideline.

Considerations for Australia and New Zealand

The Committee considered that the recommendation needed to be modified to reflect the Australian and New Zealand context.

The Committee was of the view that it is important that all hip fracture patients are given the opportunity to sit out of bed and start the process of regaining mobility as soon as possible after surgery. For most individuals, this should start the day after surgery unless there is a clinical contraindication. The presence or absence of a physiotherapist should not be the main determinant of when this happens as availability of physiotherapy is not universal, particularly at weekends.

The Committee was of the view that specialist orthopaedic nurses should, and do, have the skills to transfer and mobilise hip fracture patients in the post-operative phase of care.

The Committee did feel that a formal physiotherapy assessment was an important part of goal setting and discharge planning for hip fracture patients.

NICE Guideline recommendation

Offer patients a physiotherapy assessment and, unless medically or surgically contraindicated, mobilisation on the day after surgery.

ANZ Guideline recommendation

Unless medically or surgically contraindicated, mobilisation should start the day after surgery. Offer patients a physiotherapy assessment.

Cultural and linguistic considerations

Language should not be seen as a barrier to early mobilisation. Family and carers are often willing and able to interpret instructions given by clinical staff if the patient is unable to understand the English language. All hospitals should have access to professional interpreting services and this includes interpreting services for those who are deaf. Different cultural beliefs and experiences with other health care systems may impact patient and family acceptance of early mobilisation post-surgery. Some patients and their families may be resistant to early mobilisation and other rehabilitation activities. Using professional health care interpreters can assist clinicians explain why mobilisation is important for rehabilitation and also assist clinicians navigate through some of the cultural beliefs that may be influencing the patient and their family.

The use of Indigenous health workers is strongly encouraged specifically to help with translation of words, adaptations of concepts and to ensure that Indigenous peoples remain in contact with their respective physical, spiritual and cultural connections whilst in the hospital. This is

particularly relevant during the rehabilitation period and consideration needs to be given to the development of culturally appropriate goals and how these are achieved.

Patient, family and/or carer considerations

From a patient perspective, regaining mobility and function is critical to the overall outcome from hip fracture surgery. The opportunity to commence this process early with the benefits of reducing post-operative complications is important. Equally important is to ensure that as the mobilisation process commences (early or late), management of pain is considered.

Economic considerations

Whilst no economic evidence was identified to support the recommendation, it is highly likely that early mobilisation will lead to a shorter length of stay in hospital, thereby lowering the cost of care.

Should the recommendation be developed into a quality standard?

The Committee did consider this recommendation to be one against which a quality standard should be developed.

Further research

No further research was suggested in this area.

6.2 Intensity of physiotherapy

Background

The timing, frequency and intensity of physiotherapy offered to a patient is determined by a number of factors including availability of appropriately trained staff and the physical and cognitive capacity of the patient to engage in the process. As such, it can be difficult to interpret the literature and to put in place services that adequately address the needs of all hip fracture patients. Nonetheless some simple messages can be gleaned from the existing literature in this area.

Clinical question

In patients who have undergone surgery for hip fracture, what is the clinical and cost effectiveness of early mobilisation (<48 hours after surgery) compared to late mobilisation on functional status, mortality, place of residence/discharge, pain and quality of life?

Consensus-based Offer patients mobilisation at least once a day and ensure regular physiotherapy review.

Summary of the NICE Guideline findings

Three RCTs comprising 288 patients were identified for inclusion in the review. See Appendix *VIII* for references. These considered a number of physiological and functional outcomes, as well as length of stay and quality of life. Data from the three trials were not pooled as the interventions were not sufficiently comparable. The structure of the evidence statements reflects the heterogeneity in study design.

6 Post-operative mobilisation strategies

NICE evidence statements ⁺	GRADE assessment
Strength training	
Additional, progressive strength training produces a statistically significant and clinically significant increase in leg extensor power, hip flexor strength and walking speed compared to placebo motor training (control) at 3 months after surgery.	High quality
There is no statistically significant difference in basic or extended activities of daily living, or gait and balance as measured by the Performance Orientated Mobility Assessment, with strength training compared to placebo motor training (control) at 3 months after surgery.	High quality
There is no statistically significant difference in Timed Up and Go test and chair rises with strength training compared to placebo motor training (control) at 3 months after surgery.	Moderate quality
Weight bearing exercise and treadmill training	
There is no statistically significant difference in functional performance tests, quality of life, walking speed or pain with weight bearing exercise and treadmill gait training compared to the control.	High quality
There is no statistically significant difference in length of hospital stay with weight bearing exercise and treadmill gait training compared to the control.	Moderate quality
Intensive (more frequent) physiotherapy	
There is no statistically significant difference in knee extensor strength, adductor muscle strength, or length of stay in hospital with an increased number of physiotherapy sessions per day compared to the control.	Low quality
Economic evidence	
All intensive exercise and physiotherapy programmes are more expensive than usual care, albeit the strength programme is only slightly more costly compared to usual care.	Minor limita- tions and partial applicability

^tSupporting information is available in the full NICE Guideline Sections 11.3, 17.10 (Appendix E), and 19.7 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and identified one Cochrane review comprising 19 trials and 1589 participants.⁴⁰ The studies considered various interventions including type, intensity and duration of physiotherapy strategies.

The NICE Evidence Update Advisory Group concluded that the findings from the updated search were consistent with the original recommendation in the NICE Guideline.

Considerations for Australia and New Zealand

The Committee considered that the recommendation is appropriate and no modifications are indicated for the Australian and New Zealand context.

Cultural and linguistic considerations

Language should not be seen as a barrier to frequency of mobilisation and often family and carers are more than happy to interpret instructions given by clinical staff if the patient is unable to understand the English language. Key phrases and instructions commonly used

during rehabilitation should be available in written format. All hospitals should have access to professional interpreting services and this includes interpreting services for those who are deaf. The use of Indigenous health workers is strongly encouraged specifically to help with translation of words, adaptations of concepts and to ensure that Indigenous peoples remain in contact with their respective physical, spiritual and cultural connections whilst in the hospital. This is particularly relevant during the rehabilitation period and consideration needs to be given to culturally appropriate goals and how these are achieved.

Patient, family and/or carer considerations

From a patient perspective, regaining mobility and function is critical to the overall outcome from hip fracture surgery. Not all patients are able to progress at the same rate or have the ability to achieve the same outcomes. Therapy should be tailored to the individual needs and progressed at a rate that is appropriate to each patient. For some patients this will be once per day, but for others more therapy may be beneficial. Adequate control of pain is required to maximise the gains from a physiotherapy session.

Economic considerations

More evidence is required to link the intensity of intervention to meaningful and tangible outcomes for a hip fracture patient so as to undertake a reliable assessment of the economic aspects of the intensity of therapy input in the post-operative phase of care.

Should the recommendation be developed into a quality standard?

The Committee did not consider this recommendation to be one against which a quality standard should be developed.

Further research

The Committee supports the research question recommended by NICE in this area:

"What is the clinical and cost effectiveness of additional intensive physiotherapy and/or occupational therapy (for example progressive resistance training) after hip fracture?"


Background

Over the years the approach to care of hip fracture patients has evolved both in terms of responsibility during the acute phase and the subsequent rehabilitative process. A number of disciplines are routinely involved in the care of these patients including doctors, nurses, physiotherapists, occupational therapists, and social workers. Other disciplines involved, depending on need and availability, include pharmacists, dietitians, speech pathologists, orthotists, clinical psychologists and neuropsychologists.

The most basic model of hospital care, which still exists in many parts of Australia and New Zealand, involves the hip fracture patient being admitted to an orthopaedic or surgical ward and the orthopaedic team taking sole responsibility for care. This may or may not include referrals to other specialties including geriatric medicine on a needs basis, but does not include shared ongoing responsibility for the patient. This will be referred to as "usual care" for the purposes of this Guideline.

The more advanced model of care known as a "hip fracture programme" in the UK and as an "orthogeriatric model of care" in Australia and New Zealand involves a shared care arrangement of hip fracture patients between the specialties of orthopaedics and geriatric medicine. The geriatrician is involved in the pre-operative optimisation of the patient in preparation for surgery and then takes a lead in the post-operative medical care and coordinates the discharge planning process. Implicit in this role are many of the aspects of basic care including nutrition, hydration, pressure care, bowel and bladder management and monitoring of cognition. Hybrids of this model exist across Australia and New Zealand.

Following the acute phase of care, a hip fracture patient usually undergoes a period of rehabilitation and this can take place in the home environment or in a rehabilitation setting depending on the abilities of the patient and the availability of services. In the UK, Geriatric Orthopaedic Rehabilitation Units (GORUs), provide dedicated beds for rehabilitation of older trauma patients of which hip fracture constitutes a large number of the patient population. This is less common in Australia and New Zealand where inpatient rehabilitation is more likely to be in a mixed rehabilitation unit which may be run by either a geriatrician or rehabilitation physician. Rehabilitation beds may be available in the acute hospital (described in the UK as a Mixed Assessment and Rehabilitation Unit (MARU)) or patients may be transferred to a dedicated "Intermediate Care" bed which is comparable to what is described in Australia as rehabilitation in a subacute facility.

The option of rehabilitation in the home environment is also available in many places across Australia and New Zealand with a variety of services funded through various funding streams at the State (District Health Board in New Zealand) or National level.

7.1 Hospital-based multidisciplinary rehabilitation versus usual care

The NICE Guideline originally defined two review questions in relation to hospital-based multidisciplinary care. However, because of significant overlap in the evidence (geriatrician input was involved in all the hospital-based multidisciplinary rehabilitation studies), the reviews were considered together.

For the purposes of the review, the models of care were defined as follows:

Usual care – the traditional model described with ad hoc or selective referral to some or all of the multidisciplinary rehabilitation disciplines, but without formal arrangements for coordinated multidisciplinary teamwork.

Acute trauma focus – those focused predominantly or exclusively on the acute ward and described as a Hip Fracture Programme in the UK.

Rehabilitation focus – those provided in a hospital in-patient rehabilitation setting known as a MARU/GORU or Intermediate Care in the UK.

Clinical question

In patients with hip fracture what is the clinical and cost effectiveness of hospital-based multidisciplinary rehabilitation on functional status, length of stay in secondary care, mortality, place of residence/discharge, hospital readmission and quality of life?

In patients with hip fracture what is the clinical and cost effectiveness of 'orthogeriatrician' involvement in the whole pathway of assessment, peri-operative care and rehabilitation on functional status, length of stay in secondary care, mortality, place of residence/ discharge, hospital readmission and quality of life?

Evidence-basedFrom admission, offer patients a formal, acute orthogeriatric servicerecommendationthat includes all of the following:

- regular orthogeriatrician assessment
- rapid optimisation of fitness for surgery
- early identification of individual goals for multidisciplinary rehabilitation to recover mobility and independence, and to facilitate return to prefracture residence and long-term wellbeing.
- early identification of most appropriate service to deliver rehabilitation
- continued, coordinated, orthogeriatric and multidisciplinary review and discharge planning liaison or integration with related services, including falls prevention, secondary fracture prevention, mental health, cultural services, primary care, community support services and carer support services.

Grade of recommendation

В

Summary of the NICE Guideline findings

Eleven studies comprising 2214 patients were included in the review. Four studies were identified for the economic review. See *Appendix VIII* for references.

NICE evidence statements ⁺	GRADE assessment
Hospital-based multidisciplinary rehabilitation (MDR) (GORU/MARU)	
There is a statistically significant and clinically significant reduction in pressure sores with hospital-based MDR (GORU/MARU) compared to usual care.	High quality
There is a statistically significant, but not clinically significant improvement in recovery of activities of daily living at 1 year with hospital-based MDR (GORU/MARU) compared to usual care.	Moderate quality
There is a statistically significant, but not clinically significant improvement in transfers (bed to chair) and being more dependent (Katz index) at 1 year with hospital-based MDR (GORU/MARU) compared to usual care. ††	Low quality
There is a statistically significant, but not clinically significant reduction in severe delirium with hospital-based MDR (GORU/MARU) compared to usual care.	Low quality
There is no statistically significant difference in mortality at 6 months and functional outcomes at 6 months between hospital-based MDR (GORU/MARU) and usual care.	Moderate quality
There is no statistically significant difference in mortality at 12 months and mortality at discharge between hospital-based MDR (GORU/MARU) and usual care.	Moderate quality
There is no statistically significant difference in length of hospital stay and readmission to hospital between hospital-based MDR (GORU/MARU) and usual care.	Low quality
Hip Fracture Programme (HFP)	
There is a statistically significant and clinically significant improvement in functional outcomes at 1 year with HFP compared to usual care.	Moderate Quality
There is a statistically significant and clinically significant reduction in mortality at discharge between HFP and usual care.	Low quality
There is no statistically significant difference in mortality at 12 months and readmission to hospital, between HFP and usual care.	Moderate quality
There is no statistically significant difference in length of hospital stay, between HFP and usual care.	Low quality
HFP is the dominant strategy (less costly and more effective) than both GORU/MARU and usual care as a hospital based multidisciplinary rehabilitation of hip fracture patients.	Minor limitations Direct applicability

^tSupporting information is available in the full NICE Guideline Sections 12.2, 17.11 (Appendix E), and 19.8 (Appendix G).¹ th The working group (JC/LG) identified that the first part of this statement in the NICE guideline is incorrect. There is not a statistically significant difference between groups with respect to transfers (bed to chair) (RR 0.96, 95% CI 0.69 to 1.34) (see full NICE Guideline Figure G-143). The second part of the statement correctly identifies a statistically significant difference in dependency (Katz index) at 1 year favouring hospital-based MDR (RR 0.64, 95% CI 0.51 to 0.81). This could be interpreted as being clinically significant.

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and no new evidence was found.

Considerations for Australia and New Zealand

The Committee determined that the wording of the original recommendation was not directly applicable to the Australian and New Zealand context where acute, sub-acute and community services including rehabilitation services often have different operational policies, governance structures and funding arrangements. It also recognises the role and importance of carers and carer support services in the ongoing care of hip fracture patients. However, the underlying principles and components of a comprehensive programme of care were felt to be desirable and the alteration of the wording to reflect the Australian and New Zealand context does not deviate from the interpretation of the literature. It is also important to acknowledge that given the wide variety in size and distribution of hospitals that provide orthopaedic surgery, an orthogeriatrician will not always be available, and another physician with an interest in peri-operative medical care may fulfil this role. In addition, in Australia and New Zealand, rehabilitation physicians play an important role in the rehabilitation phase of the care of a hip fracture patient.

NICE Guideline recommendation

From admission, offer patients a formal, acute orthogeriatric or orthopaedic ward-based Hip Fracture Programme that includes all of the following:

- orthogeriatric assessment
- rapid optimisation of fitness for surgery
- early identification of individual goals for multidisciplinary rehabilitation to recover mobility and independence, and to facilitate return to prefracture residence and long-term wellbeing
- · continued, coordinated, orthogeriatric and multidisciplinary review
- liaison or integration with related services, particularly mental health, falls prevention, bone health, primary care and social services
- clinical and service governance responsibility for all stages of the pathway of care and rehabilitation, including those delivered in the community.

ANZ Guideline recommendation

From admission, offer patients a formal, acute orthogeriatric service that includes all of the following:

- regular orthogeriatrician assessment
- rapid optimisation of fitness for surgery
- early identification of individual goals for multidisciplinary rehabilitation to recover mobility and independence, and to facilitate return to prefracture residence and long-term wellbeing
- · early identification of most appropriate service to deliver rehabilitation
- continued, coordinated, orthogeriatric and multidisciplinary review and discharge planning liaison or integration with related services, including falls prevention, secondary fracture prevention, mental health, cultural services, primary care, community support services and carer support services.

Cultural and linguistic considerations

All hospitals should have access to professional interpreting services and this includes interpreting services for those who are deaf. The use of interpreting services or Indigenous health workers is strongly encouraged in the process of optimising patients for surgery where language or culture is perceived as a barrier to care. Continuity of these services through the hip fracture journey can enhance the patient experience and allows for appropriate planning of ongoing rehabilitation and support for discharge and the transition to home.

Patient, family and/or carer considerations

Consumers and their family and carer(s) want to receive care that is effective and delivers the best outcome for the hip fracture patient. They also want care that is well co-ordinated, and where there are open and effective lines of communication between the treating teams, the patient, and the family/carer. The important outcome for patients is that they are given every chance to regain meaningful function and for many, the ability to continue to live independently at home. Access to carer support networks and services play a vital role for the many informal caregivers that may support hip fracture patients during their journey.

Preventing future fractures is also important and patients with a hip fracture should be offered appropriate and evidence-based interventions to reduce the risk of future falls and fractures. As it is not always possible to complete assessment and initiate treatment or put in place interventions during the acute stay, a mechanism must be in place to ensure that longer term follow-up including specialist referral where appropriate is in place.

Economic considerations

The NICE Guideline review process did not identify any economic studies on hospital-based MDR and so elected to develop a cost-effectiveness model based on an indirect comparison of randomised trials. The findings suggest that whilst hospital-based MDR is more expensive than usual care, the costs are offset by the benefits which include a reduced length in acute hospital stay and a reduction in the need for aged care services including residential aged care services. The orthogeriatric service with the acute care focus was the dominant strategy.

Given the differences in funding models and the availability of services in Australia and New Zealand, the Committee would strongly recommend that a dedicated piece of work is commissioned to look at the economic argument for the different approaches to hip fracture care seen or being developed in Australia and New Zealand. The Committee also agreed that it is important to look at overall costs of care, rather than focusing only on the acute phase of care.

Should the recommendation be developed into a quality standard?

The Committee did consider this recommendation to be one against which a quality standard should be developed. Any measure considered should look at the overall impact of a service on the health care system as opposed to focusing solely on acute care. This is of particular relevance to the funding of health care in Australia.

Additional Recommendations

The NICE Guideline produced two further recommendations in this area which were not specifically derived from the hip fracture literature, but which are felt to be appropriate. The Guideline Adaptation Committee is of the view that the NICE recommendations on terminal illness and cognition are appropriate and are particularly important when considering the patient and the family/carer perspective. In addition, the Guideline Adaptation Committee elected to produce a third recommendation around nutrition and hip fracture.

Hip fracture and terminal illness

There is no evidence in the literature specific to end of life care and hip fracture patients but the Committee agreed that the NICE Guideline recommendation was appropriate and that surgery had a role particularly in alleviating pain from a hip fracture.

Practice point	If a hip fracture complicates or precipitates a terminal illness, the multidisciplinary team should still consider the role of surgery as part of a palliative care approach that:
	 minimises pain and other symptoms
	 establishes patients' own priorities for rehabilitation
	 considers patients' wishes about their end-of-life care.

Hip fracture and cognition

An increasing proportion of patients admitted to hospital with a hip fracture have underlying cognitive impairment and some will have a formal diagnosis of dementia. In others, the acute hospitalisation will unearth undiagnosed cognitive problems which may manifest as an acute delirium. There is already evidence that comprehensive geriatric assessment can reduce the incidence, severity and duration of delirium in hip fracture care.⁴¹ The recommendation below is derived from the NICE Guideline on delirium⁴² which also provides an economic argument for the benefits of tailored multi-component intervention in this group. Again, the Committee felt this to be appropriate to the Australian and New Zealand context.

Practice point	Healthcare professionals should deliver care that minimises the patient's risk of delirium and maximises their independence, by:
	 actively looking for cognitive impairment when patients first present with hip fracture
	 reassessing patients to identify delirium that may arise during their admission
	 offering individualised care in line with 'Delirium' (NICE Clinical Guideline 103).

Hip fracture and nutrition

Patients admitted with a hip fracture are at high risk of nutritional insufficiency. Some will be malnourished at the point of admission whilst others are at risk of becoming malnourished if

insufficient attention is paid to their nutritional needs. Assessment of nutritional status linked to tailored intervention is considered a core role of orthogeriatric care. Multimodal interventions may include: ensuring the patient has their teeth in situ, a swallowing assessment, cognitive and mood assessment, assistance with feeding at mealtimes and a review of the nutritional content of the diet provided.

Practice Nutritional status should be assessed early in the hospital stay and point reassessed during the course of the admission. Tailored interventions should be implemented.

Further research

The NICE guideline recommends further research in this area:

"What is the clinical and cost effectiveness of a designated hip fracture unit within the trauma ward compared to units integrated into acute trusts on mortality, quality of life and functional status in patients with hip fracture?"

The Committee supports the broader concept of the need to undertake further research in this area, to determine the most effective models of care. However, from an Australian and New Zealand context this needs to reflect the challenges of hospital size, geography, availability of services in rural and remote settings and new and innovative approaches to delivering care including the use of emerging technologies. Whilst much can be learnt from research undertaken in other countries, this particular question is likely to require research specifically undertaken in Australia and New Zealand.

7.2 Community-based multidisciplinary rehabilitation versus usual care

Clinical question In patients with hip based multidiscipli care, mortality, place	o fracture what is the clinical and cost effectiveness of community- nary rehabilitation on functional status, length of stay in secondary ce of residence/discharge, hospital readmission and quality of life?
Evidence-based recommendation	 Consider early supported discharge provided the patient: is medically stable and has the mental ability to participate in continued rehabilitation and is able to transfer and mobilise short distances and has not yet achieved their full rehabilitation potential, as discussed with the patient, carer and family. If unable to meet the criteria for early supported discharge, consider in-patient rehabilitation for those in whom further improvement with a structured multidisciplinary programme is anticipated.
Grade of recommendation	c

Summary of the NICE Guideline findings

Two studies comprising 168 patients were included in the clinical review. See *Appendix VIII* for references.

NICE evidence statements ⁺	GRADE assessment
There is a statistically significant and clinically significant reduction in hospital length of stay, but an increase in total length of rehabilitation (hospital + home) with home-based multidisciplinary early supported discharge (ESD) compared with usual care.	Moderate quality
There is a statistically significant and clinically significant increase in functional independence measures with home-based multidisciplinary ESD compared with usual care.	High quality
There is no statistically significant difference in mortality at 12 months and readmission to hospital at 4 months with home-based multidisciplinary ESD compared with usual care.	Low quality
Home-based MDR – ESD is cost-effective in the rehabilitation of patients with hip fracture.	Minor limitations Direct applicability

^tSupporting information is available in the full NICE Guideline Sections 12.4, 17.11 (Appendix E), and 19.9 (Appendix G).¹

NICE Evidence Update

A NICE Evidence Update published in March 2013²² extended the literature search to October 2012 and no additional studies were identified.

Considerations for Australia and New Zealand

The Committee determined that the wording of the original recommendation was not directly applicable to the Australian and New Zealand context where acute, sub-acute and community services including rehabilitation services often have different operational policies, governance structures and funding arrangements. However, the underlying principles and components of a comprehensive programme of care were felt to be desirable and the alteration of the wording to reflect the Australian and New Zealand context did not deviate from the interpretation of the literature.

Geographical considerations are relevant when considering the option of community-based rehabilitation and in some parts of Australia, the delivery of a home-based rehabilitation programme is precluded due to the distances people live from their local services.

NICE Guideline recommendation

Consider early supported discharge as part of the Hip Fracture Programme, provided the Hip Fracture Programme multidisciplinary team remains involved and the patient:

- is medically stable and
- has the mental ability to participate in continued rehabilitation and
- · is able to transfer and mobilise short distances and
- has not yet achieved their full rehabilitation potential, as discussed with the patient, carer and family.

ANZ Guideline recommendation

Consider early supported discharge provided the patient:

- is medically stable and
- has the mental ability to participate in continued rehabilitation and
- is able to transfer and mobilise short distances and
- has not yet achieved their full rehabilitation potential, as discussed with the patient, carer and family.

If unable to meet the criteria for early supported discharge, consider in-patient rehabilitation for those in whom further improvement with a structured multidisciplinary programme is anticipated.

Cultural and linguistic considerations

Both culture and language need to be considered when delivering a rehabilitation programme in the community. All health services should have access to professional interpreting services and this includes interpreting services for those who are deaf. The use of Indigenous health workers is strongly encouraged during the rehabilitation period and consideration needs to be given to culturally appropriate goals and how these are achieved. This is particularly true of the discharge process and the transition to home.

Patient, family and/or carer considerations

It is important that patients and their family and/or carers are involved in decisions around rehabilitation and where this can be undertaken. In the absence of compelling data around the effectiveness of one programme over another in terms of health or economic outcomes, then choice should be offered where a range a rehabilitation services are available.

Economic considerations

The NICE Guideline review process did not identify any cost-effectiveness studies on community-based MDR and so elected to develop a decision analytic model based on work originally undertaken in Australia and published in 2002/3. The results did not provide evidence of the cost effectiveness of home-based rehabilitation and the model was highly sensitive to both the acute length of stay and the period of time spent in a home-based rehabilitation programme.

Given the differences in funding models and availability of services in Australia and New Zealand, the Committee would strongly recommend that a dedicated piece of work is commissioned to look at the economic argument for the different approaches to hip fracture care currently in practice or being developed in Australia and New Zealand. The Committee also agrees that it is important to look at overall costs of care rather than to focus simply on the acute phase of care. The proportion of hip fracture patients who fulfil the criteria in the recommendation also need to be factored in to any economic modelling for the future. Any modelling of costs needs to consider the challenges posed in delivering rehabilitation in rural and remote settings.

Should the recommendation be developed into a quality standard?

The Committee did not consider this recommendation to be one against which a quality standard should be developed. However a measure of time in acute and rehabilitation care will

be important to consider, particularly with the change in approach to funding care in Australia.

Additional Recommendations

The NICE Guideline produced two further recommendations in this area which were not specifically derived from the hip fracture literature or specific to the original review question.

One recommendation focused on governance arrangements for Intermediate Care and was not considered directly relevant or the Australian and New Zealand context.

A second recommendation was made in relation to access to rehabilitation services for people living in residential aged care facilities. The Committee had considerable discussion around this recommendation and particularly with reference to the lack of evidence to support it. It is recognised that a proportion of individuals living in residential aged care facilities did have potential to benefit from a rehabilitation programme, with the chance of delivering on improved functional outcomes, which may be as basic as making bed to chair transfers easier and safer. Where and how this rehabilitation is delivered is not clear and is an area that requires dedicated research to answer both the clinical effectiveness and cost effectiveness arguments.

At the end of the discussion, the Committee felt that the wording of the current recommendation was appropriate and that the decision around the appropriateness of a rehabilitation programme should be made at the discretion of the treating team in consultation with the patients and their families and/or carers.

Practice Patients admitted from residential aged care facilities should not be point excluded from rehabilitation programmes in the community or hospital, or as part of an early supported discharge programme.

Further research

The Committee supports the research question recommended by NICE in this area:

"What is the clinical and cost effectiveness of early supported discharge on mortality, quality of life and functional status in patients with hip fracture who are admitted from a care home?"

A second research question around equity of access to rehabilitation services was also suggested in the NICE Guideline. However, in the absence of evidence of effectiveness, this was not considered a priority area by the ANZ Guideline Adaptation Committee.

8.1 Patient and carer views and information

Background

A hip fracture is a devastating event for any person, young or old. When admitted to a hospital, hip fracture patients are often in pain, which is distressing both for them and their families and carers. Effective communication between health care professionals and patients can help alleviate some of the distress and allow for appropriate management strategies to be put in place in a timely manner.

In 2006 the Australian Bureau of Statistics found that almost 60% of adult Australians have low health literacy, which means they are not able to effectively exercise choice or voice when making health care decisions.⁴³

The NICE Guideline undertook a systematic review of studies which considered patient and carer views of their experience extending from the acute phase to the end of the rehabilitation period. The stated aim of this review was to provide:

- Supplementary evidence to clinical questions addressed in the guideline
- A general overview of patients' views on hip fracture and hip fracture management
- Evidence relating to the provision of information to patients and carers

Eleven studies were identified of which just one was from Australia and none were from New Zealand. See *Appendix VIII* for references.

Common themes emerged from the studies including the initial despair and anxiety about ever walking again, the optimism and desire to regain independence, the importance of a positive attitude of staff and the need to communicate in a simple and effective manner.

No specific recommendation was made from the qualitative review. However the findings did contribute to the recommendation around information for patients. No additional research evidence from randomised trials was identified to contribute to the recommendation.

8 Patient and carer perspectives

PracticeOffer patients (or, as appropriate, the carer and/or family) information aboutpointtreatment and care including:

- diagnosis
- aims of care
- choice of anaesthesia
- · choice of analgesia and other medications
- surgical procedures
- possible complications
- post-operative care
- rehabilitation programme
- future fracture prevention
- · healthcare professionals involved in their care
- how to care for the patient, especially after discharge
- support and services to assist the carer/family.

Information should be available in a range of media and in appropriate languages.

Considerations for Australia and New Zealand

The Committee considered that the original NICE Guideline recommendation should be modified.

Australia's Commonwealth Carer Recognition Act 2010 states that 'carers should be considered as partners with other care providers in the provision of care, acknowledging the unique knowledge and experience of carers.'

The Committee felt it was not possible to discuss "long term outcomes" with patients and their family and/or carers as this was largely unknown but felt that it was more appropriate to discuss "aims of care". The Committee felt that a discussion about future fracture prevention should take place following a hip fracture.

Standard policy and practice guides the process of consent to anaesthesia and surgical intervention in both Australia and New Zealand. Patients and their family and/or carers should be provided with the necessary information to make an informed decision.

The Royal Australasian College of Surgeons has endorsed patient information leaflets specific to hip fracture care and to anaesthesia which can be obtained from the following website – *www.smservices.net.au*.

8 Patient and carer perspectives

NICE Guideline recommendation

Offer patients (or, as appropriate, their carer and/or family) verbal and printed information about treatment and care including:

- diagnosis
- choice of anaesthesia
- choice of analgesia and other medications
- surgical procedures
- possible complications
- post-operative care
- rehabilitation programme
- long term outcomes
- healthcare professionals

ANZ Guideline recommendation

Offer patients (or, as appropriate, their carer and/or family) information about treatment and care including:

- diagnosis
- aims of care
- choice of anaesthesia
- choice of analgesia and other medications
- surgical procedures
- possible complications
- post-operative care
- rehabilitation programme
- future fracture prevention
- healthcare professionals involved in their care
- how to care for the patient, especially after discharge
- support and services to assist the carer/family.

Information should be available in a range of media and in appropriate languages.

A further recommendation was made by the Committee to reflect the importance of engaging with the patient and, as appropriate, their carer and/or family, in all aspects of care in the hip fracture journey. The active engagement of the patient in decision making processes was felt to be more than simply providing information.

Practice point	Patients (or, as appropriate, the carer and/or family) should be involved in all key decisions in the hip fracture journey. This should include the use of professional interpreters where required and be done in a culturally sensitive manner. Issues to address include:
	 the pros and cons of operative versus non-operative intervention
	 goals and limitations of treatment including resuscitation
	palliation and end of life care.

Cultural and linguistic considerations

All hospitals should have access to professional interpreting services and this includes interpreting services for those who are deaf. Information should be made available to patients in their preferred language. Whilst easy access to interpreters can be a problem, written information highlighting the pathway for hip fracture care should be provided in languages that reflects the makeup of the local population. Any written material developed for Indigenous peoples should be done in partnership with people with expertise in Indigenous health issues. The use of validated methods in production of written information is encouraged including the back translation of any material to ensure linguistic and cultural appropriateness.

Economic considerations

Health care staff sometimes struggle to find time to sit with patients and their family and/or carer to explain what is happening and to answer any questions or concerns. But, failure to communicate effectively may cause unnecessary distress for the patient, and can also lead to complaints, which take a considerable amount of time to address. In addition, if the patient's family and/or carer are not fully prepared for the caring role they will be undertaking post-discharge, this can create stress and a risk of a poor outcome for both the patient and family.

Should the recommendations be developed into quality standards?

The Committee did not consider these recommendations to be ones against which a quality standard should be developed.

Further research

The Committee supports the research questions recommended by NICE in this area:

"What quality of life values do individual patients and their carers place on different mobility, independence and residence states following rehabilitation?"

and

"What is the patient's experience of being admitted to hospital with a hip fracture in relation to surgery, pain management, timeliness of information given, and rehabilitation?"

The Committee was strongly of the opinion that the views of patients, families and carers should be proactively sought so as to ensure that there is alignment between what health care professionals and patients consider to be important aspects of hip fracture care.

The original NICE Guideline made a number of recommendations for future research to address the identified gaps in the literature that were apparent during the review process. The ANZ Guideline Adaptation Committee supported the majority of the research questions put forward. Those not supported are highlighted at the end of each section in the clinical recommendations. In order to provide meaningful answers for the Australian and New Zealand context, consideration was given in relation to whether the research needs to be undertaken in Australia and New Zealand, e.g. models of care, or whether results could be extrapolated directly from other countries also attempting to address the research questions, e.g. long versus short intramedullary nail in trochanteric fractures with no subtrochanteric extension. There were additional research questions that the Committee also felt were warranted.

9.1 Imaging options in occult hip fracture

NICE research question

In patients with a continuing suspicion of a hip fracture but whose radiographs are normal, what is the clinical and cost effectiveness of computed tomography compared to magnetic resonance imaging, in confirming or excluding the fracture?

ANZ Hip Fracture Guideline Adaptation Committee comments

The Committee acknowledge that this is an area where there is still uncertainty but will be difficult to answer with any degree of certainty, particularly with the continuous advances in both technologies. The clinical benefits derived from answering this research question are likely to be marginal and only relevant to a small number of hip fracture patients. It was not considered to be a priority area for research. It is a research question that, if addressed elsewhere in the world, can be extrapolated for use in Australia and New Zealand.

9.2 Analgesia: Nerve blocks

NICE research question

What is the clinical and cost effectiveness of pre-operative and post-operative nerve blocks in reducing pain and achieving mobilisation and physiotherapy goals sooner in patients with hip fracture?

ANZ Hip Fracture Guideline Adaptation Committee comments

Adequate pain control is a critical aspect of care from a patient perspective. This is a priority area for research with the primary outcome being a patient focused measure of pain control. Secondary outcomes should include the impact of pain control on the ability to mobilise and rehabilitate as well as side effects associated with use of both systemic and local analgesic agents. Cultural and linguistic issues should also be considered when addressing this research question. The cost associated with nerve blocks including the training requirements needs to be considered. This research question could be answered with a multicentre randomised controlled clinical trial design and would be possible to undertake in the Australian and New Zealand setting as routine use of nerve blocks is not widespread.

9.3 Timing of surgery

NICE research question

What is the clinical and cost-effectiveness of surgery within 36 hours of admission compared to surgery later than 36 hours from admission in mortality, morbidity and quality of life in patients with hip fracture?

ANZ Hip Fracture Guideline Adaptation Committee comments

From an ethical perspective, this is not a research question that can be addressed using the randomised controlled clinical trial design. However it is an important question to address and best undertaken using national registries. A large number of variables contribute to the ability and appropriateness of undertaking surgery within 36 hours and need to be considered in any model. Surgery within a given time period and with the appropriately skilled team should be considered together. Specific consideration needs to be given to this question in regional and rural sites where access to a hospital and a clinical team with the necessary expertise to undertake the procedure can offer challenges not seen in larger metropolitan areas.

9.4 Anaesthesia

NICE research question

What is the clinical and cost effectiveness of regional versus general anaesthesia on postoperative morbidity in patients with a hip fracture?

ANZ Hip Fracture Guideline Adaptation Committee comments

This is an important area of research likely to be best undertaken as a randomised controlled trial although it is acknowledged that there are a number of factors that impact on suitability for regional anaesthesia. Marked variation in practice exists in Australia and New Zealand although there is little evidence to suggest whether this variation in practice has any impact on patient outcomes. Some data on outcomes could be derived from national registries but an RCT is more likely to be able to answer the question with more certainty. This study would be best undertaken in countries where marked variation in practice already exists and where the anaesthetic workforce is appropriately skilled in both techniques. A number of additional factors would then need to be adjusted for in the analysis.

9.5 Displaced intracapsular fractures

NICE research question

What is the clinical and cost effectiveness of large-head total hip replacement versus hemiarthroplasty on functional status, reoperations and quality of life in patients with displaced intracapsular hip fracture?

ANZ Hip Fracture Guideline Adaptation Committee comments

Performance of prostheses used in hemiarthroplasty and total hip replacement can, to a certain degree, be ascertained from the Australian and New Zealand Joint Registries. However this does not capture data on functional performance or quality of life. The use of registries is also limited as it is difficult to account and adjust for the decisions that are made currently as to which prosthesis is used. The recently released 2013 report from the Australian National Joint Registry has for the first time, reported outcomes on partial and total arthroplasty for hip fracture.³⁴ It provides evidence of higher revision rates for the smaller femoral head size (<32mm) and little, if any additional benefit in increasing head size from 32mm to 36mm and larger.

A multicentre randomised controlled trial would be required to answer the question and it would be possible to extrapolate results obtained from other developed countries. Alternatively, working in partnership with the National Joint Registry and increasing the amount of data collected for these patients over an agreed period would allow revision rates to be combined with functional status and quality of life.

9.6 Extracapsular fracture fixation

NICE research question

What is the clinical and cost effectiveness of intramedullary versus extramedullary fixation on mortality, functional status and quality of life in patients with reverse oblique trochanteric hip fracture?

ANZ Hip Fracture Guideline Adaptation Committee comments

This was seen to be an important area of research. A high quality registry collecting sufficient detail about the fracture and the patient over a period of at least 1 year could answer this question. Otherwise a large multicentre randomised controlled trial would be required.

9.7 Intensity of physiotherapy

NICE research question

What is the clinical and cost effectiveness of additional intensive physiotherapy and/or occupational therapy (for example progressive resistance training) after hip fracture?

ANZ Hip Fracture Guideline Adaptation Committee comments

This is an important area of research and unlikely to be answered through use of registries. A multicentre randomised controlled trial is the preferred approach to answering this question. Adequate and consistent definitions of therapy intensity, duration and frequency are required as is sufficient patient level detail. Outcomes need to reflect measures that are meaningful to the hip fracture patient and/or those providing care for hip fracture patients.

9.8 Hospital-based multidisciplinary rehabilitation

NICE research question

What is the clinical and cost effectiveness of a designated hip fracture unit within the trauma ward compared to units integrated into acute trusts (hospitals) on mortality, quality of life and functional status in patients with hip fracture?

ANZ Hip Fracture Guideline Adaptation Committee comments

The Committee supports the broader concept of the need to undertake further research in this area, to determine the most effective models of care. However, from an Australian and New Zealand context this needs to reflect the challenges of hospital size, geography, availability of services in rural and remote settings and new and innovative approaches to delivering care including the use of emerging technologies. Whilst much can be learnt from research undertaken in other countries, this particular question is likely to require research specifically undertaken in Australia and New Zealand.

9.9 Community-based multidisciplinary rehabilitation

NICE research question

What is the clinical and cost effectiveness of early supported discharge on mortality, quality of life and functional status in patients with hip fracture who are admitted from a care home (residential aged care facility/rest home)?

ANZ Hip Fracture Guideline Adaptation Committee comments

People living in care homes are exposed to relatively limited rehabilitation opportunities. This is more so of people with high care rather than low care needs. In the absence of evidence to demonstrate meaningful benefits of rehabilitation in this population, research in this area is a priority. Consideration should be given as to where this rehabilitation is undertaken and to selecting outcome measures that are meaningful to the patient and/or those providing care. Given the differences in populations and services offered in residential care facilities across the world, this is research that is best undertaken in Australia and New Zealand to provide an answer with local meaning and context. The cost analysis component of this research is also critical and needs to reflect the funding of care in Australia and New Zealand.

9.10 Patient and carer views and information

NICE research question

What quality of life values do individual patients and their carers place on different mobility, independence and residence states following rehabilitation?

What is the patient's experience of being admitted to hospital with a hip fracture in relation to surgery, pain management, timeliness of information given, and rehabilitation?

ANZ Hip Fracture Guideline Adaptation Committee comments

Little is known about the hip fracture patient and family/carer experience. Assumptions are often made about what are the most important aspects of care in the hip fracture journey but there has been little systematic gathering of evidence. Equally little is known about individualised patient centred goal attainment and what constitutes a good outcome for the hip fracture patient. It is likely that both could be answered through qualitative research identifying common themes important to hip fracture patients. Much of this suggested qualitative work could and should be appended to a number of the research questions already identified.

At the same time, local quality assurance should include review of patient feedback as part of an ongoing process to improve care.

9.11 Additional areas for further research

The following questions were developed by the ANZ Hip Fracture Guideline Adaptation Committee.

a) What is the true cost of hip fracture care?

It is a specific recommendation of the Committee that a dedicated piece of work be commissioned in Australia and New Zealand looking at the actual cost of hip fracture care (acute, subacute and longer term care) and where the greatest potential exists in aligning improvements in care with the opportunity to deliver more cost-effective care. The work needs to reflect the existing funding models of care in both countries and in Australia, consideration needs to be given to State and Commonwealth funding of aspects of care.

b) What are the short, medium and long term clinical and cost implications of restricted weight bearing in the post-operative phase of care?

The Committee is aware of marked variation in clinical practice around the issue of postoperative weight bearing status. This is in part a reflection of the limited evidence for or against restricted weight bearing. Addressing this research question is considered a priority area and could be done using a national registry and linked data. The costing aspect of the research question is best addressed by undertaking the research in Australia and New Zealand.

c) What is the role of the short nail when compared to the long nail on mortality, functional status and quality of life in patients with trochanteric hip fractures that do not extend into the subtrochanteric region?

It is likely that this question can be answered through use of large national registries with longer term follow up of patients including the use of linked data.



A number of existing guidelines, supporting documents and resources are available to use in conjunction with the ANZ Guideline for Hip Fracture Care. These are listed below.

10.1 NHMRC developed or approved guidelines

Acute Pain Management - Scientific Evidence (3rd edition). 2010. Available from: *http://www.nhmrc.gov.au/* Reference number: CP104

Clinical Practice Guideline for the Prevention of Venous Thromboembolism (Deep Vein Thrombosis and Pulmonary Embolism) in Patients Admitted to Australian Hospitals. 2009.

Available from: http://www.nhmrc.gov.au/ Reference number: CP115

Clinical Guideline for the Prevention and Treatment of Osteoporosis in Postmenopausal Women and Older Men. 2010.

Available from: http://www.racgp.org.au/download/documents/Guidelines/ Musculoskeletal/racgp_osteo_guideline.pdf.

Guidelines for a Palliative Approach in Residential Aged Care. 2006. Available from: *http://www.nhmrc.gov.au/* Reference number: AC15

Guidelines for the Ethical Management of People with Advanced Chronic or Terminal Conditions in the Final Months of Life. 2011.

Available from: http://www.nhmrc.gov.au/ Reference number: REC31

Communicating with Patients: Advice for Medical Practitioners. 2004. Available from: *http://www.nhmrc.gov.au/* Reference number: E58

10.2 Guidelines on NHMRC portal but not NHMRC developed or approved

Evidence-Based Guidelines for the Management of Hip Fractures in Older Persons - an Update. 2010.

Available from: https://www.clinicalguidelines.gov.au/ Reference number: 1622

Preventing Falls and Harm from Falls in Older People - Best Practice Guidelines for Australian Community Care. 2009.

Available from: https://www.clinicalguidelines.gov.au/ Reference number: 1621

Preventing Falls and Harm from Falls in Older People - Best Practice Guidelines for Australian Hospitals. 2009.

Available from: https://www.clinicalguidelines.gov.au/ Reference number: 1605

Preventing Falls and Harm from Falls in Older People - Best Practice Guidelines for

Australian Residential Aged Care Facilities. 2009.

Available from: https://www.clinicalguidelines.gov.au/ Reference number: 1619

10.3 Other related guidelines and reports

Australian Orthopaedic Association National Joint Replacement Registry. Hip and Knee Arthroplasty. 2013 Annual Report.

Available from: https://aoanjrr.dmac.adelaide.edu.au/annual-reports-2013

National Safety and Quality Health Services Standards. 2012. Available from: http://www.safetyandquality.gov.au/wp-content/uploads/2011/09/ NSQHS-Standards-Sept-2012.pdf.

NICE Clinical Guideline 74: Surgical Site Infection. Prevention and Treatment of Surgical Site Infection. 2008.

Available from: http://www.nice.org.uk/guidance/cg74

NICE Clinical Guideline 103: Delirium. Diagnosis, Prevention and Management. 2010.

Available from: http://www.nice.org.uk/guidance/cg103

NICE Clinical Guideline 32. Nutrition Support in Adults: Oral Nutrition Support, Enteral Tube Feeding and Parenteral Nutrition. 2006.

Available from: http://www.nice.org.uk/guidance/CG32

10.4 Resources for hip fracture care

A number of tools and resources are currently available on the ANZHFR webiste: www. anzhfr.org. These include a regularly updated literature registry, local protocols and clinical pathways for hip fracture care, access to information on secondary fracture prevention and links to a number of useful websites. This website will be continuously updated and people are encouraged to forward useful material that may be of use to others providing care for hip fracture patients.



Glossary of terms and abbreviations

Abbreviations

AAGBI	Association of Anaesthetists of Great Britain and Ireland
AGREE II	Appraisal of Guidelines for Research & Evaluation II
ADAPTE	Manual and Resource Toolkit for Guideline Adaptation
ANZ	Australia and New Zealand
ANZHFR	Australia and New Zealand Hip Fracture Registry
AO	Arbeitsgemeinschaft für Osteosynthesefragen
ATSI	Aboriginal and Torres Strait Islander
Bupa	British United Provident Association
CALD	Culturally and linguistically diverse
CI	Confidence interval
СТ	Computed tomography
EQ-5D	EuroQol-5D
ESD	Early Supported Discharge
GORU	Geriatric Orthopaedic Rehabilitation Unit
GRADE	Grading of Recommendations Assessment, Development and Evaluation
HFP	Hip Fracture Programme
IM	Intramedullary
MDR	Multidisciplinary rehabilitation
MARU	Mixed Assessment and Rehabilitation Unit
MJA	Medical Journal of Australia
MRI	Magnetic resonance imaging
NA	Not applicable
NCGC	National Clinical Guideline Centre (UK)
NHMRC	National Health and Medical Research Council
NICE	National Institute for Health and Care Excellence (UK)
NSAIDs	Non-steroidal anti-inflammatory drugs
NSW	New South Wales
QALY	Quality-adjusted life year
RCT	Randomised controlled trial
RNS	Radionuclide scan
RR	Relative risk
SIGN	Scottish Intercollegiate Guideline Network
US	Ultrasound

Glossary

Aboriginal	The term "Aboriginal" is traditionally applied to the indigenous inhabitants of mainland Australia and Tasmania, along with some of the adjacent islands.
ADAPTE	An international collaboration of researchers, guideline developers, and guideline implementers who aim to promote the development and use of clinical practice guidelines through the adaptation of existing guidelines.
Aged care services	State or Commonwealth funded services designed for older people living at home or in a supported environment.
AGREE II	A validated instrument designed to assess the methodological rigour and transparency with which a guideline has been developed.
AO Classification [†]	Classification system used to describe stable trochanteric fractures (type A1), unstable trochanteric (type A2), and transtrochanteric which includes those fracture lines at the level of the lesser trochanter and reversed fracture lines (type A3).
Arthroplasty	Surgery where the articular surface of a joint is replaced.
Barthel Score	An assessment tool used to measure a person's ability to undertake a number of functional tasks.
Carer	Carers provide informal care and support to a family member or friend who has a disability, mental illness, drug or alcohol dependency, chronic condition, terminal illness or who is frail.
Clinical effectiveness ⁺	The extent to which an intervention produces an overall health benefit in routine clinical practice.
Clinical question ⁺	In guideline development, this term refers to the questions about treatment and care that are formulated to guide the development of evidence-based recommendations.
Clinician [†]	A healthcare professional providing direct patient care, for example doctor, nurse or physiotherapist.
Cochrane review [†]	The Cochrane Library consists of a regularly updated collection of evidence-based medicine databases including the Cochrane Database of Systematic Reviews (reviews of randomised controlled trials prepared by the Cochrane Collaboration).
Comorbidity ⁺	Co-existence of more than one disease or an additional disease (other than that being studied or treated) in an individual.
Computed tomography	The computed tomography (CT) scan is a medical imaging procedure that uses x-rays and digital computer technology to create cross-section images of the body.

Confidence intervals [†]	A range of values for an unknown population parameter with a stated 'confidence' (conventionally 95%) that it contains the true value. The interval is calculated from sample data, and generally straddles the sample estimate. The 'confidence' value means that if the method used to calculate the interval is repeated many times, then that proportion of intervals will actually contain the true value.
Consensus methods [†]	Techniques that aim to reach an agreement on a particular issue. Consensus methods may be used when there is a lack of strong evidence on a particular topic.
Cost effectiveness⁺	An economic study design in which consequences of different interventions are measured using a single outcome, usually in 'natural' units (For example, life-years gained, deaths avoided, heart attacks avoided, cases detected). Alternative interventions are then compared in terms of cost per unit of effectiveness.
Cost-utility analysis⁺	A form of cost-effectiveness analysis in which the units of effectiveness are quality-adjusted life years (QALYs).
Delirium	An acute confusional state characterized by poor attention and concentration and a fluctuating level of consciousness.
Dominant	An intervention is said to be dominant if it is both less costly and more effective than an alternative intervention.
Early supported discharge	Patients are discharged home from the acute ward, or in some cases a subsequent rehabilitation ward within the hospital. The duration, with a supported 4-6 week rehabilitation package.
Economic evaluation ⁺	Comparative analysis of alternative health strategies (interventions or programmes) in terms of both their costs and consequences.
Effect ⁺	The observed association between interventions and outcomes or a statistic to summarise the strength of the observed association.
EQ-5D (EuroQol-5D)†	A standardise instrument used to measure a health outcome. It provides a single index value for health status.
Evidence ⁺	Information on which a decision or guidance is based. Evidence is obtained from a range of sources including randomised controlled trials, observational studies, expert opinion (of clinical professionals and/or patients).
Exclusion criteria (literature) ⁺	Explicit standards used to decide which studies should be excluded from consideration as potential sources of evidence.
Exclusion criteria (studies)†	Criteria that define who is not eligible to participate in a clinical study.

Extrapolation ⁺	In data analysis, predicting the value of a parameter outside the range of observed values.
Forest plot	A forest plot is a graphical display designed to illustrate the relative strength of treatment effects in multiple quantitative scientific studies addressing the same question.
General anaesthesia	General anaesthesia is a medically induced coma and loss of protective reflexes resulting from the administration of one or more general anaesthetic agents. A variety of medications may be administered, with the overall aim of ensuring sleep, amnesia, analgesia.
GORU⁺	A separate geriatrician-led trauma ward. The extent of surgical input to the GORU varies, depending on how early patients are moved from the acute trauma wards. This is not a service routinely available in Australia or New Zealand.
GRADE [†]	A system developed by the GRADE Working Group to address the shortcomings of present grading systems in healthcare. The GRADE system uses a common, sensible and transparent approach to grading the quality of evidence. The results of applying the GRADE system to clinical trial data are displayed in a table known as a GRADE profile.
Harris hip score	An assessment tool to evaluate the outcomes of the results of hip surgery.
Health economics⁺	The study of the allocation of scarce resources among alternative healthcare treatments. Health economists are concerned with both increasing the average level of health in the population and improving the distribution of health.
Health-related quality of life⁺	A combination of an individual's physical, mental and social well-being; not merely the absence of disease.
Hip Rating Questionnaire	An assessment tool to evaluate the outcomes of the results of hip surgery.
Inclusion criteria†	Explicit criteria used to decide which studies should be considered as potential sources of evidence.
Indigenous	Indigenous peoples are peoples defined in international or national legislation as having a set of specific rights based on their historical ties to a particular territory, and their cultural or historical distinctiveness from other populations that are often politically dominant.
Indigenous health worker	An Indigenous health worker provides a vital link between Indigenous communities and health care services. As well as offering emergency care, they are trained to use their knowledge of Indigenous culture and communities to promote good health practices within individual community groups. Indigenous health workers also assist and encourage Indigenous peoples to take a strong role in controlling and managing their health.

Inotropic support	The use of drugs to improve the contraction of the cardiac muscle.
Internal fixation	Internal fixation involves the surgical implementation of implants for the purpose of repairing rather than replacing a bone.
Intervention ⁺	Healthcare action intended to benefit the patient, for example, drug treatment, surgical procedure, psychological therapy.
Intraoperative	Occurring at the time of surgical intervention.
Katz Index	An assessment tool used to measure a person's ability to undertake a number of functional tasks.
Length of stay [†]	The total number of days a participant stays in hospital.
Maori	The Maori are the indigenous Polynesian people of New Zealand.
MARU [†]	A rehabilitation unit able to accept patients with a variety of medical, surgical and orthopaedic conditions.
Mechanical ventilation	A method to mechanically assist or replace spontaneous breathing.
Medical optimisation	The process of ensuring that reversible medical problems are identified and treated and irreversible problems are maximally managed in preparation for surgery.
Medicare Benefits Schedule	A listing of Medicare services subsidised by the Australian Government. The schedule is part of the wider MBS which is managed by the Department of Health and Ageing (DoHA) and is administered by Medicare Australia.
Meta-analysis⁺	A statistical technique for combining (pooling) the results of a number of studies that address the same question and report on the same outcomes to produce a summary result. The aim is to derive more precise and clear information from a large data pool. It is generally more reliably likely to confirm or refute a hypothesis than the individual trials.
Mobilisation ⁺	Mobilisation is the process of re-establishing the ability to move between postures (for example sit to stand), maintain an upright posture, and to ambulate with increasing levels of complexity (speed, changes of direction, dual and multi-tasking).
Model of care	A configuration of services and staff designed to provide care for a particular health issue. A model of care takes into account the evidence to support an approach to care as well as context in relation to delivery of a service.
MRI	A medical imaging technique used to visualize internal structures of the body using the property of nuclear magnetic resonance (NMR) to image nuclei of atoms inside the body.

MDR⁺	Rehabilitation after hip fracture incorporating the following core components of assessment and management: medicine; nursing; physiotherapy; occupational therapy; social care. Additional components may include: dietetics, pharmacy, clinical psychology.
Occult fracture	A condition with clinical signs of fracture but no radiographic evidence.
Nerve block	A local anaesthetic nerve block is a short-term block, usually lasting hours or days, involving the injection of an anaesthetic and other drugs such as steroids onto or near a nerve.
Opioids	An opioid is any psychoactive chemical that resembles morphine or other opiates in its pharmacological effects.
Ortho- geriatrician	A specialist or consultant in geriatric medicine with a particular interest and expertise in the care of older people with fractures including hip fracture.
Outcome ⁺	Measure of the possible results that may stem from exposure to a preventive or therapeutic intervention.
Oxford Hip Score	The Oxford Hip Score (OHS) is a patient-reported measure designed to assess function and pain in patients undergoing hip replacement surgery.
ΡΟΜΑ	The Performance-Oriented Mobility Assessment (POMA) is a widely used instrument that provides an evaluation of balance and gait. It is used clinically to determine the mobility status of older adults and to evaluate changes over time.
Pre-operative	Occurring at a point up until the hip fracture patient reaches the operating theatre
Peri-operative	Occurring in the operating theatre including the anaesthesia area, and recovery area.
Post-operative	Occurring after surgery has been completed and the patient leaves the operating theatre environment including the recovery area.
Quality- adjusted life year⁺	An index of survival that is adjusted to account for the patient's quality of life during this time. QALYs have the advantage of incorporating changes in both quantity (longevity/mortality) and quality (morbidity, psychological, functional, social and other factors) of life. Used to measure benefits in cost-utility analysis. The QALYs gained are the mean QALYs associated with one treatment minus the mean QALYs associated with an alternative treatment.
Randomised controlled trial ⁺	A comparative study in which participants are randomly allocated to intervention and control groups and followed up to examine differences in outcomes between the groups.

Regional anaesthesia	Anaesthesia affecting a large part of the body, such as a limb or the lower half of the body. Regional anaesthetic techniques can be divided into central and peripheral techniques. The central techniques include so called neuraxial blockade (epidural anaesthesia, spinal anaesthesia).		
Relative risk ⁺	The number of times more likely or less likely an event is to happen in one group compared with another (calculated as the risk of the event in group A/the risk of the event in group B).		
Renal replacement therapy	Renal replacement therapy is a term used to encompass life-supporting treatments for renal failure including dialysis.		
Residential aged care facility	A special-purpose facility which provides accommodation and other types of support, including assistance with day-to-day living, intensive forms of care, and assistance towards independent living, to frail and aged residents. Commonly referred to as nursing homes and hostels.		
Resource implications	The likely impact in terms of finance, workforce or other health service resources.		
Sensitivity ⁺	Sensitivity or recall rate is the proportion of true positives which are correctly identified as such. For example in diagnostic testing it is the proportion of true cases that the test detects.		
Short Form 36	A patient-reported measure of health status commonly used in health economics as a variable in the quality-adjusted life year calculation to determine the cost-effectiveness of a health treatment.		
Specificity ⁺	The proportion of true negatives that are correctly identified as such. For example in diagnostic testing the specificity is the proportion of non-cases incorrectly diagnosed as cases.		
Statistical significance ⁺	A result is deemed statistically significant if the probability of the result occurring by chance is less than 1 in 20 (p < 0.05).		
Systematic review [†]	Research that summarises the evidence on a clearly formulated question according to a pre-defined protocol using systematic and explicit methods to identify, select and appraise relevant studies, and to extract, collate and report their findings. It may or may not use statistical meta-analysis.		
Timed Up and Go test	A simple timed test used to assess a person's mobility and requires both static and dynamic balance.		

⁺ Definition taken directly from the NICE Clinical Guideline

Appendix II: Guideline Adaptation Committee membership

Member	Expertise	Titles, affiliations and representation
Jacqueline Close	Orthogeriatrics	Co-Chair ANZHFR Steering Group
(Chair)		Director & Principal Research Fellow, Falls and Injury Prevention Group, Neuroscience Research Australia, Sydney, NSW.
		Consultant Geriatrician & Conjoint Professor,, Prince of Wales Clinical School, UNSW, Sydney, NSW.
		Nominee of the Australian and New Zealand Society of Geriatric Medicine (ANZSGM)
lan Harris	Orthopaedics & Trauma	Co-Chair - ANZHFR Steering Group
		Professor of Orthopaedic Surgery, UNSW, Sydney, NSW.
		Nominee of the Australian Orthopaedic Association (AOA) and the Royal Australasian College of Surgeons (RACS)
Laura Ahmad	Orthogeriatrics	Consultant Geriatrician, Royal North Shore Hospital, Sydney, NSW.
lan Cameron	Rehabilitation Medicine	Professor of Rehabilitation Medicine, University of Sydney, NSW.
		Nominee of the Australasian Faculty of Rehabilitation Medicine (AFRM), Royal Australasian College of Physicians (RACP)
Mellick Chehade	Orthopaedics & Trauma	Associate Professor University of Adelaide, SA.
		Orthopaedic Trauma Surgeon, Royal Adelaide Hospital, SA.
		President Australasian Orthopaedic Trauma Society.
		Nominee of Osteoporosis Australia (OA)
Joanna Diong (June 2012-April 2013)	Methodology	Research Fellow, Falls and Injury Prevention Group, Neuroscience Research Australia, Sydney, NSW.
Owen Doran	Emergency Medicine	Emergency Medicine Specialist, Auckland City Hospital, Auckland, NZ.
		Nominee of the Australasian College for Emergency Medicine (ACEM)
Lesley Gillespie	Methodology	Honorary Senior Research Officer, Falls and Injury Prevention Group, Neuroscience Research Australia, Sydney, NSW.
		Contracted Methodologist
Richard Halliwell	l Anaesthetics	Senior Clinical Lecturer, Sydney Medical School, University of Sydney, Sydney, NSW.
		Deputy Director, Department of Anaesthesia, Westmead Hospital, Sydney, NSW.
		Nominee of the Australian and New Zealand College of Anaesthetists (ANZCA)

Guideline Adaptation Committee membership

Appendix II: Guideline Adaptation Committee membership

Roger Harris	Geriatric Medicine Orthogeriatrics	Consultant Geriatrician, Auckland City Hospital, Auckland, NZ.
Raphael Hau	Orthopaedics & Trauma	Honorary Clinical Senior Lecturer, University of Melbourne, Victoria.
		Adjunct Senior Lecturer, Monash University, Victoria.
		Director of Orthopaedics, The Northern Hospital, Epping, Victoria.
Simon Journeaux	Orthopaedics & Trauma	Director of Orthopaedics, Mater Hospital, South Brisbane, Queensland.
		Honorary Senior Lecturer at University of Queensland, Brisbane, Queensland.
Lisa Langley	Consumer representation	Policy Manager, Council on the Ageing (COTA) NSW, Sydney, NSW.
		Representing COTA, NSW
Paul Mitchell	Policy, advocacy and business planning	Deputy Chair, Osteoporosis New Zealand.
		Adjunct Senior Lecturer, University of Notre Dame Australia, Sydney, NSW.
		Director, Synthesis Medical NZ Ltd, Auckland, NZ.
		Nominee of Osteoporosis New Zealand (ONZ)
Rebecca Mitchell	Injury Epidemiology	Senior Research Fellow, Falls and Injury Prevention Group, Neuroscience Research Australia, Sydney, NSW.
Jacob Munro	Orthopaedics & Trauma	Orthopaedic Surgeon, Auckland City Hospital, Auckland, NZ.
		Senior Lecturer Department of Surgery, University of Auckland, NZ.
		Nominee of the New Zealand Orthopaedic Association
Louise Bradley	Carer	Project Officer, Sydney Area, Sydney, NSW.
	Representation	Representing Carers NSW
Betty Ramsay	Physiotherapy	Research Physiotherapist, Falls and Injury Prevention Group, Neuroscience Research Australia, Sydney, NSW.
Nigel Robertson	Anaesthetics	Chair, New Zealand National Committee (NZNC), Australian and New Zealand College of Anaesthetists (ANZCA).
		Nominee of the New Zealand Committee of the ANZCA
Hannah Seymour	Geriatric Medicine	Consultant Geriatrician, Royal Perth Hospital, WA.
		Medical Co-Director Service 3, Fiona Stanley Hospital, Murdoch, Perth, WA.
		Cluster Lead Aged Care and Rehabilitation SMHS (South Metropolitan Health Service), Perth, WA.
Anita Taylor	Orthopaedic Nursing	Orthopaedic Nurse Practitioner, Royal Adelaide Hospital, Adelaide, SA.
		Nominee of the Australian & New Zealand Orthopaedic Nurses Association (ANZONA)

Appendix III: Terms of reference for the ANZ Hip Fracture Guideline Adaptation Committee

Terms of reference for the ANZ Hip Fracture Guideline Adaptation Committee

Purpose

To produce an evidence-based, usable guideline for the pre-, peri- and post-operative phases of management of hip fracture patients including the rehabilitation phase of recovery.

Role of the ANZ Hip Fracture Guideline Adaptation Committee

The role of the ANZ Hip Fracture Guideline Adaptation Committee is to:

- agree the clinical questions to be addressed in the guideline using the existing NICE Guideline
- · identify and consider new evidence derived from updated literature searches if required
- translate the evidence into clinically and locally appropriate recommendations for care
- use a formal consensus process for decision making where there is disagreement
- · identify areas which might be used as measurable quality indicators
- · identify areas where more research is required
- · formulate the guideline, and plans for review and update
- ensure that the guideline is a useful and implementable resource for clinicians, managers and patients
- ensure that the guideline is relevant to the Australia and New Zealand healthcare context
- facilitate the dissemination of the guideline through respective professional bodies and societies

The Adaptation Committee will be supported by a working committee based at Neuroscience Research Australia. This group will meet fortnightly for the duration of the guideline adaptation process.

Summary of the adaptation process

The ANZ Hip Fracture Guideline Adaptation Committee will adapt the existing high quality NICE Hip Fracture Guideline using the ADAPTE methodology for guideline adaptation.

Membership of the Guideline Adaptation Committee

The ANZ Hip Fracture Guideline Adaptation Committee will comprise approximately 15 members. Membership of guideline group will be multidisciplinary, comprising clinicians, consumer representatives and technical experts with appropriate representation from both Australia and New Zealand. A number of key professional bodies and societies will have representation on the Committee.

Appendix III: Terms of reference for the ANZ Hip Fracture Guideline Adaptation Committee

The ANZ Guideline Adaptation Committee will have members with expertise in:

- Orthopaedic surgery
- Orthogeniatrics
- Anaesthetics
- Rehabilitation
- Nursing
- Allied Health
- Guideline appraisal methodology
- Guideline implementation
- Consumer experience

Frequency of meetings

There will be an estimated 3 meetings between Dec 2012 and Nov 2013 for the Guideline Adaptation Committee. The working group supporting the Committee will meet fortnightly for the duration of the guideline adaptation process.

Deliverables

By the projected completion date of Dec 2013, it is expected that there will be an adapted guideline suitable for use in Australian and New Zealand hospital settings. The types of documents to be produced include a long version of the guideline, a short version and a patient information guide.

Clinical questions included in the ANZ Hip Fracture Guideline

Diagnosis and pre-operative care

- In patients with a continuing clinical suspicion of hip fracture, despite negative radiographic findings, what is the clinical and cost-effectiveness of additional imaging (radiography after at least 48 hours, radionuclide scanning (RNS), ultrasound (US) and computed tomography (CT)), compared to magnetic resonance imaging (MRI), in confirming, or excluding, a hip fracture?
- In patients who have or are suspected of having a hip fracture, what is the comparative effectiveness and cost effectiveness of systemic analgesics in providing adequate pain relief and reducing side effects and mortality?
- In patients who have or are suspected of having a hip fracture, what is the clinical and cost effectiveness of nerve blocks compared to systemic analgesia in providing adequate pain relief and reducing side effects and mortality?
- In patients with hip fractures what is the clinical and cost effectiveness of early surgery (within 24, 36 or 48 hours) on the incidence of complications such as mortality, pneumonia, pressure sores, cognitive dysfunction and increased length of hospital stay?

Peri-operative care

- In patients undergoing surgical repair for hip fractures, what is the clinical and cost effectiveness of regional (spinal/epidural) anaesthesia compared to general anaesthesia in reducing complications such as mortality, cognitive dysfunction, thromboembolic events, post-operative respiratory morbidity, renal failure and length of stay in hospital?
- What is the clinical and cost effectiveness of surgeon seniority (consultant or equivalent) in reducing the incidence of mortality, the number of patients requiring reoperation, and poor outcomes in terms of mobility, length of stay, wound infection and dislocation?

Operative intervention

- In patients undergoing repair for displaced intracapsular hip fractures, what is the clinical and cost effectiveness of internal fixation compared to hemiarthroplasty on mortality, surgical revision, functional status, length of stay, quality of life, pain and place of residence after hip fracture?
- In patients having treatment for displaced intracapsular hip fracture what is the clinical and cost effectiveness of internal fixation compared to total hip replacement on mortality, number of reoperations, functional status, length of stay in hospital, total time to resettlement in the community, quality of life, pain and place of residence after hip fracture.
- In patients having treatment for displaced intracapsular hip fracture what is the clinical and cost effectiveness of hemiarthroplasty versus total hip replacement on mortality, number of reoperations, functional status, length of stay in hospital, total time to resettlement in the

Appendix IV: Clinical questions included in the ANZ Hip Fracture Guideline

community, quality of life, pain and place of residence after hip fracture.

- In patients having replacement arthroplasty for hip fracture what is the clinical and cost effectiveness of a cemented stem versus an uncemented stem on mortality, number of reoperations, wound healing complications, functional status, length of stay in hospital and total time to resettlement in the community, quality of life, pain and place of residence after hip fracture?
- In patients undergoing repair for trochanteric extracapsular hip fractures what is the clinical and cost effectiveness of extramedullary sliding hip screws compared to intramedullary nails on mortality, surgical revision, functional status, length of stay, quality of life, pain and place of residence after hip fracture?
- In patients undergoing repair for reverse oblique extracapsular hip fractures, what is the clinical and cost effectiveness of extramedullary sliding hip screws compared to intramedullary nails on mortality, surgical revision, functional status, length of stay, quality of life, pain and place of residence after hip fracture?
- In patients undergoing repair for subtrochanteric extracapsular hip fractures, what is the effectiveness of extramedullary sliding hip screws compared to intramedullary nails on mortality, surgical revision, functional status, length of stay, quality of life, pain and place of residence after hip fracture?

Post-operative mobilisation strategies

- In patients who have undergone surgery for hip fracture, what is the clinical and cost effectiveness of early mobilisation (<48 hours after surgery) compared to late mobilisation on functional status, mortality, place of residence/discharge, pain and quality of life?
- In patients who have undergone surgery for hip fracture, what is the clinical and cost effectiveness of intensive physiotherapy compared to non-intensive physiotherapy on functional status, mortality, place of residence/discharge, pain and quality of life?

Models of care

- In patients with hip fracture what is the clinical and cost effectiveness of hospital-based multidisciplinary rehabilitation on functional status, length of stay in secondary care, mortality, place of residence/discharge, hospital readmission and quality of life?
- In patients with hip fracture what is the clinical and cost effectiveness of 'orthogeriatrician' involvement in the whole pathway of assessment, peri-operative care and rehabilitation on functional status, length of stay in secondary care, mortality, place of residence/discharge, hospital readmission and quality of life?
- In patients with hip fracture what is the clinical and cost effectiveness of communitybased multidisciplinary rehabilitation on functional status, length of stay in secondary care, mortality, place of residence/discharge, hospital readmission and quality of life?

Declaration of interest policy

Consistent with the NHMRC 2012 document entitled "Guideline Development and Conflicts of Interest - Identifying and Managing Conflicts of Interest of Prospective Members and Members of NHMRC Committees and Working Groups Developing Guidelines", it is critical for the integrity of any guideline that there is an agreed policy and transparent process for handling any potential conflict of interest in guideline development and adaptation.

Conflict of interest can be categorised as potential, perceived or actual and relate to members' interests as well as the interests of their family relating to the guideline topic. Interests may be direct or indirect, pecuniary or non-pecuniary.

This document sets out the planned approach to identifying and managing any potential conflict of interest that arises for members of the ANZ Hip Fracture Guideline Adaptation Committee (the Committee. Whilst the Committee is not an NHMRC committee, it is planning to seek approval of the final guideline and as such will comply with NHMRC requirements for managing conflict of interest from the outset of the guideline process.

Membership of the Committee will reflect the necessary expertise required to develop such a document and it is anticipated that most members of the committee will be representatives of key professional organisations with an interest and expertise in the area.

- All members of the Committee will receive an electronic copy of the NHMRC document "Guideline Development and Conflicts of Interest 2012" and the accompanying "NHMRC Form for Disclosure of Potential Conflicts of Interest" prior to the first meeting of the potential committee.
- 2. The documents will be available in paper format at the first meeting and there will be dedicated time on the agenda of the first meeting and all subsequent meetings to discuss declared interests. Any issues where clarity is sought in relation to the content of the documents will be directed to the NHMRC Guideline Development Office.
- 3. Membership of the Committee will not be confirmed until the NHMRC Form for Disclosure of Potential Conflicts of Interest has been completed, signed and reviewed by the Chair of the Committee.
- 4. The Chair of the Committee must not have any declared interests which would be considered by the Committee to compromise his/her ability to Chair the Committee.
- 5. The Chair of the Committee will review all signed NHMRC Forms for Disclosure of Potential Conflicts of Interest and contact any proposed member where a disclosed interest might lead to the person being conflicted in one or more areas of the guideline development process.
- 6. Where a declared interest is perceived to give rise to potential conflict of interest exists and depending on the perceived level of conflict, that member of the committee will be asked by the Chair to either refrain from participation in any dialogue relating to that

particular area or will be asked to step out of the room during that particular conversation. This will be documented in minutes of the meeting.

- 7. Where a declared interest gives rise to a potential conflict that cannot be adequately addressed and mitigated, the Chair has the right to preclude that proposed member from becoming a confirmed member of the ANZ Hip Fracture Guideline Adaptation Group.
- 8. In advance of all subsequent meetings of the ANZ Hip Fracture Guideline Adaptation Group, members will be asked to identify and declare any new or changed interests. All members will be required to respond electronically for the purposes of the records verbal communication will be considered insufficient record.
- 9. By identifying any new or changed interests in advance of the meeting, the Chair will have the opportunity to discuss and agree a plan to deal where the declared interest gives rise to potential conflict of interest. The agreed plan to manage potential conflict will be documented in the minutes of the meeting.
- 10. The initial signed NHMRC Form for Disclosure of Potential Conflicts of Interest for every member and subsequent documentation of any changes to this original declaration will be held on file by the secretariat for the ANZ Hip Fracture Guideline Adaptation Committee. Any initial and subsequently disclosed interests will also be recorded in the minutes of each meeting.
- 11. Failure to comply with this policy will lead to the termination of membership of the ANZ Hip Fracture Guideline Adaptation Committee.
Appendix VI: Example of material sent out to Committee members

Example of material sent out to Committee members

Imaging options in occult hip fracture

Recommendation

Offer magnetic resonance imaging (MRI) if hip fracture is suspected despite negative anteroposterior pelvis and lateral hip X-rays. If MRI is not available within 24 hours or is contraindicated, consider computed tomography (CT).

Protocol for this	question [†]
Guideline question	In patients with a continuing clinical suspicion of hip fracture, despite negative radiographic findings, what is the clinical and cost-effectiveness of additional imaging (radiography after at least 48 hours, Radionuclide scanning (RNS), ultrasound (US) and computed tomography (CT)), compared to magnetic resonance imaging (MRI), in confirming, or excluding, a hip fracture?
Population	The following inclusion and exclusion criteria apply for all recommendations:
	Included: Patients >18 years old with a hip fracture undergoing different types of surgery for hip fracture repair
	Excluded: People with fractures caused by specific pathologies other than osteoporosis or osteopenia, and patients under 18 years.
Intervention	• Repeat radiography after 48hrs • US
	Computed tomography
	Radionuclide scanning (also known as isotope scanning or scintigraphy)
Comparisons	Magnetic resonance imaging (assumed to be gold standard)
Outcomes	• Sensitivity
	• Specificity
	Positive and negative predictive values
	Positive and negative likelihood ratios
Search strategy	The databases to be searched are Medline, Embase, The Cochrane Library, CINAHL and AMED.
	Randomised controlled trials (RCTs considered. If no RCTs are found for certain outcomes such as adverse events, well conducted cohort studies and observational studies also considered.
	Studies restricted to English language only
	No date restriction will be applied. Databases be searched from their date of origin
Review strategy	Meta-analysis not conducted for diagnostic studies. Ranges of results reported.

⁺See full NICE Guideline Section 15.1¹

Appendix VI: Example of material sent out to Committee members

Evidence statement(s)⁺

Radiographs

No studies identified comparing repeat plain imaging versus MRI

Radionuclide bone scan

Clinical

Two studies (not RCTs) with total of 99 patients identified

The sensitivity of bone RNS compared to MRI ranged from 75% to 98% and specificity was 100%. This means that between 2% and 25% of those who have a fracture, the fracture will have been missed. However, all patients who tested positively do actually have a fracture. (LOW QUALITY)

Economic

No studies were identified on the cost-effectiveness of the diagnostic accuracy of RNS compared to MRI in the diagnosis of occult hip fractures.

Ultrasound

Clinical

One study (not RCT), 30 participants

The sensitivity of ultrasound (US) compared to MRI was 100% and specificity was 65%. This means that none of the patients who had a fracture have been missed. However, of those who tested positive 35% do not actually have a fracture – i.e. there is a high percentage of false positives (sonographic abnormalities indistinguishable from those attributable to conditions other than fracture) (LOW QUALITY)

Economic

No studies were identified on the cost-effectiveness of the diagnostic accuracy of ultrasound (US) compared to MRI in the diagnosis of occult hip fractures.

Computed tomography

Clinical

No studies were identified directly comparing the diagnostic accuracy of CT with MRI and that meet our inclusion criteria.

Economic

No studies were identified on the cost-effectiveness of the diagnostic accuracy of CT compared to MRI in the diagnosis of occult hip fracture.

⁺See full NICE Guideline Section 5¹

Additional Information

Hip radiographs have an estimated sensitivity of between 90% and 98%, and the initial films will therefore miss only a small proportion of hip fractures. It is, however, essential to ensure that the radiographs are of satisfactory quality. In particular, if the initial AP film of the entire pelvis together with the lateral hip projection (taken in the position of comfort) show no fracture, a third film should be taken centred on the hip with the hip in 10 degrees of internal rotation to position the femoral neck at 90 degrees to the x-ray beam and ensure an optimum view of this area. All subsequent discussion and recommendations assume radiographs of this standard to have been obtained before characterising a suspected but undetected fracture as occult.

The prevalence of occult hip fractures is estimated to be around 3 – 4%; up to 9% in some series

Appendix VI: Example of material sent out to Committee members

(though a proportion of this may reflect radiographs of inadequate standard.

MRI is usually considered to be the reference standard, as numerous studies have found MRI to have the highest accuracy (100% sensitivity and between 93% and 100% specificity, depending on experience and skill of radiologist interpreting the images).

ADAPTE assessments	
ADAPTE Tool 14 Scientific validity of guideline (consistency between evidence, its interpretation and recommendations)	Overall, the evidence was valid: YES Coherence between the evidence and recommendations: YES Overall, the scientific quality of this recommendation does not present risks of bias: YES
ADAPTE Tool 15 Acceptability/Applicability	Overall, the recommendation is acceptable: YES
	Overall, the recommendation is applicable YES

Other considerations	
Any ANZ considerations e.g. availability of intervention/equipment, availability of	Limited availability of MRI scanners and where available also time limitations
necessary expertise etc?	3D CT techniques improving all the time
Any CALD/ATSI/Maori considerations?	Nil
Any new evidence that would change the recommendation?	Nil
Any qualifying statements or good practice points?	Nil
Additional actions needed before making final recommendation?	Look at cost element from NZ and Australian context as may be different from UK
Is this an area where further research is seen to be an important next step?	Possibly
Is this a recommendation against which a quality standard should be developed?	Νο

Final ANZ Recommendation: Imaging options in occult hip fracture			
Any justification for modifying the original recommendation?	No		

NHMRC evidence statement form

(If rating is not completely clear, use the space next to each criterion to note how the group came to a judgment.)

Key question(s):		Evidence table ref:
1. Evidence base (number of studies, level of evidence and risk of bias in the included studies)		
	A	One or more level I studies with a low risk of bias or several level II studies with a low risk of bias
	В	One or two Level II studies with a low risk of bias or SR/ several Level III studies with a low risk of bias
	с	One or two Level III studies with a low risk of bias or Level I or II studies with a moderate risk of bias
	D	Level IV studies or Level I to III studies/SRs with a high risk of bias
2. Consistency (if only one study was available, rank this component as 'not applicable')		
	A	All studies consistent
	В	Most studies consistent and inconsistency can be explained
	с	Some inconsistency, reflecting genuine uncertainty around question
	D	Evidence is inconsistent
	NA	Not applicable (one study only)

3. Clinical impact (Indicate in the space below if the study results varied according to some unknown factor (not simply study quality or sample size) and thus the clinical impact of the intervention could not be determined)

,		
	A	Very large
	В	Substantial
	С	Moderate
	D	Slight/Restricted
4. Generalisability (How well does the body of evidence match the population and clinical settings being targeted by the Guideline?)		
	A	Evidence directly generalisable to target population
	В	Evidence directly generalisable to target population with some caveats
	С	Evidence not directly generalisable to the target population but could be sensibly applied
	D	Evidence not directly generalisable to target population and hard to judge whether it is sensible to apply

5. Applicability (Is the body of evidence relevant to the Australian healthcare context in terms of health services/delivery of care and cultural factors?)		
	A	Evidence directly applicable to Australian healthcare context
	В	Evidence applicable to Australian healthcare context with few caveats
	С	Evidence probably applicable to Australian healthcare context with some caveats
	D	Evidence not applicable to Australian healthcare context
Other factors (Indicate here any other factors that you took into account when assessing the evidence base (for example, issues that might cause the group to downgrade or upgrade the recommendation)		

EVIDENCE STATEMENT MATRIX

Please summarise the development group's synthesis of the evidence relating to the key question, taking all the above factors into account.

Component	Rating	Description	
1. Evidence base			
2. Consistency			
3. Clinical impact			
4. Generalisability			
5. Applicability			
Evidence statement			
Indicate any dissent	ing opinion	S	
RECOMMENDATIO development grou where possible.	DN What re p draw fror	ecommendation(s) does the guideline n this evidence? Use action statements	Grade Of Recommendation

Supporting references for recommendations in the NICE Guideline

Diagnosis and pre-operative care

Imaging options in occult hip fracture

Radionuclide bone scan

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