



Dementia, falls and fractures

**Integrated approaches
to improve quality and reduce costs**

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Foreword

Over the next 20 years, 450 million people will celebrate their 65th birthday¹. As such, healthcare systems are facing unprecedented challenges to cope with the rising burden of chronic disease of the elderly. In the United Kingdom, significant progress has been made on the development of healthcare policy to address this challenge. The National Dementia Strategy² and the Department of Health's 'Falls and Fractures' document which forms part of the Prevention Package for Older People³, make the case for a systematic approach to case-finding to enable consistent and reliable implementation of relevant national guidance.

A significant overlap exists between sufferers of dementia and older people at high risk of fractures and injury through falling; this is particularly evident amongst patients presenting with a hip fracture. Of the approximately 80,000 patients admitted to hospital with hip fracture in the UK every year⁴ in excess of a quarter are likely to be dementia sufferers⁵. The risk of suffering a hip fracture has been shown to be three times higher for those with Alzheimer's disease compared to those not suffering from the condition⁶. Patients with Alzheimer's disease also have a considerable increase in mortality following fracture.

Hip fracture has been described as "... all too often the final destination of a 30-year journey fuelled by decreasing bone strength and increasing falls risk."⁷ Dementia sufferers are at considerably higher risk of experiencing a fall in a given year and fall far more frequently than individuals without the condition⁸. However, the treatment of osteoporosis in people with dementia is considerably lower than amongst those without dementia⁹.

Taken together, this data suggests a gap exists in the care of those suffering from dementia, and associated falls and fractures. This document provides health and social care professionals and service commissioners with a rationale for integration of dementia assessment into falls and fractures pathways and falls prevention into dementia care pathways. Emerging examples of best practice are described to support localities in improving quality and reducing the substantial costs associated with dementia, falls and fractures.



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1 National policy and clinical guidelines for dementia, falls and fractures

The organisation and delivery of healthcare across the constituent nations of the United Kingdom has diverged considerably since devolution of central government in 1998. Accordingly, healthcare policy relevant to dementia falls and fractures will be considered at an individual National level. Examples of guidance that is applicable throughout the UK will be reviewed in section 1.5.

1.1 England

Dementia

Both the Department of Health and the National Institute for Health and Clinical Excellence (NICE), have produced key policy documents relevant to dementia care in England:

- Department of Health:
 - Quality outcomes for people with dementia: Building on the work of the National Dementia Strategy. September 2010¹⁰
 - Living well with dementia: A National Dementia Strategy. Feb-2009²
- NICE:
 - Donepezil, galantamine, rivastigmine and memantine for the treatment of Alzheimer's disease. Review of NICE technology appraisal guidance 111. Technology Appraisal 217. March 2011¹¹
 - Quality Standard for Dementia. June 2010¹²
 - Dementia: Supporting people with dementia and their carers in health and social care. Clinical Guideline 42. November 2006¹³

The NHS Operating Framework for 2011-2012¹⁴ highlighted the need "... for PCTs to publish locally how they are delivering services in line with the Quality outcomes for people with dementia: Building on the work of the National Dementia Strategy." Specifically, NHS organisations were expected to make progress in the four priority areas set-out in the revised implementation plan for the National Dementia Strategy published in 2010¹⁰:

- Good quality early diagnosis and intervention for all

- Improved quality of care in general hospitals
- Living well with dementia in care homes
- Reduced use of antipsychotic medication

The NHS Operating Framework for 2012-13¹⁵ calls for a "...a renewed push on implementation of the national dementia strategy and increased support for carers." Specific actions include:

- Commissioners should ensure that providers are compliant with NICE quality standards
- Continued focus on reduction of inappropriate antipsychotic medication prescribing for people with dementia
- Inclusion of the new National Commissioning for Quality and Innovation (CQUIN) plan to improve diagnosis of dementia in hospitals within local Primary Care Trust plans to implement the National Dementia Strategy

The National CQUIN for dementia was published in April 2012¹⁶.

"The goal of the Dementia CQUIN is to incentivise the identification of patients with dementia and other causes of cognitive impairment alongside their other medical conditions and to prompt appropriate referral and follow up after they leave hospital."

Falls and Fractures

The key policy documents relevant to falls and osteoporotic fracture care in England are:

- Department of Health:
 - Falls and fractures: Effective interventions in health and social care. July 2009³
 - National Service Framework for Older People. Section 6 – Falls. March 2001¹⁷
- NICE:
 - Hip fracture: The management of hip fracture in adults. NICE Clinical Guideline 124. June 2011¹⁸
 - Alendronate, etidronate, risedronate, raloxifene, strontium ranelate and teriparatide for the secondary prevention of osteoporotic fragility fractures in postmenopausal women (amended). NICE Technology Appraisal 161. January 2011¹⁹
 - Alendronate, etidronate, risedronate, raloxifene and strontium ranelate for the primary prevention of osteoporotic fragility fractures in postmenopausal women (amended). NICE Technology Appraisal 160. January 2011²⁰
 - Denosumab for the prevention of osteoporotic fractures in postmenopausal women: NICE Technology Appraisal Guidance 204. October 2010²¹
 - Clinical practice guideline for the assessment and prevention of falls in older people. Clinical Guideline 21. November 2004²²

The NHS Operating Framework for 2011-2012¹⁴ highlighted the need for PCTs to work with local authorities to agree jointly on appropriate areas for social care investment, and the outcomes expected from this investment. This would include falls prevention initiatives in the community setting. Specific focus is given to the issue of prevention of fragility fractures:

"The introduction of the best practice tariff for hip fracture in 2010 has proved successful in transforming the care on admission of those who suffer fragility fractures each year. PCTs are also asked to take steps to reduce incidence. The best way to prevent this transformative injury is to recognise precursor or "herald" fractures and give patients a bone health assessment and treatment when they first show clear signs of being at risk."

1.2 Scotland

Dementia

Both the Scottish Government and the Scottish Intercollegiate Guidelines Network (SIGN) have produced key policy documents relevant to dementia care in Scotland:

- The Scottish Government:
 - Standards of Care for Dementia in Scotland: Action to support the change programme, Scotland's National Dementia Strategy. June 2011²³
 - Promoting Excellence: A framework for all health and social services staff working with people with dementia, their families and carers. June 2011²⁴
 - Scotland's National Dementia Strategy. June 2010²⁵
- SIGN:
 - Management of patients with dementia: A national clinical guideline. SIGN 86. February 2006²⁶

NHS Scotland's Local Delivery Plan Guidance for 2011-12²⁷ identified implementation of Scotland's National Dementia Strategy as a priority:

"Implement Scotland's first National Dementia Strategy in full and take forward the work to improve post-diagnostic information and support and to improve the care in general hospital settings."

Furthermore, maintaining the number of people with a diagnosis of dementia on the Quality and Outcomes Framework (QOF) dementia registers is one of the nine National HEAT standards for 2012-13 (Health improvement, Efficiency, Access, Treatment)²⁸.

Falls and Fractures

The key policy documents relevant to falls and osteoporotic fracture care in Scotland are:

- Healthcare Improvement Scotland (formerly NHS Quality Improvement Scotland):
 - Up and About: Pathways for the prevention and management of falls and fragility fractures. August 2010²⁹
- SIGN:
 - Management of hip fracture in older people: A national clinical guideline. SIGN 111. June 2009³⁰
 - Management of osteoporosis: A national clinical guideline. SIGN 71. June 2003³¹

Significant progress has been made in Scotland in relation to implementation of systematic approaches to fragility fracture prevention. Seventy-eight percent of the Scottish population has access to a Fracture Liaison Service³².

NICE Guidance in Scotland

Healthcare Improvement Scotland issue alerts to notify NHSScotland of the publication of NICE Guidance and advise on its applicability to Scotland³³.

1.3 Wales

Dementia

The Welsh Assembly Government has produced several key policy documents relevant to dementia care in Wales:

- National Dementia Vision for Wales: Dementia Supportive Communities. February 2011³⁴ (Co-authored with the Alzheimer's Society)
- National Dementia Action Plan for Wales. September 2009³⁵ (Co-authored with the Alzheimer's Society)
- National Service Framework for Older People in Wales. Mental Health in Older People. March 2006³⁶.

As a result of the public consultation exercise which informed the National Dementia Action Plan for Wales, four priority areas have been identified for improvement³⁴:

- Improved service provision through better joint working across health, social care, the third sector and other agencies
- Improved early diagnosis and timely interventions
- Improved access to better information and support for people with the illness and their carers, including a greater awareness of the need for advocacy
- Improved training for those delivering care, including research

In March 2011, the Minister for Health and Social Services in Wales provided an update to the Welsh Assembly Government on service for dementia sufferers in Wales³⁷. The Mental Health and Programme Board established a dementia sub-group and additional financial resources were made available in 2010-2011. The initial focus of improvement work is upon care of dementia sufferers in the general hospital setting.

Falls and Fractures

The Welsh Assembly Government has produced the following key policy documents relevant to falls and osteoporotic fracture care in Wales:

- National Service Framework for Older People in Wales. Falls and Fractures. March 2006³⁶

A fundamental review of the National Service Framework for Older People in Wales was published in January 2012³⁸. The review considers the provision of health and social care services from the perspective of an older person with dementia. However, there are no specific comments relating to prevention of fragility fractures.

NICE Guidance in Wales

The Welsh Assembly Government has an agreement in place with NICE covering the Institute's technology appraisals, clinical guidelines and interventional procedure guidance, which all continue to apply in Wales.

1.4 Northern Ireland

Dementia

In November 2011, the Department of Health, Social Services and Public Safety published "Improving Dementia Services in Northern Ireland: A Regional Strategy"³⁹. The primary aims of the strategy are to:

- Promote a greater understanding of how dementia impacts on the lives of sufferers
- Raise public awareness of dementia and how people can try to reduce the risk of developing dementia or potentially delay its onset
- Encourage sharing of information on dementia to allow sufferers, families and carers to make informed decisions, maximise independence and enhance daily living
- Promote access to earlier diagnosis and multidisciplinary assessment and support through further development of health and social care
- Promote partnership working that recognises the role of carers and integrates the activity and skills of those who work in the statutory, community, voluntary and independent sectors.

Falls and Fractures

Northern Ireland's Clinical Resource Efficiency Support Team (CREST) published "Guidance on the Prevention and Treatment of Osteoporosis" in 2001⁴⁰. Subsequently, the report "Ring the changes: A strategy for older people"⁴¹ was published in 2002 and recommended that action was required in respect of falls and associated injuries. More recently, the Fragility Fracture Working Group formed of experts across Northern Ireland published "The Prevention and Management of Fragility Fractures in Northern Ireland."⁴² This document made the following nine recommendations:

1. A Regional Public Awareness campaign to promote good bone health should be undertaken by the Northern Ireland Public Health Agency
2. A Fracture Liaison Service for secondary prevention of fragility fractures should be established in all Trusts that have A&E and Minor Injury Services to ensure secondary prevention is offered to all patients who have suffered a fragility fracture
3. All fracture units should be supported by an acute in-patient orthogeriatric service followed by an orthogeriatric rehabilitation service
4. An Information infrastructure to support the monitoring of care and quality of fragility fracture services should be mandatory for all fracture units. This should be achieved by enhancement of the existing IT infrastructure in fracture units. There is a need to include all fragility fractures in this, especially those treated on an out-patient basis.
5. The prevention of falls is an important part of reducing fragility fractures. There is a need to ensure effective population approaches to preventing falls and care pathways are developed for older people needing further investigation and intervention.
6. The Directly Enhanced Service in Primary Care, to promote early detection and treatment of osteoporosis provides a major opportunity to address the impact of fragility fractures. GPs should be supported in achieving the DES requirements. It is important that this is done in partnership with secondary care.
7. The Long Term Condition Monies identified in the 2008-2011 funding cycle should be used to implement these recommendations
8. An implementation schedule for NICE TA 160 and 161 should be developed which would include regional prescribing guidelines on initiation and maintenance of bisphosphonate therapy particularly in primary care together with medicines management support arrangements to promote patient adherence to prescribed medicines
9. A regional implementation group should be established to oversee the implementation of these recommendations

NICE Guidance in Northern Ireland

In July 2006, the Northern Ireland Executive formalised its relationship with the National Institute for Health and Clinical Excellence. This enabled local review of the applicability of NICE guidance to Northern Ireland.

1.5 Guidance applicable throughout the United Kingdom

Falls and Fractures

In 2007, the British Orthopaedic Association (BOA) and British Geriatrics Society (BGS) published the second edition of the Blue Book on care of patients with fragility fracture⁴³. The Blue Book makes a case for nation-wide implementation of a systematic approach to hip fracture care and prevention. Chapter 1 focuses on surgical aspects and models of ortho-geriatric care, primarily for hip fracture patients. Chapter 2 considers an integrated approach to secondary fracture prevention for patients presenting with all fragility fracture types. The third chapter of the Blue Book describes the National Hip Fracture Database (NHFD)⁴⁴ which was launched simultaneously with the Blue Book. The NHFD was developed with the benefit of substantial previous experience of hip fracture audit in regions of the UK, including the Scottish Hip Fracture Audit (SHFA)⁴⁵, and from overseas. NHFD is based technologically on the highly successful Myocardial Ischaemia National Audit Project (MINAP)⁴⁶.

The NHFD provides a means to deliver standards, audit and feedback to improve hip fracture care and secondary prevention. The six standards below appear in the Blue Book:

1. All patients with hip fracture should be admitted to an acute orthopaedic ward within 4 hours of presentation
2. All patients with hip fracture who are medically fit should have surgery within 48 hours of admission, and during normal working hours
3. All patients with hip fracture should be assessed and cared for with a view to minimising their risk of developing a pressure ulcer
4. All patients presenting with a fragility fracture should be managed on an orthopaedic ward with routine access to acute orthogeriatric medical support from the time of admission
5. All patients presenting with fragility fracture should be assessed to determine their need for antiresorptive therapy to prevent future osteoporotic fractures
6. All patients presenting with a fragility fracture following a fall should be offered multidisciplinary assessment and intervention to prevent future falls

The Blue Book highlights the need for consistent delivery of NHFD standards 5 and 6:

"...the most practical option available to the NHS to attenuate the rising incidence of hip fractures is to ensure that every patient presenting today with any fragility fracture receives effective secondary preventative care."

2 Rationale for integration across dementia, falls and fracture pathways

2.1 Epidemiology of dementia, falls and fractures

In 2010, in excess of 820,000 people in the UK suffer from dementia; the annual estimated cost to the UK economy is a staggering £23 billion⁴⁷. Every year, almost 650,000 A&E attendances and 200,000 admissions to hospital for fall related injuries occur in people aged ≥ 60 years⁴⁸. These falls contribute significantly to 300,000 fragility fractures which account for 1.5 million hospital bed days in England alone⁴⁹. Hip fracture represents the most serious fall related injury; almost 80,000 cases per year⁴ result in tremendous suffering for patients and a cost to the UK economy of £2.3 billion⁴⁹. As the UK population ages, the burden of dementia, falls and fractures upon our older people and health and social care budgets will relentlessly increase.

The government policies and professional guidance reviewed in section 1 of this document recognise that nationwide implementation of systematic approaches to care and prevention are urgently required. During March 2011, Professor Clive Ballard, in his capacity as Director of Research at the Alzheimer's Society, issued the following statement⁵⁰:

"There are 750,000 people living with dementia in the UK yet more than half never receive a diagnosis. A timely diagnosis is essential in order to give people access to care, support and medical treatments that can make a huge difference to their quality of life. We must act now to improve these dismal diagnosis rates.

We would welcome a debate on the value of screening and any other approaches that could help more people with dementia get an early diagnosis."

Falls and fractures have been reported to be the most common reason for dementia sufferers to be admitted to hospital^{51, 52}. Given the scale of the challenge facing the National Health Service, opportunities to close gaps must be taken whenever they present. With this in mind, the following literature analysis considers the co-morbidity of dementia, falls and fragility fracture risk.

2.2 Dementia sufferers: falls and fragility fracture risk

Falls risk factors and their incidence in dementia

A longitudinal cohort study published in 2009 found that during a 12 month period, 66% of participants with dementia had a fall compared to 36% of age-matched controls⁸. Furthermore, the incidence of falls in dementia was 9,118 per 1,000 person years compared to just 1,023 per 1,000 person years for controls. For dementia sufferers, predictors of sustaining a fall included diagnosis of Lewy body disorder and history of falls in the preceding 12 months. Potentially modifiable predictors were symptomatic orthostatic hypotension, autonomic symptom score and Cornell depression score, whilst higher levels of physical activity were found to be protective.

A systematic review published in 2009 intended to identify specific risk factors for falls in older people with dementia or cognitive impairments⁵³. Whilst definitive conclusions could not be drawn on account of the small number of studies identified, eight categories of risk factors were reported: disease specific motor impairments, impaired vision, type and severity of dementia, behavioural disturbances, functional impairments, falls history, neuroleptic use and low bone mineral density.

The incidence of falls in Parkinson's disease (PD) has been the subject of prospective study⁵⁴. Sixty-eight percent of PD patients suffered a fall during a year of follow-up. Dementia, defined by a mini-mental state examination score of < 24 , was present in 26% of those that fell compared to just 6% of those that did not. Previous falls, disease duration, dementia, and loss of arm swing were independent predictors of falling.

An observational cohort study published in May 2011 evaluated dose-response relationships between psychotropic drugs and falls incidence⁵⁵ for nursing home patients with dementia. A significant increase in the risk of falling was seen in patients who took:

- A quarter of the defined daily dose (DDD) of an antidepressant or antipsychotic (28%)
- A fifth of the DDD of an anxiolytic (8%)
- A half of the DDD of a hypnotic or sedative (56%)

Falls risk increased with increasing dose and combinations of psychotropics, however, the key observation was that relatively low dosages of psychotropic agents are associated with elevated falls risk in nursing home patients.

A 2010 review of psychotropic medications and falls in older adults considered the issue of drug-drug interactions⁵⁶:

"Perhaps the most challenging aspect of older adult pharmacology is the concomitant use of multiple medications."

The proportion of older people taking multiple medications supports this statement with 40% taking more than 5 prescription medicines per week and 12% taking 10 different drugs per week⁵⁷. Data from the Multidisciplinary Medication Management Project based in the United States suggests that patients taking at least 6 different medicines have an 80% chance of experiencing a drug-drug interaction⁵⁸. The author of the 2010 review concludes that polypharmacy and drug-drug interactions increases the risk of falls amongst the elderly, necessitating an ongoing review of medicines and where appropriate, gradual dose reductions⁵⁶.

A meta-analysis published in 2011 evaluated the effect of cholinesterase inhibitors (ChEIs) and memantine on the risk of falls, syncope and related events⁵⁹. The study concluded that whilst ChEIs may increase the risk of syncope, no effect was seen on falls, fracture, or accidental injury in cognitively impaired older adults.

Fracture outcomes in dementia

A study of admission diagnoses of patients aged over 70 years found that hip fracture accounted for 6.1% of all admissions for persons with dementia compared to 1.6% for age-matched controls⁶⁰.

A UK retrospective cohort study evaluated hip fracture incidence amongst patients with Alzheimer's disease compared to age and sex-matched controls for the period 1988-2007⁶. The incidence of hip fracture among patients with Alzheimer's disease was almost three times higher than those without, at 17.4 and 6.6 per 1,000 person years, respectively. Mortality was also reported to be higher for Alzheimer's sufferers after hip fracture.

A historical cohort study conducted in the United States examined co-morbid conditions and associated costs among Alzheimer's sufferers compared to persons without the condition⁶¹. Subjects with Alzheimer's disease were significantly more likely to have a diagnosis for a fracture than subjects without AD. Eighteen percent of Alzheimer's patients suffered at least one fracture compared to 8% of the controls. Hip fracture was the most common fracture type, at 5.3% of the Alzheimer's cohort, with vertebral fractures also being common in 3.3% of the Alzheimer's patients.

A population-based cohort study of older people admitted to nursing homes in British Columbia evaluated risk of death and hospital admission for major medical events after initiation of psychotropic medications⁶². Notably, when compared with users of atypical antipsychotics, users of conventional antipsychotics and antidepressants had an increased risk of death and hip fracture.

2.3 Prevalence of dementia in fallers and fragility fracture patients

Prevalence of dementia amongst fallers

A prospective descriptive study evaluated individuals aged over 65 years who presented to a UK hospital Emergency Department as a result of a fall⁶³. Twenty-six percent were cognitively impaired, as defined by a mini-mental state examination score of less than 25/30.

A prospective observational study conducted in the Emergency Department of a French tertiary teaching hospital assessed prior diagnosis of dementia amongst over 75 year olds presenting with a fall⁶⁴. Eleven percent of fallers had diagnosed dementia. This reported prevalence is likely to be an under-estimate on account of the study analysis being restricted to those patients alive 6 months after the index presentation.

Prevalence of dementia amongst fracture patients

A recent meta-analysis⁶⁵ estimated the prevalence of dementia amongst older hip fracture patients at 19%. The prevalence of cognitive impairment was estimated at 42%. No significant differences in the prevalence of dementia or cognitive impairment were evident between the sexes. Notably, individuals admitted from the long-term care setting were significantly more likely to have dementia (49%) compared to those admitted from the community (16%).

In 2007, The Scottish Hip Fracture Audit reported on the prevalence of dementia amongst hip fracture patients⁵. Twenty-eight percent of patients had a documented past medical history of dementia. The authors state "Local co-ordinators were simply asked to record any documented history of dementia, so these figures will be an underestimation of the true prevalence."

2.4 Dementia and osteoporosis

The prevalence of osteoporosis amongst community dwelling dementia sufferers has been reported to be a third higher than that observed in non-demented age-matched controls⁶¹. Dementia syndromes and osteoporosis share many common risk factors. An extensive literature review considered whether the two disease states are in fact pre-disposing to one another⁶⁶. The central nervous system plays a direct role in regulating bone mass⁶⁷. Reductions in limbic and hypothalamic volumes have been reported to correlate with bone density in early Alzheimer's disease, suggesting that neuro-degeneration may disrupt bone remodelling⁶⁸.

2.5 Mild cognitive impairment and risk of falling

A cross-sectional study compared falls risk factors in community-dwelling women with or without mild cognitive impairment (MCI)⁶⁹. Participant's fall risk profile was assessed by the Physiological Profile Assessment (PPA). The composite PPA scores were higher for participants with MCI and greater postural sway was observed. In relation to tests of central executive function, participants with MCI performed significantly worse on all 3 tests conducted. The authors concluded that falls risk screening may be prudent in older adults with MCI.

A secondary analysis of a randomised clinical trial⁷⁰ sought to answer the question "Does rate of falls increase only after a threshold (such as MMSE less than 24) is reached, or does rate of falls increase incrementally as MMSE score progressively declines?" The authors compared narrow ranges of mini-mental state examination (MMSE; 22 vs. 23, 23 vs. 24 and so on to 29 vs. 30) and concluded that small reductions in the MMSE were associated with an increase in falls risk.

A longitudinal cohort study evaluated the relationship between MCI and falls in non-demented older people with and without Parkinson's disease⁷¹. MCI and a history of falls were independently associated with an increased risk of falling. The authors concluded that MCI should be subject to further research as an ameliorable risk factor for falls.

2.6 The economics of dementia, falls and fractures

The economic impact of dementia, falls and fractures can best be illustrated by consideration of dementia sufferers' experience of the most serious fall-related injury, hip fracture. The National Audit Office (NAO) commissioned the London School of Economics (LSE) to undertake health economic research into dementia sufferers presenting to hospital with hip fracture⁷². The model was based on the annual number of hip fracture admissions according to Hospital Episode Statistics for 2004/5. Of almost 64,000 cases, the LSE model assumed that 25,700 patients would have dementia, 18,200 were psychiatrically well and 20,000 people would have depression, delirium or another psychiatric illness on admission.

The base case estimated the average length of stay for dementia sufferers to be 43 days, some 65% longer than the 26 day stay of the psychiatrically well. Consequently, demented hip fracture patients would account for 1.1 million bed days compared to under 0.5 million for the psychiatrically well. The NAO's 2010 interim report⁷³ on implementation of the National Dementia Strategy recognises that funding of the National Dementia Strategy will come from efficiency savings. However, with efficiency savings from implementation of the strategy taken into account, a net cost of almost £1.4 billion remains. The NAO identify improved care of demented hip fracture patients as a major potential contributor to the short-fall:

"(The NAO) 2007 report also highlighted how effective interventions for hip surgery patients with dementia could generate annual savings of between £110 and £182 million. The Department already has a Falls and Fractures Toolkit that primary care trusts could draw on to set up commissioned hip fracture services and make these savings. And the Department's own plans to shift care of people with dementia out of acute beds and into intermediate care beds where possible could provide a further £21 million a year..."

In total these additional sources of savings could contribute £1.1 billion towards the £1.356 billion costs."

This NAO analysis makes a case that better falls and fracture care will not only improve outcomes for dementia sufferers, but could also make a vital contribution to efficiency savings that would fund implementation of the National Dementia Strategy.

The best way to reduce length of hospital stay and associated costs is to prevent a hip fracture from happening in the first place. In this regard, the Department of Health has published economic analysis of the fracture prevention service models advocated in the falls and fractures component of the Prevention Package for Older People⁷⁴. The Department of Health concluded that the Fracture Liaison Service (FLS) model is a cost-saving intervention. FLS delivers innovative, preventative care that can improve quality and reduce costs through a reduction in unscheduled emergency admissions⁷⁵. The structure of FLS and how they could be linked to dementia services will be considered in section 4 of this document.



3 Current care gap

At the time of writing, implementation of both the National Dementia Strategy² and the falls and fractures component of the Department of Health Prevention Package for Older People³ is a work in progress. This section will consider the findings of recently published national audits relating to dementia, falls and fractures. The findings of other significant audits will also be considered to assess the scale of the current care gap.

3.1 National audit of dementia care

National Audit of Dementia (Care in General Hospitals)

The National Audit of Dementia (Care in General Hospitals)⁷⁶ (NAD) is an audit performed by the Royal College of Psychiatrists in partnership with⁷⁷:

- Royal College Physicians
- British Geriatrics Society
- Royal College of Nursing
- Royal College of General Practitioners
- The Alzheimer's Society

The NAD was commissioned by the Healthcare Quality Improvement Partnership (HQIP). The report of the first round of the NAD was published in December 2011⁷⁷. Eighty nine percent of eligible hospitals submitted data to the audit which represented 99% of Trusts or Health Boards in England and Wales. An over-arching conclusion of the audit was that:

"The results of the audit overall suggest that the majority of hospitals have yet to consider and implement measures which would address the impact of the hospital experience on people with dementia, and to assess the impact on the hospital of admitting people with dementia."

Specific findings include:

- 6% of hospitals had a care pathway in place for people with dementia at the time of audit and 44% of hospitals had a care pathway in development
- Most services had limited access to specialist service input, such as social services, liaison psychiatry and occupational therapy, during evenings or weekends
- 84% of hospital protocols or guidelines on assessment of people with dementia included assessment of functioning, however, case notes showed that assessment was only conducted for 26% of individuals
- 90% of hospitals had access to a liaison psychiatry service, and in most cases this service was provided by a team; however, almost a third of urgent referrals waited 4 days to be seen
- Overall, only 6% of people with dementia had their level of cognitive impairment measured on admission and on discharge
- Less than a third of hospitals (31%, 66/210) could identify people with dementia in reported information on in-hospital falls and their causes

Key recommendations from the national audit include:

- The National Clinical Directors for Dementia and for Older People in England, and the Medical Director and Nurse Director for NHS Wales, develop an overall competency framework to underpin guidance on staff training. Specifically, that:
 - 100% of staff receive basic dementia awareness training and updates
 - 50% of front line workers should have or be working towards, enhanced knowledge of dementia care
 - 10% of front line workers should have or be working towards specialist knowledge
- The Royal College of Physicians, the Royal College of Psychiatrists and the British Geriatrics Society should recommend brief screening tools for cognitive function and delirium for the assessment of people with dementia and older people in the general hospital
- Commissioning Boards and Health Boards should ensure that liaison psychiatry services are in place to provide adequate access over 24 hours for treatment and referral of people with dementia in hospital
- The Trust Board, Board of Governors or Board of the Health Board should ensure clinical information can be reviewed on admission rates, falls, treatment and discharges, in which people with dementia can be identified
- The appointment of a Senior Clinician Lead for Dementia with designated time in their job role to develop, implement and review the dementia pathway . Specific recommendations include:
 - To ensure that the hospital has a care pathway in place for dementia that is adaptable for use within or fitted to existing acute care pathways
 - Implement systems of good practice to ensure that staff can identify people with dementia on the ward, during care and treatment and can provide an appropriate response to their needs
- Measure cognitive functioning and delirium at admission for people with dementia

The next round of the audit will be undertaken during 2012.

National Audit Office 2010 Interim Report

In January 2010, the National Audit Office (NAO) published an interim report⁷³ on implementation of the National Dementia Strategy in England (NDS)². On publication of the interim report, Amyas Morse, head of the National Audit Office stated⁷⁸:

“The Department of Health stated in October 2007 that dementia was a national priority and brought forward a widely supported strategy in February 2009 to transform the lives of people with dementia. The action however, has not so far matched the rhetoric in terms of urgency. At the moment this strategy lacks the mechanisms needed to bring about large scale improvements and without these mechanisms it is unlikely that the intended and much needed transformation of services will be delivered within the strategy’s five year timeframe.”

Key findings reported included:

- A lack of comprehensive local data on the current costs of dementia services
 - No Payment by Results Tariff for costing mental health activities
 - The original impact assessment did not account for all implementation costs (which would be informed by pilot projects that reported in March 2011)
 - Recognition that Department of Health has commissioned the baseline audit of costs to report by March 2010
- The National Dementia Strategy is largely to be funded by efficiency savings
 - £130m p.a. from 2013-14 based on delayed entry to nursing homes through early diagnosis and intervention
 - This requires widespread adoption of best practice - rapidly

The report clearly stated that improved care of dementia sufferers that have experienced hip fractures, and implementation of the falls and fractures component of the Department of Health Prevention Package for Older People³, would significantly contribute to the efficiency savings required to implement the NDS .

3.2 National audit of falls, osteoporosis and fracture care

Royal College of Physicians National audit of falls and bone health

The Royal College of Physicians Clinical Effectiveness and Evaluation Unit (RCP-CEEU) has audited the organisation of services and standards of clinical care for fragility fracture care and prevention since 2005. In May 2011, the most recent round of this audit was published⁷⁹. Key findings include:

- The majority of high-risk patients miss the best or only opportunity for their falls and fracture risk to be identified in the majority of hospitals and most primary care organisations lack adequate services for secondary falls and fracture prevention
- Nearly all localities provide falls clinics, but only 12% of non-hip fragility fracture patients had attended a falls clinic, or equivalent, within 12 weeks of the fracture
- 86% of services report that they provide supervised strength and balance exercise training however only 19% of non-hip fracture patients participated in any form of exercise for falls prevention within 12 weeks of the fracture
- 37% of local health services provide any kind of Fracture Liaison Service (FLS) and not all of these can demonstrate reliable assessment of all fracture patients
- 32% of non-hip fracture and 67% of hip fracture patients had a clinical assessment for osteoporosis and/or fracture risk
- 33% of non-hip fracture and 60% of hip fracture patients received appropriate management for bone health

Key recommendations from the national audit include:

- All localities should commission a Fracture Liaison Service following the best-evidenced models either for acute-based services (e.g. Glasgow) or primary care-based services (e.g. West Sussex)
- Commissioners should ensure adequate local provision of falls clinics, or similar, particularly for those older people who have fallen and fractured or who are at risk of fracture. In many localities, this could require a ten-fold expansion in falls service capacity
- All acute care providers should introduce routine screening of older people, presenting to EDs or minor injury units (MIUs), for falls and fractures and that this is audited at least annually

The national audit considered delivery of cognitive assessment by falls services. Whilst 81% of falls service providers include cognitive testing as part of multi-factorial falls risk assessment, only 17% of non-hip fragility fracture patients received an assessment of cognitive function. Even amongst hip fracture patients the figure was less than 50%. The recently published NICE Clinical Guideline on hip fracture care states that healthcare professionals should be “... actively looking for cognitive impairment when patients first present with hip fracture.”¹⁸

The observation that 10% of patients with non-hip fragility fractures and 22% with hip fractures came from long-term care settings underscores the need for falls and fractures service to include care home residents. With regards to the 6% of falls services that currently exclude dementia sufferers, whilst the authors acknowledge that there is less evidence of benefit from falls assessment and management in people with dementia, they state that “Such discrimination has no place in the NHS.”

The national audit of falls and bone health **recommends** that falls service providers ensure that cognitive assessment is performed on all patients being assessed for falls risk factors

National Hip Fracture Database

The National Hip Fracture Database (NHFD) is a joint venture of the British Geriatrics Society and the British Orthopaedic Association, and is designed to facilitate improvements in the quality and cost effectiveness of hip fracture care⁴⁴. The NHFD enables benchmarking of the quality of hip fracture care provided by all hospitals in England, Wales and Northern Ireland. The 2011 NHFD Report⁸⁰ presented data on adherence to the 6 clinical standards advocated by the 2007 British Orthopaedic Association – British Geriatrics Society Blue Book⁴³ (the figures in brackets provide comparison to the figures from the 2010 NHFD Report⁸¹):

1. 58% of patients are admitted to an orthopaedic ward within four hours (up from 57%)
2. 87% receive surgery within 48 hours (up from 80%)
3. 3% are reported as having developed pressure ulcers (down from 6%)
4. 37% are assessed preoperatively by an orthogeriatrician (up from 31%)
5. 66% are discharged on bone protection medication (up from 57%)
6. 81% received a falls assessment prior to discharge (up from 63%)

For the first time, the 2011 report provided data on Abbreviated Mental Test Scores (AMTS)⁸². The authors note that AMTS is an important factor to be considered when conducting case mix adjustment. As such, the fact that AMTS was available for only 57% of the >53,000 cases evaluated identifies significant scope for improvement of cognitive assessment of hip fracture patients across the UK. The range of AMTS reporting is also noteworthy, from 100% in some hospitals to 0% in others. Where AMTS has been recorded, 31% of patients score less than 6/10, which is indicative of significant cognitive impairment. The NHFD concludes that *“Hospitals should endeavour to increase the number of records in which this field is completed.”*

3.3 Under-treatment of osteoporosis in dementia

At the 2011 Annual Scientific Meeting of the American Geriatrics Society, investigators from Rochester in the United States issued a call for improvement in the diagnosis and treatment of osteoporosis in patients with dementia prior to hip fracture⁸³. Their case-controlled analysis of hip fracture patients aged over 60 years found that 48% had been diagnosed with dementia and 41% with osteoporosis prior to admission. However, whilst patients diagnosed with dementia were more likely to also be diagnosed with osteoporosis, dementia sufferers were less likely to be treated with anti-osteoporosis medication prior to suffering hip fracture.

A population-based study of people from Sweden compared use of osteoporosis drugs in older people with and without dementia⁹. Whilst the incidence of osteoporotic fracture during the study period was 3 times higher amongst dementia sufferers than individuals without dementia, treatment rates were more than 50% lower for the demented. Furthermore, dementia sufferers were less likely to be treated with potent anti-osteoporosis treatments.

4 Integrated approaches to dementia, falls and fractures

4.1 The case for an integrated approach

The evidence reviewed in sections 2 and 3 of this document could be summarised as follows:

Persons with dementia suffer more falls, more fractures and higher post-fracture mortality than those without dementia, yet they are under-assessed for falls risk factors and are less likely to receive treatment for osteoporosis.

Falls and fracture patients have a high prevalence of dementia and cognitive impairment, yet do not routinely receive cognitive assessment and, consequently, frequently miss an opportunity for a diagnosis of dementia to be made.

Consideration of these statements from an epidemiological perspective puts into context the scale of the opportunity for improved care that an integrated approach to dementia, falls and fractures could realise.

In 2010, it was estimated that 820,000 people suffer from dementia in the UK⁴⁷. Study of the incidence of falls in dementia found that 66% of dementia sufferers experienced a fall during a 12 month period⁸, many of whom experienced multiple falls. Were these data to be generalised to the entire population with dementia in the UK, the number of dementia sufferers experiencing falls every year could be in excess of half a million people.

An economic analysis published in 1999 reported that there were almost 650,000 fall-related Emergency Department attendances in the UK for persons aged >60 years⁴⁸. Two-thirds of these occurred amongst people aged over 75 years. These falls led to in excess of 200,000 hospital admissions of which almost 80% were in people aged over 75 years. Just over a quarter of individuals aged over 65 years that present to hospital with a fall are cognitively impaired⁶³. Accordingly, at least 169,000 such individuals are likely to be presenting to UK hospitals as a result of a fall every year. Furthermore, the 2011 National Hip Fracture Database Report⁸⁰ suggests that up to 21,700 of the 70,000 patients presenting with hip fracture annually in England, Wales and Northern Ireland could be suffering from dementia and/or delirium.

Two thirds of people with dementia never receive a diagnosis and the UK is in the bottom third of countries in Europe for diagnosis and treatment of people with dementia¹⁰. Falls and fractures are the most common reason for dementia sufferers to be admitted to hospital^{51, 52}. Accordingly, as advocated in the 2010 edition of the Memory Services National Accreditation Programme (MSNAP) *Standards for Memory Services Assessment and Diagnosis*⁸⁴, in accordance with the original recommendation from the Royal College of Psychiatrists⁸⁵:

- All dementia sufferers for whom falls risk presents a serious issue should be referred to specialist falls teams

Conversely, as recommended in the 2011 national audit of falls and bone health⁷⁹:

- All patients presenting with falls and fractures should receive cognitive assessment

This section provides healthcare professionals and service commissioners with a practical overview of systematic approaches to:

- Integrate falls and fracture risk assessment into dementia care pathways
- Integrate dementia assessment into falls and fracture care pathways

4.2 Assessment tools for dementia, falls and fractures

Dementia and mild cognitive impairment assessment

NICE Clinical Guideline 42 states that diagnosis of dementia should be made only after a comprehensive assessment, which should include¹³:

- history taking
- cognitive and mental state examination
- physical examination and other appropriate investigations
- a review of medication in order to identify and minimise use of drugs, including over-the-counter products, that may adversely affect cognitive functioning

NICE recommends that formal cognitive testing should be undertaken using a standardised instrument which could include the following:

- Mini Mental State Examination (MMSE)⁸⁶
- 6-item Cognitive Impairment Test (6-CIT)⁸⁷
- General Practitioner Assessment of Cognition (GPCOG)⁸⁸
- 7-Minute Screen⁸⁹

A 2010 meta-analysis⁹⁰ of the diagnostic accuracy of all brief multi-domain alternatives to the MMSE concluded that MMSE or the AMTS (Abbreviated Mental Test Score⁸²) should be considered in primary care, and either the 6-CIT⁸⁷ or the MINI-COG⁹¹ should be considered in specialist settings.

NICE also suggest that primary care teams should consider referring people with signs of mild cognitive impairment (MCI) for assessment by memory assessment services, because more than half of people with MCI later develop dementia. MMSE scores for patients with MCI have been shown not to differ from control subjects; however, analysis of MMSE subtest scores may increase the sensitivity of the MMSE test in screening for MCI and its subtypes⁹².

Falls and fracture risk assessment

Falls

NICE Clinical Guideline 21²² identified three categories of assessment tools which included:

1. Tests of balance and gait used in both community dwelling and extended care settings
2. Multi-factorial assessment instruments/processes administered by health care professionals for all settings, including:
 - a. home hazard assessment instruments administered by health care professionals for community-dwelling people
 - b. multi-factorial falls risk assessment processes
3. Minimum data set (MDS) for home care and residential settings for comprehensive assessment

The most commonly used tests of balance and gait were the 'timed up and go' test (TUGT); the 'Turn 180°' test; performance-oriented assessment of mobility problems (Tinetti scale); functional reach; dynamic gait index; and, the Berg balance scale. NICE concluded that it was unclear which instrument was the most predictive and therefore useful.

The 2010 American Geriatrics Society (AGS)/British Geriatrics Society (BGS) Clinical Practice Guideline for Prevention of Falls in Older Persons reviewed the societies' previous guidance from 2001⁹³. The AGS/BGS Guideline recommendations included:

- multi-factorial fall risk assessment for all older adults who present with a fall or who have gait and balance problems
- multi-factorial falls risk assessment for individuals who simply report difficulties with gait or balance
- falls risk assessment is not considered necessary for older persons reporting only a single fall without reported or demonstrated difficulty or unsteadiness

Critically, this guideline concludes that *"For older persons with cognitive impairment, there is insufficient evidence for supporting any recommendations to reduce fall risk."*

Fractures

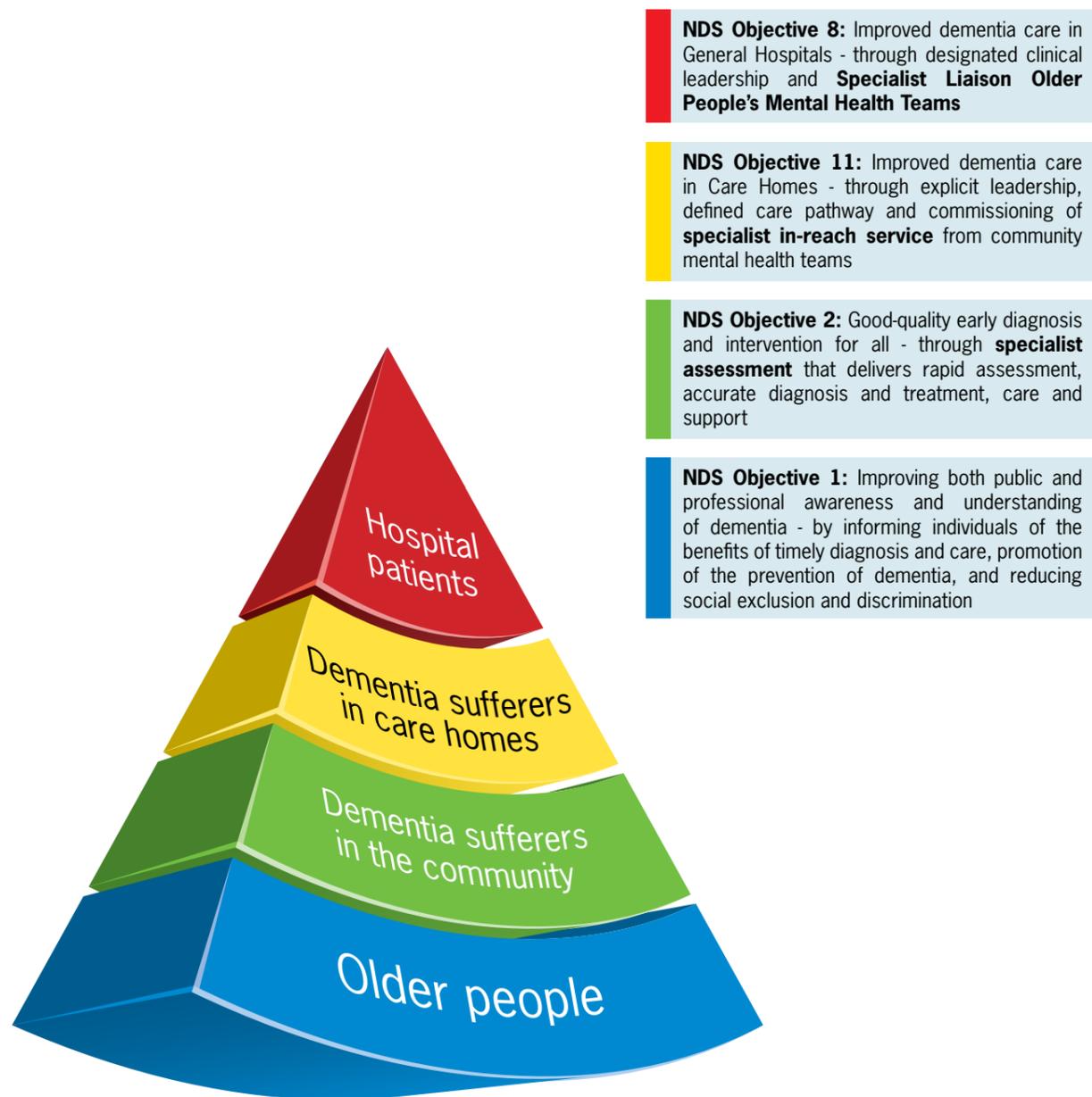
NICE has published 4 Technology Appraisals on treatments for the primary and secondary prevention of osteoporotic fractures in post-menopausal women^{19,21, 94}. Assessment for treatment for osteoporosis is based upon age, bone mineral density T-Score and several clinical risk factors. In parallel to publication of the NICE Technology Appraisals, significant advances have occurred in relation to fracture risk assessment. Under the auspices of the World Health Organisation, the FRAX[®] fracture risk algorithm has been developed to provide 10 year estimates of major osteoporotic and hip fracture risk. The FRAX[®] tool is available to healthcare professionals and patients as an online resource hosted by the University of Sheffield⁹⁵. At the time of writing NICE is developing a Clinical Guideline titled "Osteoporosis fragility fracture risk."⁹⁶ The anticipated publication date of the guideline is August 2012.

4.3 Established models of care for dementia, falls and fractures

Dementia service models

The pyramid in figure 1 links specific populations to delivery of National Dementia Strategy² objectives through implementation of established models of care. The following section provides the reader with a précis of these service structures and several examples from the literature.

Figure 1. The National Dementia Strategy objectives and related service structures (Adapted from *Falls and fractures: Effective interventions in health and social care*³)



Liaison Mental Health Teams for older people

National Dementia Strategy² objective 8 is concerned with improvement of care for dementia sufferers in the general hospital setting. The traditional model of care for old age psychiatry is founded on the multi-disciplinary community mental health team (CMHT), with support from psychiatric wards, day hospitals, social care and voluntary organisations⁹⁷. The primary aim of the CMHT is to provide care at, or close by, older people's homes. A challenge to this service structure is the high prevalence of dementia amongst patients admitted to general hospital wards, which necessitates a referral from general hospital staff to the CMHT.

Liaison Mental Health Teams (LMHTs) for older people have been developed to improve the care of patients admitted to hospital. LMHTs are staffed in a variety of ways; some based upon a single doctor of psychiatric nurse specialist, others with sessional commitments. A survey conducted in 2007 reported that almost half of acute hospitals in the UK have received an LMHT and there is a growing trend towards nurse-led services⁹⁸. An LMHT developed by a consultant nurse in Chesterfield provides an illustration of the practical steps taken to implement a service and the impact on referral rates⁹⁸. The key features of this service are:

- Dedicated clinical time for a nurse specialist
- Referrals are triaged and allocated by the consultant nurse to either receive a psychiatrist or consultant nurse review according to a specific protocol
- The consultant nurse has ready access to psychiatrist input and can admit patients to mental health wards as needed

An audit of 206 ward referrals assessed by the consultant nurse during the second year of operations found that only a quarter of the individuals concerned were previously known to local mental health services.

In-reach services for care homes

National Dementia Strategy² objective 11 calls for significant improvement in the care of dementia sufferers in care homes. The key components proposed to achieve this change are explicit leadership in each home, defined care pathways and in-reach for local Community Mental Health Teams (CMHTs).

An award winning program from the South Humber region provides a successful illustration of this approach⁹⁹. A team comprised of a consultant psychiatrist and 5 community mental health nurses provide rapid access to specialist mental health assessment for people living in care homes. The objectives of the Care Home Liaison Service (CHLS) are:

- Provide comprehensive mental health assessments for older people in care homes and to formulate person-centred care plans
- Work in collaboration with partnership agencies and care homes to enhance evidence-based, person-centred care
- Support patients admitted to 24-hour care from an inpatient setting and prevent readmission
- Support, educate and train care home staff in managing and caring for older people with mental health problems

The CHLS received 486 referrals during the first year of operations. During this time there were only 6 admissions to mental health wards from care homes compared to 24 admissions in the year prior to launch of the CHLS. Other outcomes included a reduction in anti-psychotic medication use, reduced length of stay on mental health wards for those discharged to a care home and fewer readmissions due to placement breakdown. During the second year of the service, over 600 members of staff attended CHLS training sessions.

Memory services

National Dementia Strategy² objective 2 highlights memory services or clinics as the model of care to facilitate early diagnosis and intervention for all dementia sufferers. Whilst memory clinics have been described since the 1980s, the number of clinics in the UK and associated publications has grown considerably in the last decade¹⁰⁰. Most memory services are staffed by a multi-professional team who work from a clinic base that provides consultations on an out-patient basis¹⁰¹. Memory services are clinically-led, have organisational support from senior nursing staff and appropriate administrative support. Specialist input is usually provided by:

- Medical staff: Including physicians, neurologists and psychiatrists
- Clinical psychologists
- Nursing staff
- Occupational therapists
- Local Alzheimer's society representatives
- Social workers
- Speech therapists
- Dieticians
- Clinical pharmacists

Various approaches have been taken to establish memory services. Some published examples follow.

Croydon Memory Service Model

The National Dementia Strategy² cited the Croydon Memory Service Model (CMSM) as an example of a clinically¹⁰² and cost-effective¹⁰³ model of care. The CMSM is a low-cost, high throughput service staffed by a multi-disciplinary team with generic team working. Accordingly, an initial assessment can be conducted by any team member. During the first two years of the service:

- 290 referrals to the CMSM were made
- 247 of those referrals were assessed
- 140 were diagnosed as Alzheimer's disease or mixed dementia and MMSE ≥ 10
- 68 (48%) patients were taking anti-dementia medications 6 months post-assessment
- During 2004-2005, diagnosis of dementia in Croydon increased by 63%

The cost-effectiveness analysis¹⁰³ concluded in 2008 that, at a National level, universal access to this model of care could be provided for £220 million per year. The estimated public and private savings associated with a 10% reduction in admission to care homes would be £245 million per year. The Memory Services National Accreditation Programme (MSNAP)⁸⁴ have developed standards of care that "...will help services demonstrate compliance with key policy and guidance available on the assessment and diagnosis of dementia."

Three tier regional memory service

Based on experience of memory services in Stafford, a three tier approach to development of a regional memory service has been described¹⁰⁴. The key elements of this model are:

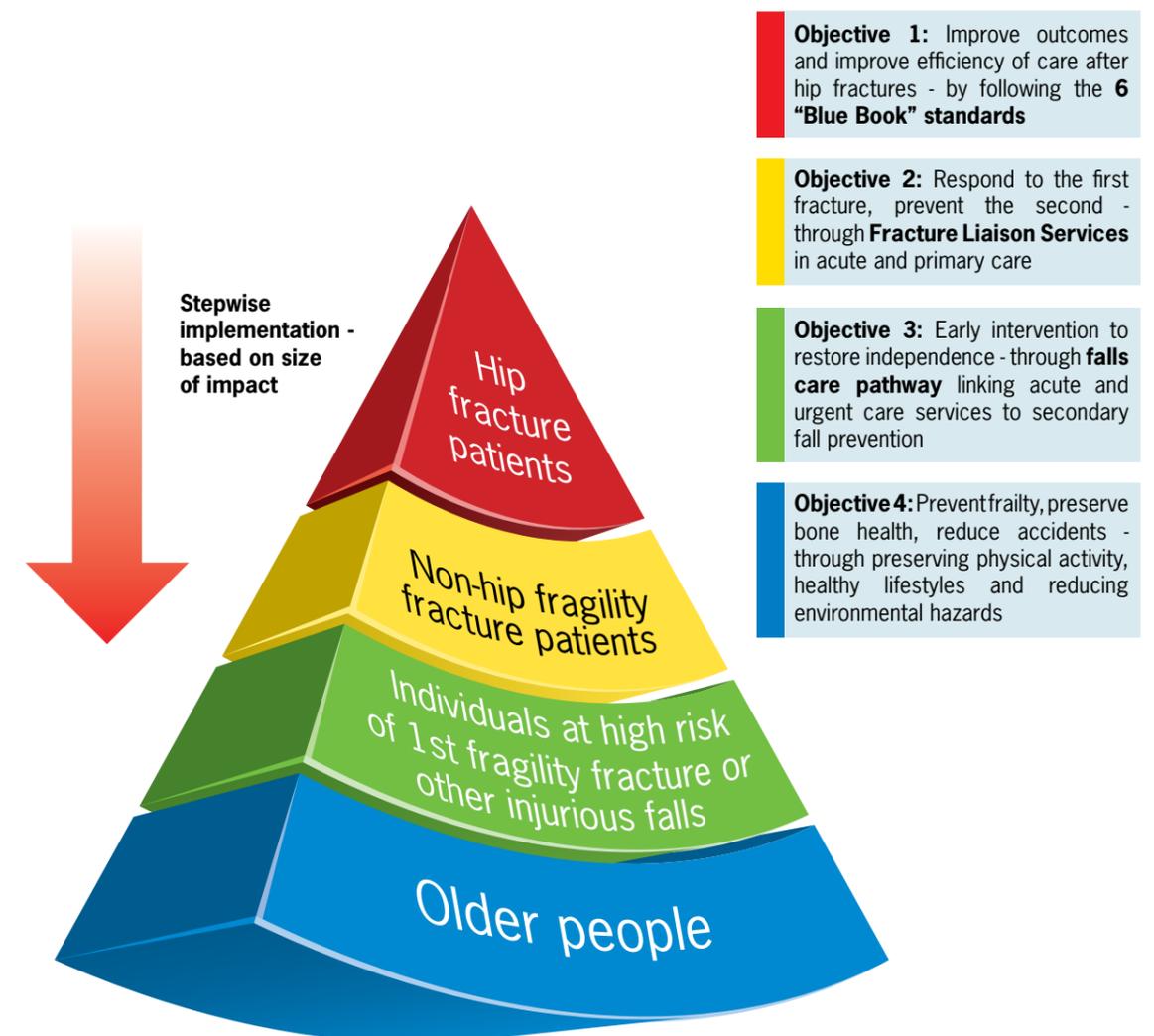
- **Memory clinic in primary care:** A memory service for a GP practice serving a population of 8,000 people was provided by a monthly 'in-practice' session with local expertise from specialist old age psychiatry/memory clinic personnel. The key functions of this memory clinic include:
 - Case-find individuals with memory problems
 - Assess, investigate and diagnose
 - Initiate or advise appropriate treatment(s)
 - Inform patients, carers and other relevant agencies
 - Utilise the District memory service when needed

- **Secondary tier - District memory service:** A skilled team usually based in old age psychiatry. The majority of this service's clinician time will be spent in local primary care. This service will be staffed by senior clinical psychologists (x2), consultant physician (x1), a full time manager and secretary, nursing staff, a social worker and occupational therapists (x2). The key functions of the district memory service include:
 - A major role in disseminating knowledge, teaching, training, audit and research relating to dementia
 - Be a resource to people with early onset dementia
 - Be available throughout the disease course to primary care
- **Tertiary tier - Regional memory service:** A specialist and/or academic service to support the primary and secondary tiers of the service in provision of care for particularly complicated cases.

Falls and fractures models

The falls and fractures component of the Department of Health Prevention Package for Older People³ is summarised in the pyramid in figure 2. The following section provides the reader with a précis of these service structures and examples from the literature.

Figure 2. A systematic approach to hip fracture care and prevention (Adapted from *Falls and fractures: Effective interventions in health and social care*³)



Objective 1: Improve outcomes and improve efficiency of care after hip fractures - by following the 6 "Blue Book" standards

Objective 2: Respond to the first fracture, prevent the second - through **Fracture Liaison Services** in acute and primary care

Objective 3: Early intervention to restore independence - through **falls care pathway** linking acute and urgent care services to secondary fall prevention

Objective 4: Prevent frailty, preserve bone health, reduce accidents - through preserving physical activity, healthy lifestyles and reducing environmental hazards

Ortho-geriatrics services

Objective 1 of the falls and fractures section of the DH Prevention Package relates to ortho-geriatrics services³. The British Orthopaedic Association – British Geriatrics Society Blue Book⁴³ makes the case for collaborative care of hip fracture patients shared by ortho-geriatricians and orthopaedic surgeons. Literature review suggests that four models of ortho-geriatric care may exist:

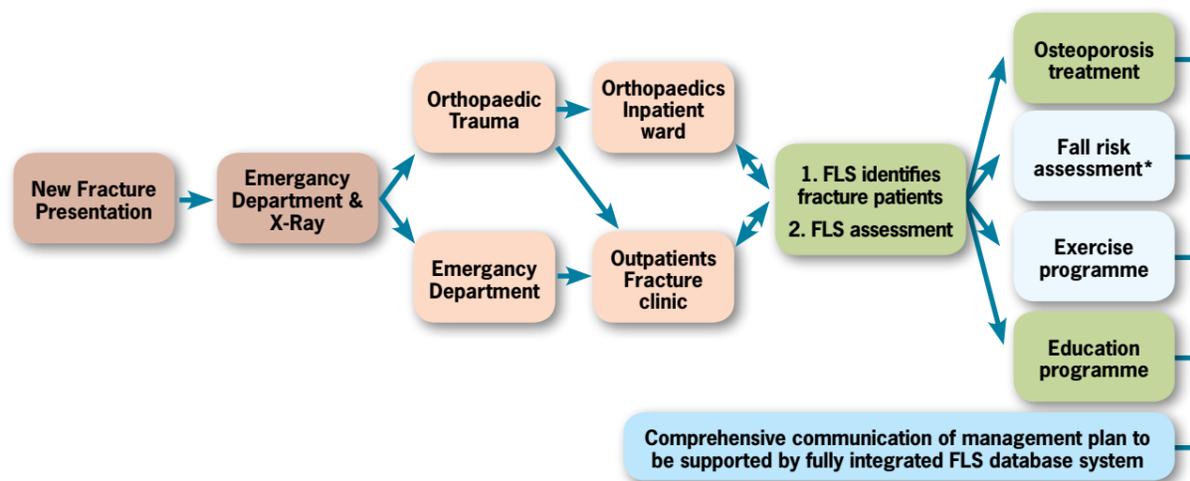
- The “traditional model”: the elderly patient with a fracture is admitted to a trauma ward, and care and subsequent rehabilitation is managed by the orthopaedic surgeon and his or her team. A consultative service is provided by geriatricians to address medical queries.
- The “traditional model” with regular geriatrician input: This may involve a twice-weekly multi-disciplinary ward round.
- Early post-operative transfer: Preoperative care delivered by the orthopaedic team with early transfer to a geriatric rehabilitation unit.
- Combined ortho-geriatric care: The patient with a fracture is admitted to a dedicated ortho-geriatric ward under the care of geriatricians and orthopaedic surgeons. Pre- and post-operative geriatric care is delivered by the geriatrics team. Rehabilitation may occur in this unit or at another facility.

According to the 2011 Royal College of Physicians national audit of falls and bone health almost all hospitals have an ortho-geriatrics service of some sort⁷⁹. However, capacity issues may currently result in sub-optimal access to routine ortho-geriatric assessment for all hip fracture patients.

Fracture Liaison Services

Objective 2 of the falls and fractures section of the DH Prevention Package relates to Fracture Liaison Services (FLS)³. FLS have been shown to provide routine secondary preventive care for patients presenting to hospital with fragility fractures at any skeletal site¹⁰⁵⁻¹⁰⁷. The FLS model usually relies upon a dedicated nurse specialist who works in the orthopaedic environment, under the guidance of a specialist clinician in metabolic bone disease. By working to protocols devised by appropriately experienced clinicians, the specialist nurse establishes a system of care in a particular hospital to ensure that every fracture patient over the age of 50 years (excluding high-trauma and road traffic accidents) receives a ‘one-stop-shop’ osteoporosis assessment, with dual energy X-ray absorptiometry (DXA) where appropriate. As indicated in figure 3, older patients are referred to local falls services for assessment and intervention to reduce risk of falling.

Figure 3. The structure of a Fracture Liaison Service adapted from *The care of patients with fragility fracture*⁴³



* Older patients, where appropriate, are identified and referred for falls assessment

FLS have been shown by UK lead clinicians¹⁰⁸ and the Department of Health⁷⁴ to be cost-saving services. The Royal College of Physicians national audit published in May 2011 reported that 37% of localities have established an FLS⁷⁹. Universal access across the United Kingdom could be provided for 0.6% of the estimated annual spend on hip fracture care alone¹⁰⁹.

Falls Prevention Services

Objective 3 of the falls and fractures section of the DH Prevention Package relates to Falls Prevention Services³ (FPS). The specific elements of falls provision highlighted in the policy include:

- a falls care pathway
- a falls service
- falls co-ordinator
- multi-factorial interventions
- community-based therapeutic exercise

Falls services should focus on individuals presenting with a fall or fracture to any urgent care service, including Emergency Departments, minor injury units, primary care out of hours services and fallers that are not conveyed to hospital by the ambulance service. Assessment for both falls risk and bone health should be offered in all cases. Falls services can operate from a variety of settings and should be staffed by appropriately skilled practitioners with access to secondary care expertise as required. Many localities have developed the falls co-ordinator role with responsibility for ensuring an integrated approach is shared by primary and secondary care. On the subject of multi-factorial targeted interventions, the policy states;

“Multi-factorial targeted interventions are based on risk assessment, and are likely to include optimising medication, reducing visual disability, avoiding unnecessary environmental hazards in the context of lifestyle advice and support to prevent frailty, preserving bone health, and promoting independence. The most effective component of multi-factorial interventions is therapeutic exercise.”

Community-based therapeutic exercise programmes should be tailored for the specific needs of fallers presenting to urgent care and those individuals with hip and non-hip fragility fractures.

4.4 Integration of dementia, falls and fractures pathways

Thus far, this document has provided a review of existing policies and service structures, and a rationale for integration of dementia, falls and fractures pathways. Having described the nature of the problem, this section aims to consider potential solutions for the NHS to effectively integrate dementia, falls and fracture pathways. The approaches considered are:

- **Acute care:**
 - Dementia identification by Ambulance Services
 - Dementia Intensive Support Teams
 - The development of a National Hip Fracture Database
- **Nursing home care:**
 - Strategies to reduce polypharmacy in care homes
 - Assigning dementia professionals to the falls pathway
 - Staff-oriented intervention to reduce falls in nursing homes
- **Memory services:**
 - Falls and fracture risk assessment in memory services
- **Innovative integrated approaches:**
 - The CARPE DEM Model: Towards an “ideal” dementia care pathway?

As many of the approaches described are comparatively recent innovations or, in several cases, propositional in nature, long-term impact and outcomes would be the subject of future presentations and publications.

Acute care

Dementia identification by Ambulance Services: The Great Western Ambulance Service

A study from London reported that one fifth of individuals aged 65 years or over, presenting to Accident and Emergency Departments have a primary diagnosis of having fallen¹¹⁰. Another study of calls to the London Ambulance Service reported that 40% of fallers in this age group were not conveyed to hospital¹¹¹. Amongst those conveyed to hospital, data from the North East Ambulance Service suggests that 26% of people who had fallen are admitted, 10% referred to a liaison nurse service and the remaining 64% seen and discharged¹¹². Accordingly, there is significant potential for improved identification of dementia sufferers by ambulance clinicians. The Great Western Ambulance Service has recognised this opportunity and developed educational resources^{113, 114} to improve dementia awareness amongst their crews which has been recognised by the Department of Health¹¹⁵ and the NHS Confederation¹¹⁶. The primary aims of the programme are to:

- Share information on arrival at the hospital, so that an appropriate care package can be developed for the patient
- Avoid unnecessary admissions for patients with dementia to hospitals
- Provide a clear and more appropriate care pathway so that the patient and carer experience will be more positive
- Identify patients who require dementia-appropriate community services and initiating links to these services

Dementia Intensive Support Teams: NHS Norfolk

Norfolk and Waveney Mental Health NHS Foundation Trust has recruited 13 nursing staff to form a Dementia Intensive Support Team (DIST)^{117, 118} to work at the Norfolk and Norwich University Hospital from Q3-2011. After a successful pilot of a Community-based DIST¹¹⁹ which cared for 240 people during the first year of operations, of whom 86% continued to remain living in their homes, the ‘in-reach’ DIST was devised in light of hospital audit data that found >28% of all adult inpatients had some degree of dementia. The posts have been funded by NHS Norfolk at a cost of £450,000.

The focus of the in-reach DIST will be to case-find individuals whose dementia was the underlying cause of their admission to hospital or likely to increase their length of stay. Working collaboratively with hospital staff and carers, the in-reach DIST will provide support to patients to overcome the crisis that resulted in hospitalisation. The focus of the community-based DIST will continue to be to provide care in patients’ homes or in nursing homes to reduce the likelihood of dementia sufferers being admitted to hospital.

National Hip Fracture Database⁸⁰

All hospitals in England, Wales and Northern Ireland are registered with the National Hip Fracture Database (NHFD). The 2011 NHFD Report provided data on Abbreviated Mental Test Scores (AMTS)⁸². AMTS was available for 57% of the >53,000 cases evaluated during the period April 2010 to March 2011. Where AMTS has been recorded, 31% of patients score less than 6/10, which is indicative of significant cognitive impairment. The NHFD concludes that “Hospitals should endeavour to increase the number of records in which this field is completed.”

The NHFD provides a reliable mechanism to case-find hip fracture patients that also suffer from dementia. Establishment of robust links between hospital-based orthogeriatrics services and local dementia services provides an opportunity to close the dementia diagnosis care gap, should it exist, in this population. The place of residence of individual hip fracture patients will determine which diagnostic service is most appropriate to conduct the initial cognitive assessment i.e. whether they are community dwelling or living in nursing home care.

From April 2012, pre- and post-operative cognitive assessment became one of the criteria for payment of the Best Practice Tariff for hip fracture⁴⁴.

Nursing home care

Strategies to reduce poly-pharmacy in care homes: NHS Cornwall

In January 2011, the Department of Health published *Living well with dementia: a National Dementia Strategy - good practice compendium*¹¹⁵. The compendium provides examples of good practice collated from across the English regions which includes the STAR Toolkit from Cornwall. STAR stands for *Stop, Think, Assess, Review* and is a countywide initiative intended to reduce the use of inappropriate medications in care homes. One of the stated objectives of STAR is to reduce the number of falls sustained as a result of medications and poly-pharmacy. The STAR Toolkit provides health and social care professionals with:

- Information regarding Behavioural and Psychological Symptoms of Dementia (BPSD)
- Explanations of factors contributing to BPSD
- Alternative strategies to medication
- Prescribing information to assist health workers

STAR promotes a quarterly checklist to review, monitor and reduce the prescribing of medication, and an ‘at a glance’ summary and pathway, in addition to laminated information booklets with practical observational tools to monitor behaviour.

Assigning dementia professionals to the falls pathway: NHS Suffolk

In 2010, healthcare professionals from Suffolk Mental Health Partnership NHS Trust, in collaboration with Suffolk County Council, considered the impact of dementia, falls and fractures in the NHS East of England region. Based on health economic research conducted by the London School of Economics (LSE)⁷², previously described in section 2.6 of this document, the Suffolk group concluded that cost savings of £1.2 to £3.1 million could be achieved in the Eastern Region by reducing the length of hospital stay (LOS) by one week for dementia sufferers who had a fall¹²⁰. In an attempt to reduce the LOS, three priority areas were identified for quality improvement initiatives:

- Mental health clinicians dedicated to the falls pathway
- Earlier involvement in the admissions process linking with the interface geriatrician
- Moving late life mental health services into the urgent care pathway to provide multi-disciplinary admission prevention and discharge planning

In 2011, NHS Suffolk began a long-term pilot project to integrate falls and dementia pathways for the residents of 50 nursing homes in the county¹²¹. A mental health nurse has been specifically appointed to provide training to nursing home staff to improve knowledge and understanding of dementia and risk of falling. The success of the initiative will be measured by the impact of the educational intervention on the incidence of falls amongst people living with dementia in nursing homes.

Staff-oriented intervention to reduce falls in nursing homes

A study from Belgium¹²² evaluated the impact of a staff-oriented intervention in nursing homes to reduce the risk of falls in residents with and without cognitive impairment. The intervention consisted of provision of multi-faceted training to nursing staff. The nurses kept falls diaries which detailed the risk factors for the fall and possible interventions to prevent future falls. A detailed questionnaire was completed for all patients in the intervention group, which included chronic medications and co-morbidity. The study considered three time periods; a 6 month pre-intervention period, a 6 week intervention phase and a 6 month post-intervention. The primary outcome measure was the number of participants with at least one fall requiring intervention during each study period. The intervention led to a 50% reduction in the number of participants who experienced at least one fall. Notably, no difference of effect was observed for the cognitively impaired when compared to the cognitively well.

Memory services

Falls and fracture risk assessment in memory services

Integration of falls risk and memory assessments into a single clinical service has been described in rural Australia¹²³, however, there is no peer-reviewed literature to date on this subject from the UK. Based on published studies, the following issues could be considered clinically appropriate to be addressed by memory services at the time a diagnosis of dementia is made:

- Management of symptomatic orthostatic hypotension, autonomic symptoms and depression, and encouragement of physical activity in individuals who do not have significantly impaired gait and balance⁸
- A review of the individual's medicines with an aim to reduce polypharmacy and the incidence of drug-drug interactions that contribute to increased falls risk⁵⁶
- A risk assessment for falls⁸⁴, fractures and possible interventions including treatments for osteoporosis^{83, 124}

Two service development strategies could be envisaged to deliver these assessments:

1. **'Liaison strategy'**: Where capacity exists within the local falls and fragility fracture prevention services, mechanisms to enable direct referral from the memory service could be established. In this scenario, protocols would need to be pre-agreed with local general practices to ensure appropriate communication with the patient's GP. An alternate arrangement would be to establish an in-reach service, whereby personnel from the falls and fragility fracture prevention services conduct assessments in the memory clinic setting on specific days of the week.
2. **'Training strategy'**: Memory service personnel to receive training from falls and fragility fracture prevention teams to conduct falls and fragility risk assessments and deliver interventions for memory service clients. Training from expert colleagues could provide a cost-effective solution to the increasing need for falls and fracture assessments and interventions. Implementation of this strategy would need to be entirely dependent on strict adherence to protocols developed by local clinicians with expertise in falls and fracture prevention.

Increasing demand on falls and fractures services fuelled by the ageing population, in combination with the need for significant efficiency savings to be achieved within the NHS by 2015¹²⁵, would suggest that a training strategy is likely to be the preferred option for those responsible for health and social care budgets.

Management of orthostatic hypotension, autonomic symptoms and depression could be undertaken by medical staff and clinical psychologists working in memory services. Falls and fracture risk assessment could be undertaken by allied healthcare professionals in memory services. Through establishment of pre-agreed protocols with local primary care, efficient processes to expedite diagnostic assessments could be conducted. For example, direct referrals from the memory service to the local bone densitometry unit for patients that require a DXA scan to confirm an osteoporosis diagnosis. Medical staff and/or clinical pharmacists working in memory services could deliver initial medicines use reviews (MUR) and liaise with the patient's GP to ensure that ongoing MUR is incorporated into the long-term management plan. Thus, polypharmacy might be reduced and the potential for drug-drug interactions that contribute to falls risk minimised.

The primary objective of this integrated approach would be to eliminate the potential for dementia sufferers to fall between the potential cracks created by multiple service providers delivering individual elements of falls and fracture preventative care.

Innovative integrated approaches

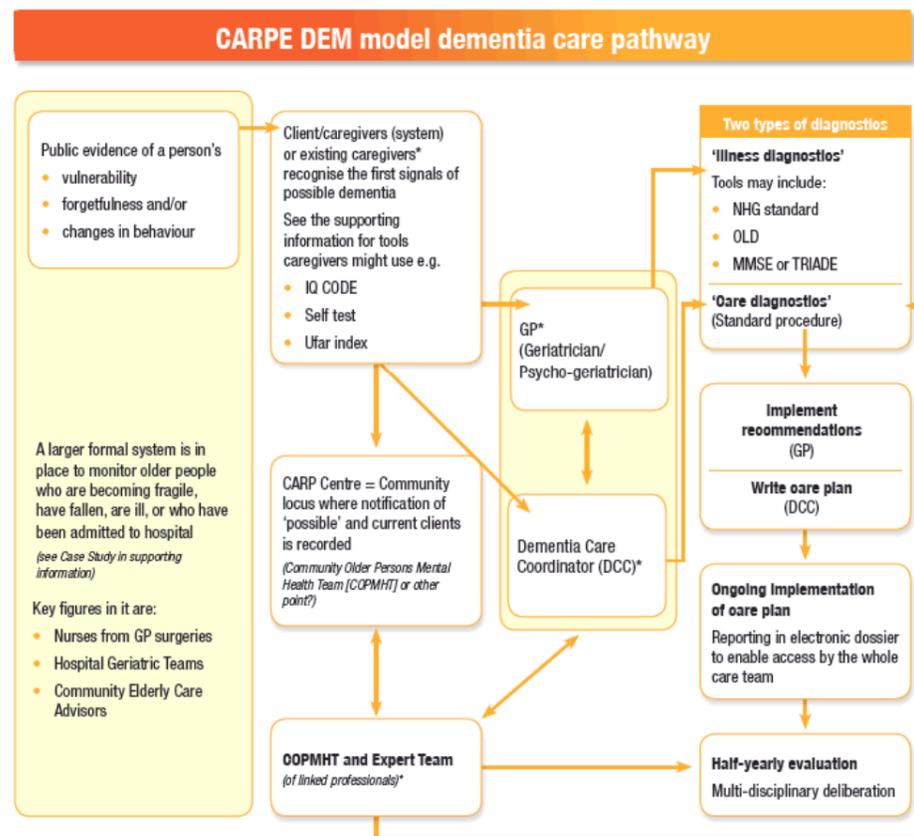
The CARPE DEM Model: Towards an “ideal” dementia care pathway?

The award winning CARPE DEM Model (Care for Every Person with Dementia)¹²⁶ proposes an ideal dementia care pathway which attempts to ensure dementia sufferers do not fall between the cracks of various diagnostic services. The pathway, whose development has received financial support from Novartis, highlights falls and fracture patients as a key group that should be targeted for improved dementia assessment. Central to the implementation plan is creation of a ‘Community Area Registration Point’ (CARP) which is defined as:

“... a place/service where members of the public, paid caregivers and health and social care professionals can report any concerns about people who are becoming fragile or forgetful, including those who have been hospitalised or have had falls.”

The key professionals responsible for delivery of care are GPs and Dementia Care Co-ordinators (DCCs). The DCC is a specialist case manager with dementia experience and stipulated qualifications. Once a diagnosis has been made, the CARP assigns new cases to a DCC, who remains the primary point of contact for the patients and their carers. Hospital-based geriatrics teams are linked to dedicated GP practices through designated hospital liaison nurses. The structure of the CARPE DEM pathway is shown in figure 4.

Figure 4. The CARPE DEM model dementia care pathway (reproduced with kind permission of Dr. Gemma Jones)



* Ongoing Education

CARP, Community Area Registration Point; COPMHT, Community Older Persons Mental Health Team; DCC, Dementia Care Coordinator; OLD, Observation List for early signs and symptoms of Dementia; MMSE, Mini-Mental State Evaluation; TRIADE, Triage in Dementia

A 3 day training course has been specifically developed for GPs and DCCs which includes training on dementia, its assessment, management, and legal and ethical considerations applicable to dementia care¹²⁷. In addition to case-finding and creation of a registry of individuals at risk, the pathway describes key activities in the context of 4 sequential levels of support from the time of formal diagnosis to circum-death care.

4.5 Financial levers to support pathway integration

Payment by Results tariff for mental health

At the time of writing, the Payment by Results (PbR) tariff for mental health services is in development¹²⁸. The key developments during 2011 and over the next two years include¹²⁹:

- February 2011:
 - Publication of PbR guidance for 2011/12. Section 9 describes steps that should have been taken by providers and commissioners during 2011 to prepare for the introduction of mental health PbR in 2012/13.
 - Publication of updated version of clustering tool booklet (A Clustering Booklet for Mental Health PbR (2011/12)). The booklet incorporates the transition protocols, which are to be used at each cluster review period.
- July 2011: Usual reference cost collection exercise
- September 2011: Specific cluster reference cost collection exercise
- December 2011: Deadline for allocation of all service users accessing mental health care to a cluster
- 2012-2013: Providers and commissioners to be planning for discussions on mental health service provision
- 2013-2014: Earliest possible date for a national tariff for mental health

Best Practice Tariff for hip fracture

The Best Practice Tariff (BPT) for hip fracture was introduced in April 2010¹³⁰. The BPT offers an incentive (of £445 per patient in 2010-2011, rising to £890 per patient in 2011-2012) when surgery is conducted within 36 hours of admission in combination with provision of effective ortho-geriatrician led medical care of the acute phase. BPT also requires hospitals to ensure that falls risk and bone health assessments are undertaken for all hip fracture patients, aiming to prevent secondary fractures. From April 2012, pre- and post-operative cognitive assessment became one of the criteria for payment of the BPT⁴⁴. Thus, hospitals will be required to record this data on the National Hip Fracture Database if the uplift in tariff payment is to be received.

Quality, Innovation, Productivity and Prevention (QIPP) polypharmacy initiative

NHS South West Essex has developed an initiative¹³¹ to address polypharmacy for people with dementia as a component of local Quality, Innovation, Productivity, Prevention (QIPP)¹²⁵ activities. The primary objective of this initiative is to avoid adverse drug reactions, in the form of drug interactions, which could lead to a fall or other drug related problem resulting in a potentially avoidable hospital admission. A multidisciplinary Dementia Treatment Steering Committee was convened in December 2010 to determine how best to optimise dementia treatment, reduce unnecessary polypharmacy and maximise compliance with therapy. Key aspects of this initiative include:

- Training of local community pharmacists and GPs to recognise potentially harmful drug interactions between dementia medications and treatments for comorbid conditions
- Redesign of the acute hospital dementia treatment pathway to clarify which healthcare professional is responsible for conducting a 6 month review for those prescribed anti-dementia drugs
- Development of materials for carers to enable them to undertake mini-mental state activities of daily living assessments to support the work of GPs and memory clinics.

Commissioning for Quality and Innovation (CQUIN)

In July 2010, the Coalition Government committed to continuation of the Commissioning for Quality and Innovation (CQUIN) payment framework, to support local quality improvement goals¹³². In November 2010, a series of 'Exemplar CQUIN Goals' were published¹³³. These included reference to the Fracture Liaison Service model discussed previously in this document.

CQUINs provide a potential mechanism to reward best practice delivered through integrated approaches to dementia, falls and fractures. An example of this approach is the Great Western Ambulance Service initiative¹¹³¹¹⁶, previously described in section 4.4, where the dementia training provided to ambulance crews has been recognised as a CQUIN target.

The National CQUIN for dementia was published in April 2012¹⁶.

"The goal of the Dementia CQUIN is to incentivise the identification of patients with dementia and other causes of cognitive impairment alongside their other medical conditions and to prompt appropriate referral and follow up after they leave hospital."

Quality and Outcomes Framework

The Quality and Outcomes Framework (QOF) of the general practice contract has included several indicators relating to dementia¹³⁴:

- 2009-2011:
 - DEM 1. The practice can produce a register of patients diagnosed with dementia (5 points)
 - DEM 2. The percentage of patients diagnosed with dementia whose care has been reviewed in the previous 15 months (15 points)
- 2011-2012: DEM 3¹³⁵. The percentage of patients with a new diagnosis of dementia from 1 April 2011 to have FBC, calcium, glucose, renal and liver function, thyroid function tests, serum vitamin B12 and folate levels recorded 6 months before or after entering on to the register.
- 2012-2013: DEM4¹³⁶. The percentage of patients with a new diagnosis of dementia recorded between the preceding 1 April to 31 March with a record of FBC, calcium, glucose, renal and liver function, thyroid function tests, serum vitamin B12 and folate levels recorded 6 months before or after entering on to the register .

For the first time, the 2012-2013 QOF includes osteoporosis indicators relating to the secondary prevention of fragility fractures¹³⁶ :

- OST1. The practice can produce a register of patients:
 1. Aged 50-74 years with a record of a fragility fracture after 1 April 2012 and a diagnosis of osteoporosis confirmed on DXA scan, and
 2. Aged 75 years and over with a record of a fragility fracture after 1 April 2012
- OST2. The percentage of patients aged between 50 and 74 years, with a fragility fracture, in whom osteoporosis is confirmed on DXA scan, who are currently treated with an appropriate bone-sparing agent
- OST3. The percentage of patients aged 75 years and over with a fragility fracture, who are currently treated with an appropriate bone-sparing agent

Accordingly, the existing QOF dementia registers serve to identify a group of individuals at high risk of suffering falls and fragility fractures. Creation of Local Enhanced Service (LES)¹³⁷ arrangements could provide a stimulus to improve assessment of dementia sufferers for falls and fracture risk. Conversely, the new indicators relating to fragility fracture sufferers will provide a registry of patients amongst whom a high prevalence of undiagnosed dementia may be evident.



5 Action plan

The following section provides the reader with a framework, that is based upon the well tested Plan-Do-Study-Act methodology¹³⁸ for continuous quality improvement, to develop specific new models of care to integrate dementia, falls and fractures care.

5.1 Development of healthcare delivery using Plan-Do-Study-Act (PDSA) Methodology

Rapid cycle process improvement methods have underpinned successful healthcare quality improvement programmes throughout the world. Rapid cycle process improvement methods are widely applied in the industrial sector. The method involves execution of sequential Plan-Do-Study-Act (PDSA) cycles. The steps of the PDSA cycle are illustrated below:

- Plan
 - Conduct baseline audit to establish care gap
 - Design prototype pathway to close the management gap
 - Engage healthcare commissioners to fund pilot phase
- Do
 - Implement prototype pathway
 - Collect audit data throughout pilot phase
- Study
 - Analyse improvement in provision of care from audit
 - Refine prototype pathway to improve performance
- Act
 - Implement changes and monitor performance improvement
 - Repeat PDSA cycle through continuous ongoing audit and review

5.2 Pathway integration

Preparatory work prior to an integrated approach becoming operational

A significant number of health and social care professionals are involved in the care of sufferers of dementia, falls and fractures. Development of integrated approaches requires establishment of a multi-disciplinary stakeholder group from the outset. This group is likely to include:

- General Hospital NHS Trust staff:
 - Lead Clinician for Dementia
 - Lead Clinician for Falls
 - Lead Clinician for Osteoporosis
 - Consultant Geriatrician or Ortho-geriatrician
 - Consultant in Emergency Medicine
 - Relevant specialist nurses, physiotherapists and other Allied Healthcare Professionals
 - Older people and/or trauma services business manager
 - Consultant Neurologist and/or Parkinson's Lead
- Mental Health NHS Trust staff:
 - Lead Clinician for Dementia
 - Lead for falls and fractures
 - Lead Clinician and/or Specialist Nurse for Liaison Psychiatry Services
 - Lead for the Community Mental Health Team
 - Relevant Allied Healthcare Professionals
- Primary Care Organisations:
 - Lead for Mental Health
 - Lead for Older People's Services
 - GP with Specialist Interest in Dementia
 - GP with Specialist Interest in Falls
 - GP with Specialist Interest in Osteoporosis
 - Quality, Innovation, Productivity and Prevention (QIPP) Director
 - Head of Medicines Management
- Older people and trauma service commissioners
- Patient representatives:
 - Local Alzheimer's society representative
 - Local National Osteoporosis Society Representative
 - Local Age UK representative
- Director of Adult Social Services
- Director of Public Health
- Local Ambulance Service representative
- Community Service representative

Use PDSA methodology to plan initial pathway integration and continuous improvement

- Plan
 - Identify the aspects of care in specific settings that are to be targeted for improvement e.g.:
 - Hospitals:** Integrate falls and fractures assessment into dementia care pathway and cognitive assessment into falls and fractures pathways
 - Care Homes:** Reduce unnecessary polypharmacy amongst residents with a known diagnosis of dementia and ensure falls and fractures assessment is offered to residents who have attended hospital as a result of a fall or fracture
 - Memory Services:**
 - Management of symptomatic orthostatic hypotension, autonomic symptoms and depression
 - Conduct initial medicines use review to reduce polypharmacy and the incidence of drug-drug interactions that contribute to an increased risk of falls
 - Falls and fracture risk assessments and interventions which includes treatment for osteoporosis and encouragement of physical activity in individuals who do not have significantly impaired gait and balance
 - Primary Care:**
 - Develop strategy to ensure that individuals recorded on GPs' Quality and Outcomes Framework (QOF) dementia registries are referred into local falls and fragility fracture prevention services
 - In light of inclusion of secondary fracture prevention indicators in the 2012-2013 QOF, a strategy could be developed that would ensure appropriate referral of patients on the practice fragility fracture registry into local memory services
 - Conduct baseline audit to establish care gap
 - Hospitals:**
 - What percentage of older patients presenting to hospital with a known diagnosis of dementia, during the last 3 months, have been referred to local falls and fragility fracture prevention services?
 - What percentage of older patients presenting to hospital as a result of a fall or fragility fracture, during the last 3 months, have undergone cognitive assessment and referral into local memory services if appropriate?
 - Care Homes:**
 - What proportion of residents with a known diagnosis of dementia have undergone a Medicines Use Review in the last 6 months to reduce unnecessary polypharmacy that may increase the risk of falls?
 - What proportion of residents that have attended hospital, during the last 3 months, as a result of an injurious fall or fragility fracture have undergone cognitive assessment and referral into local memory services if appropriate?
 - Memory Services:**
 - What proportion of patients with a new diagnosis of dementia required management of symptomatic orthostatic hypotension, autonomic symptoms and/or depression
 - What proportion of patients with a new diagnosis of dementia had an initial Medicines Use Review to reduce polypharmacy and the incidence of drug-drug interactions conducted by memory service personnel?
 - What proportion of patients with a new diagnosis of dementia had falls and fracture risk assessments and interventions delivered by memory service personnel?

Primary Care:

- What proportion of individuals recorded on GPs' Quality and Outcomes Framework (QOF) dementia registries have been referred into local falls and fragility fracture prevention services
- What proportion of older patients on GPs' QOF fragility fracture registries have undergone cognitive assessment and referral into local memory services if appropriate?
- Design prototype integrated pathways or strategies to improve service quality
 - Write specific aims and objectives for the service improvement initiatives
 - Identify roles and responsibilities for patient case-finding, referral mechanisms and assessment
 - Agree Draft protocols with all members of the multi-disciplinary strategy group
- Develop the business case
- Engage all relevant hospital, care services and primary care commissioners to fund pilot phase of initiative
- Do
 - Implement prototype service model
 - Collect audit data throughout pilot phase
- Study
 - Analyse improvement in provision of care from audit
 - Refine prototype pathway to improve performance
- Act
 - Implement changes and monitor performance improvement
 - Repeat PDSA cycle through continuous ongoing audit and review

Issues to consider when pathway integration is operational

The PDSA model of continuous quality improvement aims to embed the practice of continuous review and evolution of new service structures. The issues that will likely be subject to ongoing consideration once a new model of care is operational would include:

- Effectiveness of case-finding mechanisms
- Effectiveness of referral mechanisms between local dementia services and falls and fracture prevention teams
- Communication with patients
 - Evaluate effectiveness of delivery of information regarding lifestyle advice and modifications
 - Evaluate delivery of treatment recommendations to patients – verbal and written
- Adherence and persistence with medication
 - Consider options for regular contact with patients to review compliance with therapy
- Communication between hospital specialities
- Communication with Primary care
 - Ongoing evaluation of response to letters sent to GPs including information on:
 - Assessments conducted
 - Risk factors
 - Blood results
 - Suitable treatment and non-pharmacological interventions
 - Maintain appropriate communication relating to ongoing Medicines Use Review in light of QOF requirement for reviews to be conducted every 15 months
- Conduct audit of new service model at a pre-agreed time interval for presentation to all members of multi-disciplinary stakeholder group
- Ongoing assessment of the cost-effectiveness of the new service model with a view to share with local/regional/national QIPP Leads

6 Summary and Conclusions

6. Summary and conclusions

During the last decade, significant energy and resources have been invested by the Departments of Health of the constituent nations of the United Kingdom to improve the care of patients with dementia, falls and fractures. National dementia strategies have been developed for each of the four nations which all call for good quality early diagnosis and intervention for all^{2, 25, 34, 39}. Similarly, governments have developed policies and implementation strategies that aim to reduce the incidence of falls and fragility fractures^{3, 17, 29, 36, 42}.

A significant overlap exists between sufferers of dementia and older people at high risk of fractures and injury through falling. However, the evidence reviewed in sections 2 and 3 of this document, which consider the rationale for integration across dementia, falls and fractures pathways and current standards of care, could be summarised as follows:

Persons with dementia suffer more falls, more fractures and higher post-fracture mortality than those without dementia, yet they are under-assessed for falls risk factors and are less likely to receive treatment for osteoporosis.

Falls and fracture patients have a high prevalence of dementia and cognitive impairment, yet do not routinely receive cognitive assessment and, consequently, frequently miss an opportunity for a diagnosis of dementia to be made.

Consideration of the epidemiology of dementia, falls and fractures puts into context the opportunity presented by integration of falls and fracture risk assessment into dementia care pathways, and, conversely, dementia assessment into falls and fracture care pathways. There are estimated to be 820,000 people living with dementia in the UK⁴⁷. Two-thirds of dementia sufferers are likely to experience a fall every year⁸; thus, in excess of half a million of these individuals could be falling annually, which will inevitably result in a substantial number of presentations to urgent care services. Conversely, data from 1999 reported that almost 650,000 fall-related Emergency Department attendances occur annually in the UK amongst persons aged >60 years⁴⁸. Just over a quarter of individuals aged >65 years that present to hospital with a fall are cognitively impaired⁶³. This suggests that at least 169,000 such individuals are likely to be presenting to UK hospitals as a result of a fall every year. An opportunity to improve dementia diagnosis rates and reduce the incidence of injurious falls and fragility fractures on this scale can no longer be missed.

The key challenge facing health services across the UK in this regard is to develop robust mechanisms which ensure that when cognitively impaired patients present with a fall or fracture, they are referred into local dementia services. And, conversely, when dementia sufferers interact with local dementia services that assessment for falls and fracture risk is routinely undertaken, with referral to local services with the expertise to minimise future falls and fracture risk.

Section 4 of this document reviews established and innovative new models of care that have been designed, to varying extents, to deliver an integrated approach to dementia, falls and fractures. Examples are provided in a range of settings:

Acute care:

- Dementia identification by Ambulance Services: The Great Western Ambulance Service has improved dementia awareness amongst their crews so that hospital staff are appropriately briefed on admission^{113, 114}.
- Dementia Intensive Support Teams: Norfolk and Waveney Mental Health NHS Foundation Trust has recruited nursing staff to case-find individuals whose dementia was the underlying cause of their admission to hospital or likely to increase length of stay¹¹⁷⁻¹¹⁹.
- The National Hip Fracture Database: From 1st April 2012, the Best Practice Tariff (BPT) for hip fracture care in England included a new mandatory criterion; pre- and post-operative cognitive assessment must be conducted if the hospital is to be eligible for the BPT payment uplift⁴⁴.

Nursing home care:

- Strategies to reduce polypharmacy in care homes: The STAR Toolkit (Stop, Think Assess, Review) implemented countywide in Cornwall focuses on reduction in the use of inappropriate medications in care homes¹¹⁵.
- Assigning dementia professionals to the falls pathway: In Suffolk, a mental health nurse has been appointed specifically to improve knowledge and understanding of dementia and the risk of falling amongst staff in 50 nursing homes across the county^{120, 121}.
- Staff-oriented intervention to reduce falls in nursing homes: A pre- and post- intervention study conducted in Belgian nursing homes evaluated multi-faceted training of nursing home staff¹²². The intervention led to a 50% reduction in the number of participants experiencing a fall.

Memory services:

- Falls and fracture risk assessment in memory services: The opportunity for integration of falls and fracture risk assessments into memory services protocols is considered.

Innovative integrated approaches:

- The CARPE DEM Model: Towards an “ideal” dementia care pathway?: This award winning programme, whose development received financial support from Novartis, attempts to ensure that dementia sufferers do not ‘fall between the cracks’^{126, 127}. CARPE DEM highlights falls and fracture patients as a key group that should be targeted for improved dementia assessment.

Clearly, a growing number of clinicians and commissioners of services across the NHS have recognised the potential for integration of services focused on dementia, falls and fractures.

Throughout the remainder of the current decade, the pressure to improve quality and reduce costs will be ever-present as the deadlines for achievement of efficiency savings loom¹²⁵. Implementation of innovative strategies will play a central role in delivering those efficiency savings. Integrated approaches to dementia, falls and fractures are aligned to the Quality, Innovation, Productivity and Prevention agenda, and could play a vital role in improving the care of our older people.

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References

1. **The Global Coalition on Aging.** Welcome to the Global Coalition on Aging. <http://www.globalcoalitiononaging.com/v1/>. Accessed 15 March 2012.
2. **Department of Health.** Living well with dementia: A National Dementia Strategy. In: Department of Health, ed; 2009.
3. **Department of Health.** Falls and fractures: Effective interventions in health and social care. In: Department of Health, ed; 2009.
4. **NHS The information centre for health and social care.** Hospital Episode Statistics 2009-10. <http://www.hesonline.org.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=192>. Accessed 15 March 2012.
5. **NHS National Services Scotland.** Scottish Hip Fracture Audit Rehabilitation Report 2007. 2007.
6. **Baker NL, Cook MN, Arrighi HM, Bullock R.** Hip fracture risk and subsequent mortality among Alzheimer's disease patients in the United Kingdom, 1988-2007. *Age and Ageing*. 2011;40(1):49-54.
7. **Mitchell PJ.** Fracture Liaison Services: A systematic approach to secondary fracture prevention. *Osteoporosis Review* 2009;17(1):14-16.
8. **Allan LM, Ballard CG, Rowan EN, Kenny RA.** Incidence and prediction of falls in dementia: a prospective study in older people. *PLoS One*. 2009;4(5):e5521.
9. **Haasum Y, Fastbom J, Fratiglioni L, Johnell K.** Undertreatment of osteoporosis in persons with dementia? A population-based study. *Osteoporosis International*. 2011.
10. **Department of Health.** Quality outcomes for people with dementia: Building on the work of the National Dementia Strategy. In: Department of Health, ed; 2010.
11. **National Institute for Health and Clinical Excellence.** Donepezil, galantamine, rivastigmine and memantine for the treatment of Alzheimer's disease. Review of NICE technology appraisal guidance 111. NICE technology appraisal guidance 217. 2011.
12. **National Institute for Health and Clinical Excellence.** Quality Standard for Dementia 2010.
13. **National Institute for Health and Clinical Excellence.** Dementia: Supporting people with dementia and their carers in health and social care. Clinical Guideline 42. 2006.
14. **Department of Health and NHS Finance Performance and Operations.** The Operating Framework for the NHS in England 2011/12. In: Department of Health, ed; 2010.
15. **Department of Health.** The Operating Framework for the NHS in England 2012-13. London; 2011.
16. **Department of Health.** Using the Commissioning for Quality and Innovation (CQUIN) payment framework: Guidance on new national goals for 2012-13. In: Department of Health, ed; 2012.
17. **Department of Health.** The national service framework for older people. In: Department of Health, ed; 2001.
18. **National Institute for Health and Clinical Excellence.** Hip fracture: The management of hip fracture in adults. NICE Clinical Guideline 124. 2011.
19. **National Institute for Health and Clinical Excellence.** Alendronate, etidronate, risedronate, raloxifene, strontium ranelate and teriparatide for the secondary prevention of osteoporotic fragility fractures in postmenopausal women. NICE technology appraisal guidance 161 (amended). 2011.
20. **National Institute for Health and Clinical Excellence.** Alendronate, etidronate, risedronate, raloxifene and strontium ranelate for the primary prevention of osteoporotic fragility fractures in postmenopausal women. NICE technology appraisal guidance 160 (amended). 2011.
21. **National Institute for Health and Clinical Excellence.** Denosumab for the prevention of osteoporotic fractures in postmenopausal women: NICE Technology Appraisal Guidance 204. 2010.
22. **National Institute for Health and Clinical Excellence.** Falls: the assessment and prevention of falls in older people. Clinical guideline 21. 2004.
23. **The Scottish Government.** Standards of Care for Dementia in Scotland: Action to support the change programme, Scotland's National Dementia Strategy; 2011.
24. **The Scottish Government.** Promoting Excellence: A framework for all health and social services staff working with people with dementia, their families and carers; 2011.
25. **The Scottish Government.** Scotland's National Dementia Strategy; 2010.
26. **Scottish Intercollegiate Guidelines Network.** Management of patients with dementia: A national clinical guideline. SIGN 86. 2006.
27. **NHS Scotland.** NHS Scotland Local Delivery Plan Guidance 2011-12; 2010.
28. **The Scottish Government.** NHSScotland Local Delivery Plan: Guidance 2012/13: 4 HEAT targets & standards. <http://www.scotland.gov.uk/Publications/2011/12/15095906/5>. Accessed 15 March 2012.
29. **NHS Quality Improvement Scotland.** Up and About: Pathways for the prevention and management of falls and fragility fractures 2010.
30. **Scottish Intercollegiate Guidelines Network.** Management of hip fracture in older people: A national clinical guideline. SIGN 111 2009.
31. **Scottish Intercollegiate Guidelines Network.** Management of osteoporosis: A national clinical guideline. SIGN 71. 2003.
32. **McLellan AR.** Making Scotland Europe's first country to provide routine post-fracture assessment for secondary prevention of osteoporotic fractures: an achievable goal. In: Mitchell PJ, ed; 2009.
33. **Healthcare Improvement Scotland.** NICE Guidance and Scotland. http://healthcareimprovementscotland.org/programmes/nice_guidance_and_scotland.aspx. Accessed 15 March 2012.
34. **Welsh Assembly Government and Alzheimer's Society.** National Dementia Vision for Wales: Dementia Supportive Communities; 2011.
35. **Welsh Assembly Government and Alzheimer's Society.** National Dementia Action Plan for Wales; 2009.
36. **Welsh Assembly Government.** National Service Framework for Older People in Wales; 2006.
37. **Hart E. Speech:** "Developing and Improving Services for Dementia Sufferers in Wales". <http://www.wales.nhs.uk/news/18719>. Accessed 15 March 2012.
38. **Healthcare Inspectorate Wales, Care and Social Services Inspectorate Wales.** Growing old my way: A review of the Impact of the National Service Framework (NSF) for Older People in Wales. Caerphilly; 2012.
39. **Department of Health Social Services and Public Safety.** Improving Dementia Services in Northern Ireland: A Regional Strategy. Belfast; 2011.
40. **Clinical Resource Efficiency Support Team.** Guidance on the Prevention and Treatment of Osteoporosis 2001.
41. **Northern Health and Social Services Board.** Ringing the changes: A strategy for older people; 2002.
42. **The Fragility Fracture Working Group.** The Prevention and Management of Fragility Fractures in Northern Ireland 2009.
43. **British Orthopaedic Association, British Geriatrics Society.** The care of patients with fragility fracture 2007.
44. **British Orthopaedic Association, British Geriatrics Society, Healthcare Quality Improvement Partnership.** The National Hip Fracture Database. <http://www.nhfd.co.uk/>. Accessed 15 March 2012.
45. **NHS Scotland.** The Scottish Hip Fracture Audit. <http://www.shfa.scot.nhs.uk/>. Accessed 15 March 2012.
46. **Healthcare Quality Improvement Partnership, Central Cardiac Audit Database.** Myocardial Ischaemia National Audit Project. <http://www.hqip.org.uk/myocardial-ischaemia-national-audit-project-minap/>. Accessed 15 March 2012.
47. **Health Economics Research Centre, University of Oxford, for the Alzheimer's Trust.** Dementia2010: The economic burden of dementia and associated research funding in the United Kingdom 2010.
48. **Scuffham P, Chaplin S, Legood R.** Incidence and costs of unintentional falls in older people in the United Kingdom. *Journal of Epidemiology and Community Health*. September 1, 2003 2003;57(9):740-744.
49. **National Osteoporosis Society.** 25th Anniversary Report - A fragile future 2011.
50. **Ballard CG.** Alzheimer's Society Press release: Improving diagnosis rates. http://alzheimers.org.uk/site/scripts/press_article.php?pressReleaseID=638. Accessed 15 March 2012.
51. **Alzheimer's Society.** Counting the cost: Caring for people with dementia on hospital wards. 2009.

52. **Voisin T, Sourdet S, Cantet C, Andrieu S, Vellas B.** Descriptive analysis of hospitalizations of patients with Alzheimer's disease: a two-year prospective study of 686 patients from the REAL.FR study. *Journal of Nutrition Health and Aging.* 2009;13(10):890-892.
53. **Harlein J, Dassen T, Halfens RJG, Heinze C.** Fall risk factors in older people with dementia or cognitive impairment: a systematic review. *Journal of Advanced Nursing.* 2009;65(5):922-933.
54. **Wood BH, Bilclough JA, Bowron A, Walker RW.** Incidence and prediction of falls in Parkinson's disease: a prospective multidisciplinary study. *Journal of Neurology, Neurosurgery and Psychiatry.* 2002;72(6):721-725.
55. **Sterke CS, van Beeck EF, der Velde N, et al.** New Insights: Dose-Response Relationship Between Psychotropic Drugs and Falls: A Study in Nursing Home Residents With Dementia. *Journal of Clinical Pharmacology.* 2011.
56. **van Leuven K.** Psychotropic Medications and Falls in Older Adults. *Journal of Psychosocial Nursing and Mental Health Services.* 2010;48(9):35-43.
57. **Ruscini JM.** The Merck Manual for Healthcare Professionals: Drug therapy in the elderly: Introduction. <http://www.merckmanuals.com/professional/sec24/ch363/ch363a.html>. Accessed 15 March 2012.
58. **Multidisciplinary Medication Management Project.** Top ten dangerous drug interactions in long-term care. <http://www.drugdanger.com/Elderly/4-12-14DrugInteractions.htm>. Accessed 15 March 2012.
59. **Kim DH, Brown RT, Ding EL, Kiel DP, Berry SD.** Dementia medications and risk of falls, syncope, and related adverse events: meta-analysis of randomized controlled trials. *Journal of the American Geriatrics Society.* 2011;59:1919-1031.
60. **Natalwala A, Potluri R, Uppal H, Heun R.** Reasons for hospital admissions in dementia patients in Birmingham, UK, during 2002-2007. *Dementia and Geriatric Cognitive Disorders.* 2008;26:499-505.
61. **Malone DC, McLaughlin TP, Wahl PM, et al.** Burden of Alzheimer's disease and association with negative health outcomes. *American Journal of Managed Care.* 2009;15(8):481-488.
62. **Huybrechts KF, Rothman KJ, Silliman RA, Brookhart MA, Schneeweiss S.** Risk of death and hospital admission for major medical events after initiation of psychotropic medications in older adults admitted to nursing homes. *Canadian Medical Association Journal.* 2011;183(7):E411-419.
63. **Davies AJ, Kenny RA.** Falls presenting to the accident and emergency department: types of presentation and risk factor profile. *Age and Ageing.* 1996;25(5):362-366.
64. **Bloch F, Jegou D, Dhainaut J-F, et al.** Do ED staffs have a role to play in the prevention of repeat falls in elderly patients? *American Journal of Emergency Medicine.* 2009;27(3):303-307.
65. **Seitz DP, Adunuri N, Gill SS, Rochon PA.** Prevalence of Dementia and Cognitive Impairment Among Older Adults With Hip Fractures. *Journal of the American Medical Directors Association.* Mar 7 2011.
66. **Tysiewicz-Dudek M, Pietraszkiewicz F, Drozdowska B.** Alzheimer's disease and osteoporosis: common risk factors or one condition predisposing to the other? *Ortopedia Traumatologia Rehabilitacja.* 2008;10(4):315-323.
67. **Patel MS, Eleftheriou F.** The new field of neuroskeletal biology. *Calcified Tissue International.* 2007;80(337-347).
68. **Loskutova N, Honea RA, Brooks WM, Burns JM.** Reduced Limbic and Hypothalamic Volumes Correlate with Bone Density in Early Alzheimer's Disease. *Journal of Alzheimer's Disease.* 2010;20(1):313-322.
69. **Liu-Ambrose TY, Ashe MC, Graf P, Beattie BL, Khan KM.** Increased risk of falling in older community-dwelling women with mild cognitive impairment. *Physical Therapy.* 2008;88(12):1482-1491.
70. **Gleason CE, Gangnon RE, Fischer BL, Mahoney JE.** Increased risk for falling associated with subtle cognitive impairment: secondary analysis of a randomized clinical trial. *Dementia and Geriatric Cognitive Disorders.* 2009;27:557-563.
71. **Camicoli R, Majumdar SR.** Relationship between mild cognitive impairment and falls in older people with and without Parkinson's disease: 1-Year Prospective Cohort Study. *Gait & Posture.* 2010;32(1):87-91.
72. **Henderson C, Malley J, Knapp M.** Maintaining good health for older people with dementia who experience fractured neck of femur: Report for Phase 2. 2007.
73. **The Comptroller and Auditor General - National Audit Office.** Improving dementia services in England - an interim report. 2010.
74. **Department of Health.** Fracture prevention services: an economic evaluation. 2009.
75. **National Osteoporosis Society.** Fracture Liaison Services: QIPP: Quality, Innovation, Productivity and Prevention. <http://www.nos.org.uk/page.aspx?pid=986&srcid=240>. Accessed 15 March 2012.
76. **Royal College of Psychiatrists.** What is the National Audit of Dementia? <http://www.rcpsych.ac.uk/quality/quality,accreditationaudit/nationalauditofdementia1.aspx>. Accessed 15 March 2012.
77. **Royal College of Psychiatrists, Royal College of Physicians, British Geriatrics Society, et al.** Report of the National Audit of Dementia Care in General Hospitals 2011. 2010.
78. **Morse A.** Statement on "Improving dementia services in England - an interim report". http://www.nao.org.uk/publications/0910/improving_dementia_services.aspx. Accessed 15 March 2012.
79. **Royal College of Physicians' Clinical Effectiveness and Evaluation Unit.** Falling standards, broken promises: Report of the national audit of falls and bone health in older people 2010. 2011.
80. **British Orthopaedic Association, British Geriatrics Society, Healthcare Quality Improvement Partnership.** The National Hip Fracture Database: National Report 2011. 2011.
81. **British Orthopaedic Association, British Geriatrics Society, Healthcare Quality Improvement Partnership.** The National Hip Fracture Database: National Report 2010. 2010.
82. **Hodkinson HM.** Evaluation of a mental test score for assessment of mental impairment in the elderly. *Age and Ageing.* Nov 1972;1(4):233-238.
83. **Gleason LJ, Menzies IB, Mendleson DA, Kates SL.** A Call for Improvement: Diagnosis and Treatment of Osteoporosis in Patients with Dementia Prior to Hip Fracture. *Journal of the American Geriatrics Society.* 2011;59(Supplement 1):S201.
84. **Memory Services National Accreditation Programme (MSNAP).** Standards for Memory Services Assessment and Diagnosis. 2010.
85. **Royal College of Psychiatrists.** Forgetful but not forgotten: Assessment and aspects of treatment of people with dementia by a specialist old age psychiatry service. 2005.
86. **Folstein MF, Folstein SE, McHugh PR.** "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research.* Nov 1975;12(3):189-198.
87. **Upadhyaya AK, Rajagopal M, Gale TM.** The Six Item Cognitive Impairment Test (6-CIT) as a screening test for dementia: comparison with Mini-Mental State Examination (MMSE). *Current Aging Science.* Jul 2010;3(2):138-142.
88. **Brodsky H, Pond D, Kemp NM, et al.** The GPCOG: a new screening test for dementia designed for general practice. *Journal of the American Geriatrics Society.* Mar 2002;50(3):530-534.
89. **Solomon PR, Pendlebury WW.** Recognition of Alzheimer's disease: the 7 Minute Screen. *Family Medicine.* Apr 1998;30(4):265-271.
90. **Mitchell AJ, Malladi S.** Screening and case finding tools for the detection of dementia. Part I: evidence-based meta-analysis of multidomain tests. *American Journal of Geriatric Psychiatry.* Sep 2010;18(9):759-782.
91. **Borson S, Scanlan J, Brush M, Vitaliano P, Dokmak A.** The mini-cog: a cognitive 'vital signs' measure for dementia screening in multi-lingual elderly. *International Journal of Geriatric Psychiatry.* Nov 2000;15(11):1021-1027.
92. **Diniz BS, Yassuda MS, Nunes PV, Radanovic M, Forlenza OV.** Mini-mental State Examination performance in mild cognitive impairment subtypes. *International Psychogeriatrics.* Aug 2007;19(4):647-656.
93. **Panel on Prevention of Falls in Older Persons, American Geriatrics Society and British Geriatrics Society.** Summary of the Updated American Geriatrics Society/British Geriatrics Society clinical practice guideline for prevention of falls in older persons. *Journal of the American Geriatrics Society.* Jan 2011;59(1):148-157.
94. **National Institute for Health and Clinical Excellence.** Bisphosphonates (alendronate, etidronate, risedronate), selective oestrogen receptor modulators (raloxifene) and parathyroid hormone (teriparatide) for the secondary prevention of osteoporotic fragility fractures in postmenopausal women. Technology appraisal guidance 87. 2005.
95. **World Health Organization Collaborating Centre for Metabolic Bone Diseases, University of Sheffield UK.** FRAX® WHO Fracture Risk Assessment Tool. 2011.
96. **National Institute for Health and Clinical Excellence.** Osteoporosis fragility fracture risk <http://guidance.nice.org.uk/CG/Wave25/2>. Accessed 15 March 2012.

97. **Holmes J.** Liaison old age psychiatry. *Psychiatry*. 2008;7(2):55-57.
98. **Hughes CP.** The development of a nurse-led liaison mental health service for older people in Chesterfield, Derbyshire, UK. *Journal of Psychiatric and Mental Health Nursing*. Sep 2008;15(7):595-604.
99. **Hirst J, Oldknow H.** Rapid access for older people to a specialist mental health services. *Nursing Times*. Feb 24-Mar 2 2009;105(7):12-13.
100. **Jolley D, Benbow SM, Grizzell M.** Memory clinics. *Postgraduate Medical Journal*. Mar 2006;82(965):199-206.
101. **Jolley D, Moniz-Cook E.** Memory clinics in context. *Indian Journal of Psychiatry*. Jan 2009;51 Suppl 1:S70-76.
102. **Banerjee S, Willis R, Matthews D, Contell F, Chan J, Murray J.** Improving the quality of care for mild to moderate dementia: an evaluation of the Croydon Memory Service Model. *International Journal of Geriatric Psychiatry*. Aug 2007;22(8):782-788.
103. **Banerjee S, Wittenberg R.** Clinical and cost effectiveness of services for early diagnosis and intervention in dementia. *International Journal of Geriatric Psychiatry*. Jul 2009;24(7):748-754.
104. **Jolley D, Greaves N, Greening L.** Three tiers for a comprehensive regional memory service. *Journal of Dementia Care*. January/February 2010 2010;18(1):26-29.
105. **McLellan A, Gallacher S, Fraser M, McQuillan C.** The fracture liaison service: success of a program for the evaluation and management of patients with osteoporotic fracture. *Osteoporosis International*. 2003;14(12):1028-1034.
106. **Gallacher S.** Setting up an osteoporosis fracture liaison service: background and potential outcomes. *Best Practice & Research Clinical Rheumatology*. 2005;19(6):1081-1094.
107. **Clunie G, Stephenson S.** Implementing and running a fracture liaison service: An integrated clinical service providing a comprehensive bone health assessment at the point of fracture management. *Journal of Orthopaedic Nursing*. 2008;12:156-162.
108. **McLellan AR, Wolowacz SE, Zimovetz EA, et al.** Fracture liaison services for the evaluation and management of patients with osteoporotic fracture: a cost-effectiveness evaluation based on data collected over 8 years of service provision. *Osteoporosis International*. Jul 2011;22(7):2083-2098.
109. **Cooper C, Mitchell P, Kanis JA.** Breaking the fragility fracture cycle. *Osteoporosis International*. Jul 2011;22(7):2049-2050.
110. **Close JC, Ellis M, Hooper R, Glucksman E, Jackson S, Swift C.** Prevention of falls in the elderly trial (PROFET): a randomised controlled trial. *The Lancet*. 1999;353:93-97.
111. **Snooks HA, Halter M, Close JC, Cheung WY, Moore F, Roberts SE.** Emergency care of older people who fall: a missed opportunity. *Quality and Safety in Health Care*. Dec 2006;15(6):390-392.
112. **Newton JL, Kyle P, Liversidge P, Robinson G, Wilton K, Reeve P.** The costs of falls in the community to the North East Ambulance Service. *Emerg Medicine Journal*. Jun 2006;23(6):479-481.
113. **Dementia Care News.** Great Western Ambulance Service: Initiatives in Dementia Identification. <http://dementianews.wordpress.com/2011/01/19/great-western-ambulance-service-initiatives-in-dementia-identification/>. Accessed 15 March 2012.
114. **South West Dementia Partnership.** Dementia: An introductory guide for ambulance clinicians; 2010.
115. **Department of Health.** Living well with dementia: a National Dementia Strategy - good practice compendium; 2011.
116. **NHS Confederation.** Acute awareness: improving hospital care for people with dementia 2010.
117. **American Society of Registered Nurses.** Plan To Make Hospital Stays Better. *Journal of Nursing*. 2010.
118. **BBC News.** Norfolk nurses hired to spot early signs of dementia. <http://www.bbc.co.uk/news/uk-england-norfolk-14012709>. Accessed 15 March 2012.
119. **NHS Norfolk.** New Dementia Intensive Support Teams. <http://www.norfolk.nhs.uk/new-dementia-intensive-support-teams>. Accessed 15 March 2012.
120. **Jarrold D.** Did he fall or was he pushed? The unfinished business of falls and fragility fractures. NHS East of England Strategic Health Authority and the Eastern Development Centre. Hilton Hotel, Stansted. 29 September 2010 [https://www.eoe.nhs.uk/downloadFile.php?doc_url=1286192994_WzLR_falls_and_dementia.pdf]. Accessed 15 March 2012.
121. **Suffolk Mental Health Partnership NHS Trust.** New dementia nurse tasked with helping reduce falls. <http://www.smhp.nhs.uk/News/PressReleases/Pressreleasenewdementiafallsnurse.aspx>. Accessed 15 March 2012.
122. **Bouwen A, De Lepeleire J, Buntinx F.** Rate of accidental falls in institutionalised older people with and without cognitive impairment halved as a result of a staff-oriented intervention. *Age & Ageing*. May 2008;37(3):306-310.
123. **Whitehead CH, Harding S, Giles LC, Crotty M.** Establishment of and first 20 months of operating an outreach geriatric clinic in a regional centre. *Rural and Remote Health*. Jan-Mar 2006;6(1):444.
124. **Sato Y, Kanoko T, Satoh K, Iwamoto J.** The prevention of hip fracture with risedronate and ergocalciferol plus calcium supplementation in elderly women with Alzheimer disease: a randomized controlled trial. *Archives of Internal Medicine*. Aug 8-22 2005;165(15):1737-1742.
125. **Department of Health. Quality, Innovation, Productivity and Prevention (QIPP).** <http://www.dh.gov.uk/en/Healthcare/Qualityandproductivity/QIPP/index.htm>. Accessed 15 March 2012.
126. **Jones GMM, van der Eerden WJ.** The CARPE DEM Model (Care for Every Person with Dementia). Towards an ideal dementia care pathway? Poster. 2010.
127. **Jones GMM, van der Eerden WJ.** The CARPE DEM Model (Care for Every Person with Dementia). Towards an ideal dementia care pathway? Toolkit. 2010.
128. **Department of Health. Developing Payment by Results for mental health.** http://www.dh.gov.uk/en/Managingyourorganisation/NHSFinancialReforms/DH_4137762. Accessed 15 March 2012.
129. **Alexander R, Calderwood B.** Letter to PCT, Mental Health Trust and Foundation Trust Chief Executives, Directors of Adult Social Services, Mental Health, PCT and SHA Directors of Finance, SHA Directors of Commissioning and SHA Mental Health Leads from Bob Alexander, Director of NHS Finance, and Bruce Calderwood, Director of Mental Health Policy, provides an update on the latest developments on Payment by Results (PbR) for Mental Health services for working age adults and older people, as well as confirming the timescales for its implementation. 2nd June 2011. Department of Health Gateway Reference 16162; 2011.
130. **Department of Health.** Herald Fractures: Clinical burden of disease and financial impact; 2010.
131. **NHS South West Essex.** NHS South West Essex project on polypharmacy for people with dementia. 2011.
132. **Department of Health.** Using the Commissioning for Quality and Innovation (CQUIN) payment framework. http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_091443. Accessed 15 March 2012.
133. **NHS Institute for Innovation and Improvement.** Commissioning for Quality and Innovation (CQUIN) payment framework: A set of exemplar CQUIN goals 2010.
134. **National Institute for Health and Clinical Excellence.** NM09 Briefing Paper to the committee on dementia 2011.
135. **National Institute for Health and Clinical Excellence.** NICE menu of indicators: NM09 QOF ID: DEM3. http://www.nice.org.uk/aboutnice/qof/indicators_detail.jsp?summary=13076. Accessed 15 March 2012.
136. **British Medical Association, NHS Employers.** Quality and Outcomes Framework for 2012/13: Guidance for PCOs and practices. London 2012.
137. **Department of Health.** Enhanced Services; 2011.
138. **Berwick DM.** Developing and testing changes in delivery of care. *Annals of Internal Medicine*. Apr 15 1998;128(8):651-656.



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