



FALL PREVENTION INTERVENTIONS

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Fall Prevention

Introduction

NHS Ashton, Leigh and Wigan asked HM Partnerships to conduct a desk review of evidence based fall prevention interventions.

In order to ensure the review was based on robust evidence, we identified peer reviews, articles and journals containing the most relevant interventions, and aimed to present a variety of different delivery methods aiming at reduction in falls.

The summary below contains information taken from:

- National Osteoporosis Society
- Department of Health – Fracture Prevention services – an economic evaluation
- Department of Health – Falls and Fractures: Exercise training to prevent falls
- NICE guidelines – Falls: The assessment and prevention of falls in older people
- Department of Health – Falls and Fractures: Effective interventions in health and social care
- The Cochrane Collaboration – Population-based interventions for the prevention of fall-related injuries in older people (Review)
- Knowledge Exchange Network – Information Package for Evidence –Informed Interventions: Effective falls prevention interventions for community dwelling seniors
- Key meeting with Sue Doyle, Kate Steen (21.03.11)

Costs of Falls

One in two women and one in five men over the age of 50 in the UK will fracture a bone, mainly as a result of poor bone health. The cause of the disease is still not fully understood but research continues to build up a picture of the factors that influence bone health. The combined cost of hospital and social care for patients with a hip fracture amounts to more than £2.3bn per year in the UK.

NICE guidance and population modeling states that an area with a population of 300,000, may include approximately 45,000 people over the age of 65. Within this figure, it is estimated that 15,500 will fall each year, with a figure of 6,700 of people who will fall twice or more a year. The modeling also states that 2,200 of these fallers will attend A&E department or a minor injuries unit, 1,100 will sustain a fracture and 360 of these will be to the hip.¹

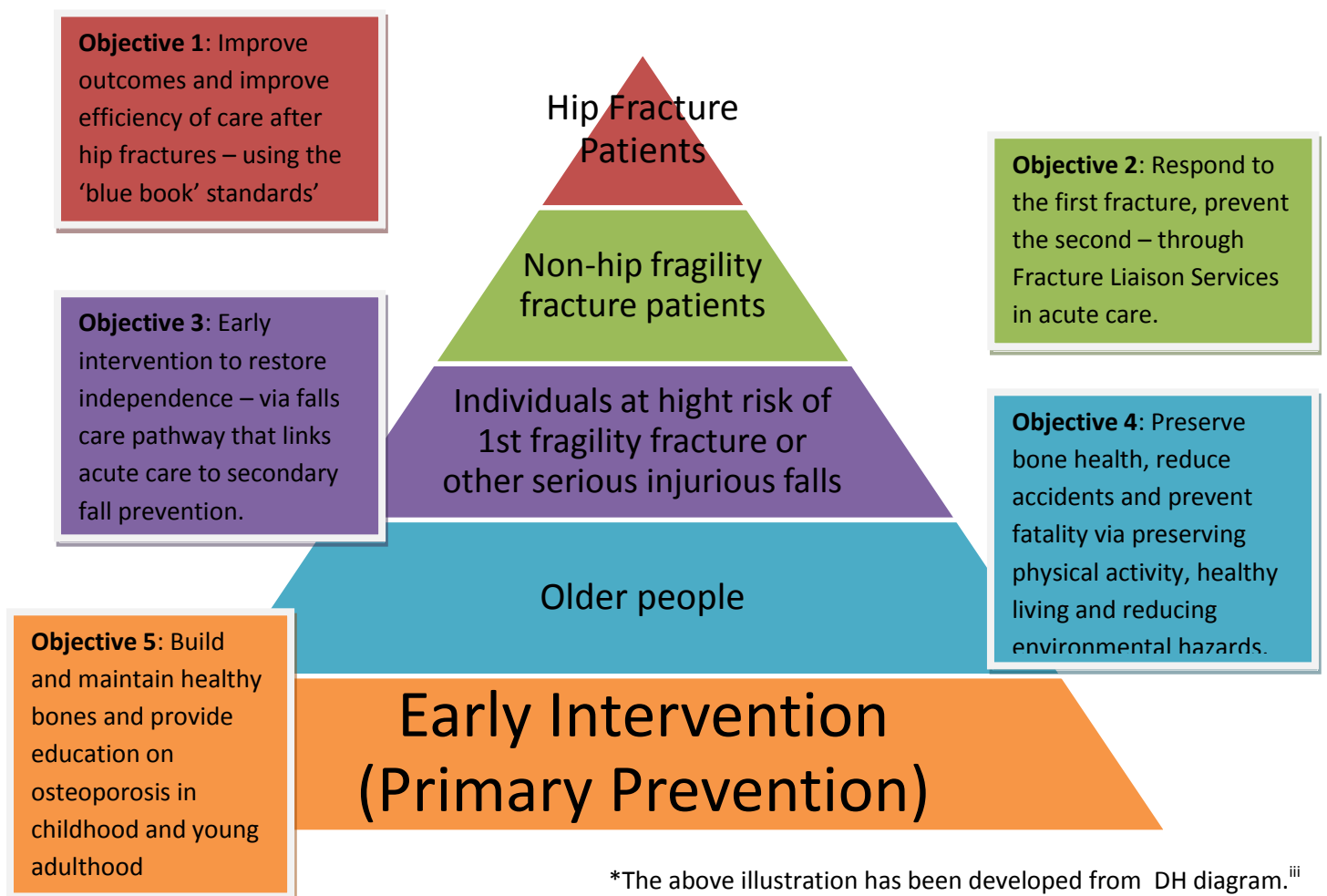
According to the DH report; Falls and Fractures – Effective interventions in health and social care, the direct cost to the commissioner of a hip fracture is £10,000, attributed to NHS costs, with extra costs attributable to the Local Authority for social care.

Population based approaches, such as promotion of the risks relating to falls, and early education on bone health will involve some initial investment, but should deliver significant cost savings relating to reduction in impact on primary care services in the short and longer term. Interventions such bone health training, early identification and social marketing resources / signposting materials are cost effective and could be supported from a number of partners.

Falls and Fracture Interventions

The risk factors for falls have been classified into two types, intrinsic and extrinsic factors. Extrinsic are the social and physical factors that relate to the environment and are therefore external to individuals, they can include obstacles, slippery surfaces, poor lighting and ill fitting or poor footwear. The intrinsic risk factors can be described across the life course from childhood lifestyle and education intervention, through to the time in life when one’s ability to cope with the extrinsic factors is compromised. This decline starts in early adulthood, but can be reduced through appropriate interventions and the effects of a fall decreased, across the life course, most notably through appropriate diet and physical activity interventions at an early age.ⁱⁱ

Approach to Falls and Fracture Prevention



Early Intervention (Primary Prevention)

Bone health is mostly dependant on genetics, and the genes inherited from parents and osteoporosis is four times more common in women than in men. However there are many factors that increase the likelihood of developing osteoporosis these include:

- Being female
- Being thin or having a small frame
- Advanced age
- Being post-menopausal
- Having an abnormal absence of menstrual periods (amenorrhea)
- Eating disorders such as anorexia or bulimia
- A low-calcium diet
- Low testosterone levels (men)
- An inactive lifestyle
- Cigarette smoking
- Excessive alcohol use

Therefore making the right lifestyle choices early in life can prevent, or reduce the impact of osteoporosis in later in life.

Lifestyle Interventions

Early awareness is considered essential in curbing the incidence of osteoporosis. It is important that children start learning about their bones from an early age; the earlier children start making healthy dietary and lifestyle choices, the better the chance of preventing osteoporosis becoming a disease of future generations.^{iv} Pre-teens and teenagers make lifestyle choices which affect their risk to later disease including osteoporosis. Bone mass can be increased between the ages of seven and twelve years and this translates to a reduced risk of osteoporosis later in life.

Case Study 1

National Osteoporosis Society (NOS): the national curriculum makes the teaching of bone health compulsory to young people. The NOS have developed a range of resources for teachers and those involved in the education of young people to help make bone health fun and engaging. The charity has created a new education website that is designed to support the teaching and learning of bone health in primary schools. Bones4life.org is an invaluable tool for teachers, parents and children. The children's section of the website has been specifically designed to appeal to ages 7 -11 and includes games, quizzes and picture galleries which incorporate vital health messages in a fun form. The adult section hosts a variety of resources including lesson plans, video and music

Numerous studies conclude that daily, moderate physical activity increases bone mass and density and is therefore important across the life course. Practising exercise at a young age helps maximise the mineral density of bones while they are still growing and maturing, and continuing to exercise in later life minimises bone loss. Not only does exercise improve bone health, it also increases muscle strength, coordination, balance, flexibility and leads to better overall health. Walking, aerobic exercise, and t'ai chi are the best forms of exercise to stimulate bone formation and strengthen the muscles that help support bones. Encouraging physical activity at all ages is therefore a top priority to prevent osteoporosis^v

Studies have demonstrated that 'active women had a 55% lower risk of hip fracture compared with sedentary women. Even women with a lower risk of hip fracture due to higher body weight experienced a further reduction in risk with higher levels of activity. Among women who did no other exercise, walking for at least 4 h/wk was associated with a 41% lower risk of hip fracture compared with less than 1 h/wk'.^{vi}

Recommendations to build and maintain healthy bones in an attempt to reduce the risk of osteoporosis and consequently falls and fractures include:

- Undertaking weight bearing exercise at least 3 times a week (20 minutes per session minimum). Engaging in vigorous, weight-bearing exercise such as walking, jogging, aerobics or dancing for 30-60 minutes at a time, three to five days a week is recommended for optimal results.
- Having a healthy and balanced diet, rich in calcium. Calcium intake is crucial during childhood, adolescence and early adulthood to help build the densest bones possible," (Singapore Nutrition and Dietetics Association).
- Exposure to sun 3-4 times a week between May – September (this allows the body to produce enough Vitamin D, which ensures absorption of calcium in diet)
- Avoiding smoking
- Drinking alcohol in moderation only.^{vii}

Population based Strategies

Population based strategies have shown to reduce fall related injuries, by encouraging physical activity, provision of exercise sessions, literature relating to hazards in the home, medication reviews and environmental changes have all impacted on the decrease.^{viii} It is important to note that these types of awareness raising campaigns can have relative successes over the wider population.

The National Osteoporosis Society published an awareness raising report in 2008 entitled '*Your bones and Osteoporosis: What every man, woman and child should know*'. This report found that awareness of this disease in the 18-24 age group was very limited, a worry considering the fact that bone strength is largely determined by the time an individual reaches 30 years old. Further awareness raising amongst this age group could potentially impact massively on the outcomes of fall prevention programmes and care pathways in the future.

Older People

There are some significant differences in the effectiveness of interventions dependant on age and existing signs of frailty, Wolf *et al.* 1996^{ix} states that in over 65s with poor strength and balance, modified Tai Chi appeared to be the most effective as a preventative group exercise. However in those over 70 with some signs of frailty, the modified Tai Chi was not beneficial in reducing falls.^x

The Department of Health (DH) state in their document; Falls and fractures- Exercise Training to Prevent Falls, that 'despite considerable evidence that exercise is a key component of a multi-factorial fall prevention intervention, some exercise-only interventions have shown little or no effect on falls risk despite improvements in known risk factors.' They conclude that individualised exercise interventions with balance training as the core of the programme are the most effective for those at risk of falls, this also includes those with significant risk of fracture.

The prescription of exercise to an older individual should vary depending on a number of factors:

- History of falls
- Medical history
- Functional capacity.

There will also be differences in terms of the exercises being prescribed, relating to prevention of first falls, and exercise to manage falls.^{xi}

Case Study 2

Devon the County Council and NHS developed a resource designed to address some of the risks in the home to reduce the chance of falls. The resource asks questions such as 'Have you had an eyesight test in the past year?' and 'Do your feet require attention?', this offers opportunity to signpost to other relevant existing services, that may reduce a person's risk of a fall in their home.^{xii} The pack also contains questions and prompts relating to information about lifestyles.

Case Study 3

In Denmark, a study targeted community dwellings, elderly men and women who were over 65 years old. The intervention involved information and resources, and home visits by Nurses. The home visits consisted of hazard and risk identification, the leaflets and information focused on physical hazard identification, diet insufficiency, inactivity, and many other risk factors for fallers. The results showed a 14% reduction in the number of fractures found in the intervention group.^{xiii}

Case Study 4

The 'Stay on Your Feet' campaign in New South Wales, Australia was a multi-strategic intervention including awareness raising, community education, policy development, home hazard reduction, media campaigns, and partner working with clinicians and other health professionals.^{xiv} A follow up found that there was a 22% non significant lower incidence of self reported falls within the intervention group when compared with controls.

Individuals with Higher Risk

The peer reviewed evidence demonstrates that fracture rates can be reduced by 50% by timely identification of osteoporosis and the treatment that follows. The way to ensure that a patient within primary care is identified as at risk or of already developing osteoporosis is by a Fracture Liaison Service (FLS), these are most commonly linked to hospitals. They make assessments and recommend the most suitable treatment options for this high risk population.

International work aimed at populations with high risk of falls, include a programme taking place in New Zealand, and another in Australia.

Case Study 5

The New Zealand intervention was based around a home exercise programme called OTAGO, this was aimed at women 80+ and those who had a high risk of falls. The exercise programme was taught to participants in their own homes by physiotherapists, the comparison was made with those individuals who received social visits as a control.^{xv} The exercise programs were individually tailored and included warm up, muscle strength and balance training, they were prescribed to be carried out three times a week. Walking was encouraged, up to 30 minutes at the individuals own pace, two-three times a week. The results showed that those within the exercise group had a significantly lower rate of falls.^{xvi}

Case Study 6

A fall prevention intervention programme in Australia involved 15 weeks of group based exercise, further trials were carried out extending the programme to 12 months. The findings demonstrated that those aged 65+ with some impairments in lower limb strength, poor balance or slow reaction time, had 40% lower rate of falls than those not taking part in group based exercise.^{xvii}

Case Study 7

Programmes in the UK found similar results, with group based exercise sessions over a 9 month period, this was complimented by twice weekly home exercise. This intervention demonstrated a reduction in risk of frequent fallers by half, it also found that participants had lower mortality and morbidity at 3 years follow up.^{xviii}

Key priorities for implementation of Bone Health Awareness and Falls Risk Reduction

The table below illustrates the number of key and recommended priorities for implementation of interventions according to NICE in their Assessment and prevention of falls in older people.^{xix}

Population and Primary Prevention	<ul style="list-style-type: none"> • Take a life course approach to combating / limiting Osteoporosis • Education at an early age to highlight dangers of osteoporosis in later life and strategies to reduce it's impact • Exercise interventions from 7 years + • Diet rich in vitamins and minerals and in particular calcium • Smoking prevention
Case/risk identification	<ul style="list-style-type: none"> • Older people in contact with healthcare professionals should be asked routinely if they have had a fall in the past 12 months, and asked about the context and frequency if they have fallen. • Older people reporting a fall or at risk of falling should be observed for balance and gait deficits and consideration given to their ability to benefit from interventions to improve strength and balance.
Multifactorial falls risk assessment	<ul style="list-style-type: none"> • Older people who seek medical attention due to a fall, should be offered a multifactorial falls risk assessment performed by healthcare professionals. <p>These assessments may include:</p> <ul style="list-style-type: none"> • Identification of falls history • Assessment of gait, balance, mobility and muscle weakness • Assessment of Osteoporosis risk • Assessment of the older persons perceived functional ability and fear relating to falling • Assessment of visual impairment • Assessment of cognitive impairment and neurological examination • Assessment of urinary incontinence • Assessment of home hazards • Cardiovascular examination and medical review
Multifactorial Interventions	<p>All those at risk of recurrent falls should be considered for an individualised multifactorial intervention.</p> <p>Successful multi-factorial interventions programmes should have the following components:</p> <ul style="list-style-type: none"> • Strength and balance training • Home hazard assessment and intervention • Vision assessment and referral • Medication review with modification/withdrawal
Encouraging the participation of older	<p>Those at risk and their carers should be offered information orally and in writing about the measures they can take to prevent further falls.</p>

people in falls prevention programmes including education and information giving.	
Professional education	ALL healthcare professionals dealing with patients known to be at risk of falls should develop and maintain basic professional competence in falls assessment and prevention.

Current / Potential Delivery in Wigan

Current pathways for identification and treatment of people at risk or with falls in Wigan are extremely comprehensive. However the falls pathway does not currently cover/highlight primary prevention in relation to bone health and there are opportunities to build bone health into existing prevention services, especially delivering training to front line staff / service delivery.

Key support from prevention services would include

1. Any contact services have with older people should consider falls prevention and identification. All staff therefore should receive brief intervention training relating to falls and the current services in the borough
2. All front line staff should receive clear and consistent information allowing appropriate signposting of contacts to falls services. This would not just be for older people but also adults / carers
3. Front line staff working one to one with adult clients and with access to a computer (health trainers, exercise referral, smoking cessation, dieticians etc) should be introduced to FRAX and encouraged to support their client to conduct a FRAX assessment.
4. Osteoporosis Training package (www.bones4life.org) on bone health currently delivered to some schools and sixth form colleges should be rolled out and offered to all schools and sixth forms
5. Easy to understand map of prevention and treatment services available for all health professionals
6. Consider developing or sourcing an e-learning package on bone health and falls prevention for front line staff in local authority and NHS

Existing Service	Existing delivery	Additional Action to Support Falls Prev / Bone health
Falls Prevention	Active Living staff work closely with Health Professionals, including the Hospital Falls Prevention teams (Wigan and Leigh), with direct and re-referrals when and if needed. Other referrers include GPs, Physio's, Practice / District Nurses, other Health Professionals, Older People's services	Already have strong links. Train staff in conducting / Promoting FRAX with clients to support appropriate identification and referral of those at high risk Targets can be included in service specs for staff receiving training and numbers of onward referrals
Bridge Builders	The aim of the project is to improve access to physical and creative activities in order to improve MH and WB.	Train staff in bone health brief interventions using existing training package delivered in schools/sixth forms

Active Living Referral	The Activity Referral Scheme is designed to help people improve their health and quality of life. It's a course of physical activity recommended by Health Professionals such as a possible alternative to taking medication or having medical treatment. It also provides the physical activity component of the NHS Find & Treat	<p>Train staff in conducting / Promoting FRAX with appropriate clients to support appropriate identification and referral of those at high risk</p> <p>Train staff in bone health brief interventions using existing training package delivered in schools/sixth forms</p> <p>Targets can be included in service specs for staff receiving training and numbers of onward referrals</p>
Your Choice Activity programme	Introducing adults back into sport, dance general fitness.	<p>Train staff in bone health brief interventions using existing training package delivered in schools/sixth forms</p> <p>Provide marketing materials so staff can signpost appropriate individuals to falls services</p>
Sexual Health Services	Teenage Pregnancy	<p>Train staff in bone health brief interventions using existing training package delivered in schools/sixth forms</p> <p>Provide marketing materials so staff can signpost appropriate individuals to falls services</p> <p>Targets can be included in service specs for staff receiving training</p>
Smoking Cessation Services		<p>Train staff in bone health brief interventions using existing training package delivered in schools/sixth forms</p> <p>Provide marketing materials so staff can signpost appropriate individuals to falls services</p> <p>Targets can be included in service specs for staff receiving training</p>
Weight Management	Lose Weight Feel Great	<p>Train staff in bone health brief interventions using existing training package delivered in schools/sixth forms</p> <p>Provide marketing materials so staff can signpost appropriate individuals to falls services</p>
Maternity Services		<p>Train staff in bone health brief interventions using existing training package delivered in schools/sixth forms</p> <p>Provide marketing materials so staff can signpost appropriate individuals to falls services</p>
Pharmacies		Roll out of training already delivered to some pharmacies
School Nurses		Roll out of training already delivered to some pharmacies
Healthy Schools		Roll out of training already delivered to some pharmacies
Health Trainers		<p>Train staff in conducting / Promoting FRAX with appropriate clients to support appropriate identification and referral of those at high risk</p> <p>Train staff in bone health brief interventions using existing training package delivered in schools/sixth forms</p> <p>Targets can be included in service specs for staff receiving training and numbers of onward referrals</p>

Summary

The evidence reviewed demonstrates that bone health promotion is essential as part of a comprehensive falls strategy and that this needs to be addressed throughout the life course in order to prevent frailty and reduce the risk of injury from falls.

This includes the following lifestyle interventions across the life course:

- 5 x 30 minutes of exercise per week
- 60 minutes a day of weight bearing exercise for young people
- Having Calcium rich diet
- Quitting smoking if a smoker
- Maintenance of optimal body weight
- Drinking alcohol in moderation only

Other approaches to prevention of falls are:

- The targeting of home assessments where appropriate
- Regular reviews of medications by clinicians

The target groups are those most at risk including:

- Elderly
- Frail elderly
- Young females
- Smokers
- Inactive
- Those with poor diets

This brief review demonstrates that Primary prevention should be at the core of a falls prevention pathway. There is sufficient evidence to conclude that the most effective interventions in the prevention of falls include:

- Programmes to promote bone health through childhood and early adulthood
- Increased physical activity from the age of 7+
- Education across the life course, in particular targeted at young women
- Brief Intervention training for all front line staff who engage with target groups
- Population or community based programmes.^{xx}
- Identification and appropriate referral for those deemed at high risk.
- Regulation and Environmental modification
- Population-based approaches to the prevention of fall-related injury is effective and can form the basis of public health practice.^{xxi}

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- ⁱⁱ Department of Health, Falls and Fractures – Effective interventions in health and social care, 2009
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