Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

National Council on Ageing and Older People
An Chomhairle Náisiúnta um Aosú agus Daoine Aosta

Department of Health & Children
AN ROINN SLÁINTE AGUS LEANAÍ

Strategy to Prevent Falls and Fractures in Ireland's Ageing Population

Summary, Conclusions and Recommendations

June 2008

Introduction and Overview of Approach

This Strategy to Prevent Falls and Fractures in Ireland's Ageing Population was jointly prepared by the Health Service Executive, the Department of Health and Children and the National Council on Ageing and Older People.

The purpose of this Strategy is to provide an evidence based approach to facilitate the implementation of Falls and Osteoporosis Programmes. Multi-disciplinary, integrated interventions are essential to improve bone health and minimise the impact of falls.

Terms of reference were to:

- Identify the components of an evidence based Fall Prevention / Fracture Prevention strategy in an ageing population.
- Document the extent of the problem of falls and osteoporosis in Ireland, and the impact on the health service, including costs, to the health service.
- Document the services currently in place to prevent falls and promote bone health in Ireland.
- Consult with multidisciplinary stakeholders regarding the development of the integrated strategy.
- Develop a system-based, integrated model of care for those at risk of falls and poor bone health including an evaluation framework.

Electronic literature, searches on best-practice were conducted. Key groups were consulted and an assessment of current services was undertaken.

Research was conducted on:

- The health impact of fall related injuries in Ireland and internationally
- Accuracy of HIPE coding of external cause of injury
- The economic burden of fall related injuries
- Emergency Department workload due to falls
- Pharmacological prescribing of osteoporosis medication in Ireland
- Availability and utilisation of DXA facilities nationally
- Environmental aspects and safety of the built environment in preventing falls.

The complete report and technical appendices are available to download from **www.hse.ie**



Scale of the Problem of Falls and Fractures

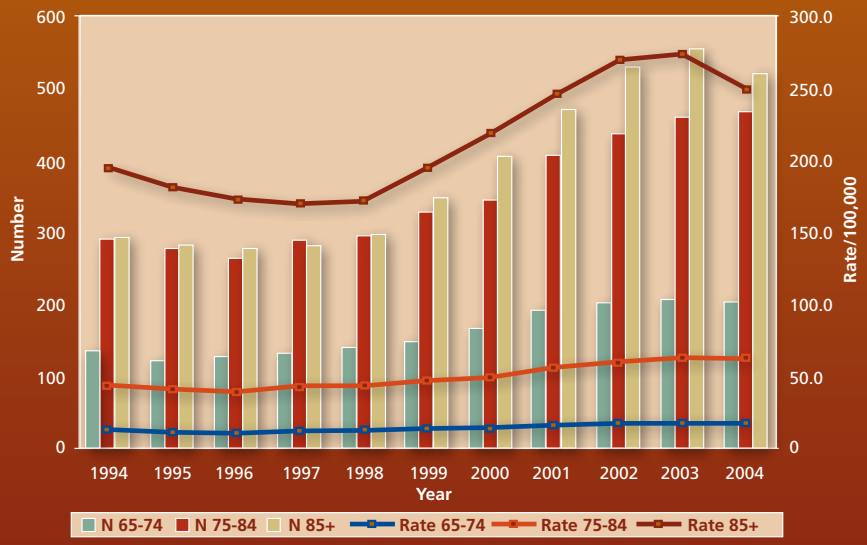
Ireland's population is ageing. Today 11% are aged 65 years or over (468,000). Within the next 25 years this will increase to 18% (to over one million people). The risk of falling increases with age. One in three older people fall every year and two-thirds of them fall again within six months. Older people are most likely to suffer serious injuries, disability, psychological consequences and death following a fall. Such injuries represent a large expenditure to the health service. Falls can be predicted and prevented.

Information from the scientific literature, European Injury Registers and Irish statistics show:

In relation to falls:

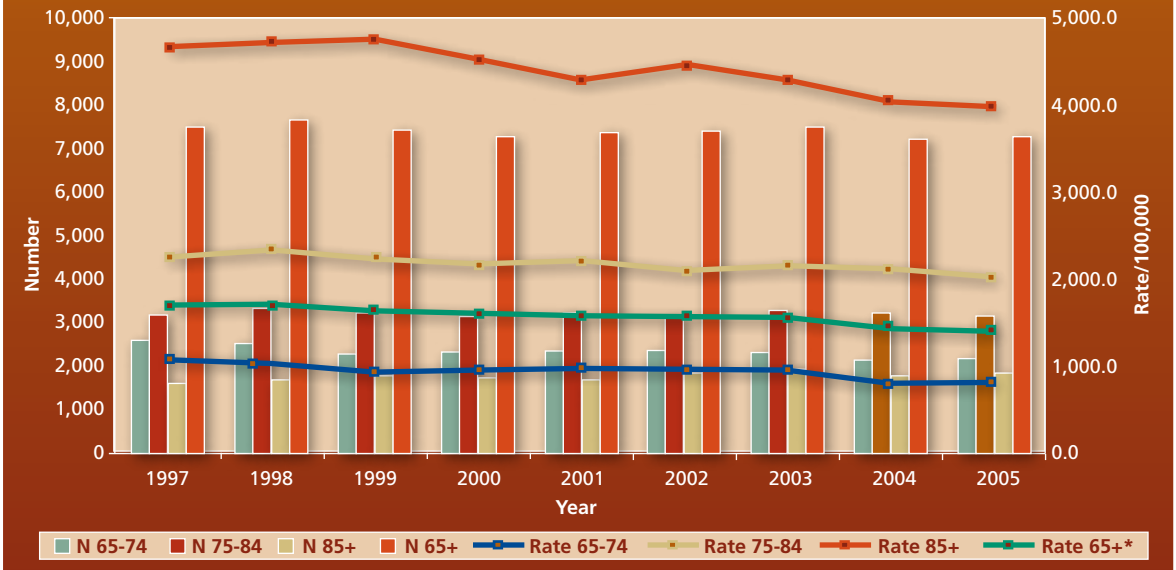
- Every year 10% of all older people need treatment following an injury. Falls cause 75% of these injuries.
- In Ireland three-quarters of all fall related deaths occur in older people (i.e. 250 deaths each year). Death rates have been increasing, (Figure 1). Fall related deaths increase with age over 65 years and they are higher in older females.
- 2-3% of all injured older people require hospital admission (over 7,000 each year). Their average length of hospital stay is 12.7 days, (Figure 2).
- Hip fractures are one of the most serious injuries due to a fall (approximately 2,800 hospital admissions each year); 80% are over 75 years of age; their length of hospital stay is 18 days; less than one-third go directly home after their hospital treatment. The inpatient cost of treating a hip fracture is €12,600.
- The inpatient cost of fall-related injury hospitalisations among older persons is currently estimated at €59 million and inpatient hip fractures cost is estimated at €35 million.
- The full picture of the impact of falls is greater than the data above indicates, as figures are not readily available from hospital emergency departments and primary care.

Figure 1
Numbers and age-specific rates for deaths due to accidental falls among people aged 65 years and over, Ireland, 1990-2004 in 5 year blocks



Year refers to the last year (e.g. 1994) of a five-year block (e.g. 1990-1994)
Accidental Falls=ICD-9 CM Codes E880-E886, E888
Data Sources: PHIS 9 and CSO

Figure 2
Numbers and age-specific rates for inpatient hospitalisations due to fall-related injuries among people aged 65 years and over, Ireland, 1997-2005



** Standardised to the WHO's European Standard Population.*
ICD-9 CM Codes 800-959 or ICD-10 AM Codes S00-T35 as principal diagnosis with ICD-9 CM Codes E800-886, E888 or ICD-10 AM Codes W00-W19 as secondary diagnosis respectively. ICD-9 CM Codes relate to 1997-2004 and ICD-10 AM Codes to 2005.
Data Source: HIPE & NPRS Unit, ESRI

In relation to bone health and osteoporosis:

Osteoporosis is the most common metabolic bone disease in Ireland.

- It is characterised by bone fragility due to low bone mass and the propensity for 'fragility fractures' – fractures that occur as a result of mechanical forces that would not usually cause a fracture e.g. from a fall in the standing position.
- One in three women and one in five men over the age of 50 years of age may have osteoporosis in Ireland. Many of them do not know they have this condition as it generally does not declare itself until the first fracture occurs.
- This means that up to 300,000 Irish people aged 50 years and over may have osteoporosis. The prevalence is rising as the population ages.
- National statistics on osteoporosis are incomplete. In 2004 there were 6,113 hospital episodes where a diagnosis of osteoporosis was recorded but this represents the 'tip of the iceberg'.

Ireland's demographic trends will have serious effect on morbidity and mortality due to fall related injuries and osteoporosis. If rates remain at current levels, then by 2031 the number of deaths and hospital admissions from fall related injuries among older people could double. This would have a huge impact on health services. However if fall related injuries could be successfully prevented on a population basis, this would result in a dramatic improvement in the health of older people.

An Economic Burden of Illness Study (BOI) of falls and fractures among people aged 65 years and over in Ireland was commissioned from The Irish Centre for Social Gerontology. This report projected costs for the next 20 years in the absence of the implementation of a National Fall and Fracture Prevention Strategy. A comprehensive Burden of Illness Study has not been previously undertaken in Ireland. The results show that, in financial terms, fall related injuries in older people currently cost €402 million to the economy. If these trends continue it is estimated that costs will escalate dramatically. By 2010 the cost will be €520 - 551 million. By 2020 the cost will be €922 - 1077 million and by 2030 the cost will be €1587 - 2043 million.

Risk Factors for Falls and Osteoporosis

Falls Risks

There are many risk factors for falling in older people. Risks can be loosely classified as:

- intrinsic (e.g. muscle weakness)
- extrinsic (e.g. medication)
- environmental (e.g. home hazards).

Some risks are more predictive of a fall than others. The most predictive intrinsic risk factors are muscle weakness, history of falls and gait/balance deficits. The most predictive extrinsic risk factors are medications and polypharmacy.

The American Geriatric Society/British Geriatric Society (AGS/BGS) guidelines, which were published in 2001, compiled a list of most common risk factors based on univariate analysis of 16 studies that examined risk factors, Figure 3.

Osteoporosis Diagnosis and Risks

Osteoporosis is defined as *"a systematic skeletal disease characterised by low bone mass and microarchictectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture".* It is estimated that:

- 55% of people aged over 50 years have low bone mass. This puts them at risk of fracture and osteoporosis.

The presence of osteoporosis can be confirmed using a DXA scan. When bone mineral density (BMD) is measured at 2.5 or more standard deviations below 'normal peak bone mass for a young woman' osteoporosis is present.

Figure 3: Fall Risk Factors: American Geriatric Society and British Geriatric Society

Risk Factor	Significant/Total*	Mean RR/OR**	Range
Muscle weakness	10/11	4.4	1.5-10.3
History of falls	12/13	3.0	1.7-7.0
Gait deficit	10/12	2.9	1.3-5.6
Balance deficit	8/11	2.9	1.6-5.4
Use assistive device	8/8	2.6	1.2-4.6
Visual deficit	6/12	2.5	1.6-3.5
Arthritis	3/7	2.4	1.9-2.9
Impaired ADL	8/9	2.3	1.5-3.1
Depression	3/6	2.2	1.7-2.5
Cognitive impairment	4/11	1.8	1.0-2.3
Age>80 years	5/8	1.7	1.1-2.5

*Number of studies with significant odds ratio or relative risk ratio in univariate analysis/total number of studies that included each factor.
**Relative risk ratios (RR) calculated for prospective studies. Odds ratios (OR) calculated for retrospective studies.

Figure 4: Osteoporosis Risks

(i) Modifiable	(ii) Non-modifiable
• Smoking • Low Calcium intake • Low Vitamin D / sunlight exposure • Sedentary lifestyle • Low body weight • Stress / depression • Surgical or drug induced hypogonadism • Glucocorticoid therapy	• Advanced age • Female gender • White / Asian race • Family history of osteoporosis • Family history of hip fracture • Metabolic disorders affecting the skeleton • Certain malignancies (myeloma, lymphoma)

- Clinical risk factors for osteoporosis are either modifiable or non-modifiable (Figure 4)
- Many factors contribute to low bone mass and osteoporotic fractures. Advanced age is the most important factor. Lower peak bone mass, increased bone loss at menopause and greater longevity all put women at greater risk than men.
- Nursing home residents are at highest risk of falls, fractures and osteoporosis. Their rate of hip fracture is 3-11 times greater than age-matched community dwelling older people.

It is possible to intervene and postpone the physical and cognitive manifestations of poor bone health. The World Health Organisation's approach to fracture risk assessment is based on the following risk factors:

- Age
- Previous fracture
- Family history of hip fracture
- Glucocorticoid use
- Current smoking
- Alcohol use > 2 units / day
- Rheumatoid arthritis.

Prevention and Intervention

Falls

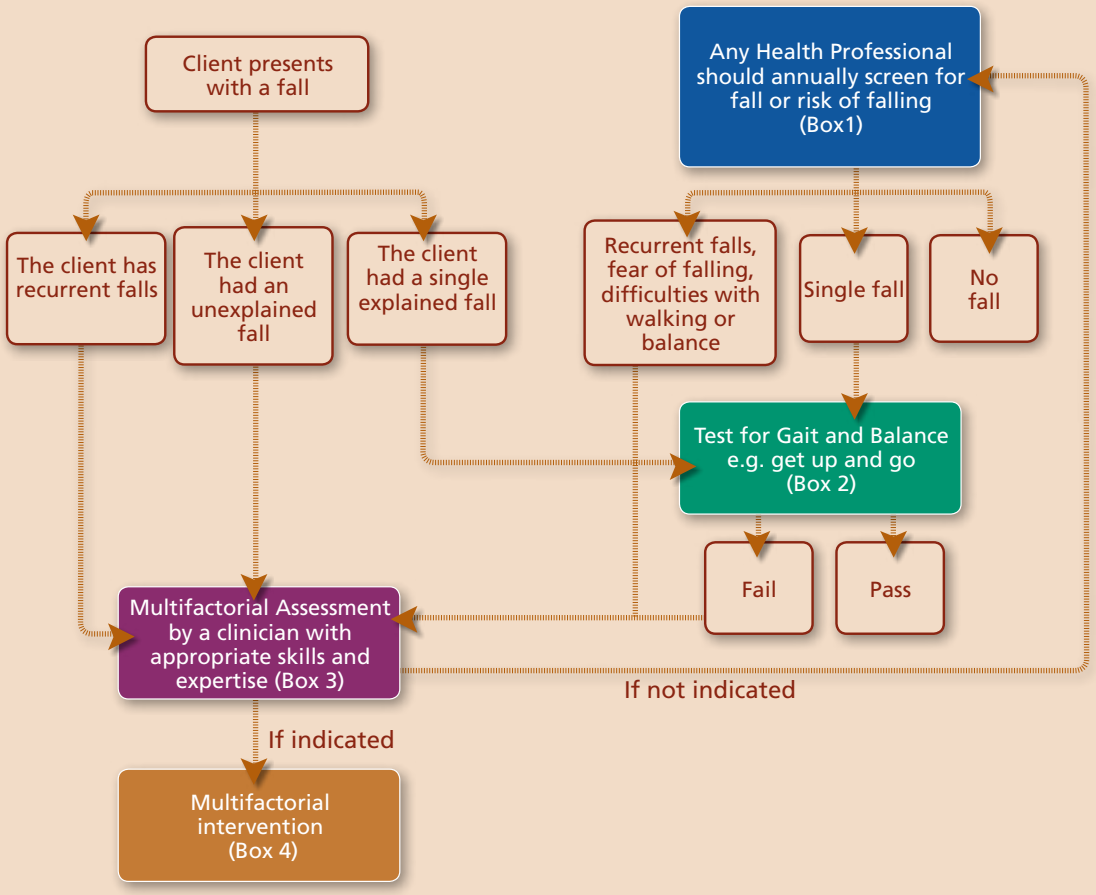
Best practice in the prevention and management of falls is based on the AGS/BGS guidelines, NICE guidelines and work carried out by Larsen. Figure 5 shows the algorithm of evidence based assessment and intervention.

- Identifying high risk people 'screening' simply involves asking a set of questions to detect who may require further assessment, Algorithm - Box 1.
- Any person who has had an unexplained fall or recurrent falls requires a multifactorial assessment and intervention as clinically indicated. A person who reports a single explained fall is tested for gait and balance.

Further assessment and intervention is in accordance with the algorithm.

- The details of the multifactorial assessment and intervention are shown in the algorithm - Boxes 2-4. The strength of evidence is presented for each intervention in the main report.
- The goal of this approach is to optimise and standardise assessment and intervention so as to reduce falls in older people. The target populations for intervention are older people living in the community and those in long-term residential care.

Figure 5: Falls Algorithm



Recurrent falls: Two or more falls in the previous year
Unexplained falls: No clear history of accidental slip or trip in cognitively normal person
Explained fall: An accidental fall (slip or trip) in cognitively normal person

Box 1

'Screen' for Fall or Risk of Falling

- The patient and/or carer is asked if the patient has fallen in the past year
- If a patient has fallen they and/or their carer are asked about the frequency and characteristics of their fall(s)
- The patient is asked if they have a fear of falling
- The patient is asked if they have experienced difficulties in walking or with their balance

Box 2

Test for Gait and Balance
Get up and go

The client is asked to do the following

- Sit in a chair
- Get up without using their arms or any other device.
- Take several steps
- Return to the chair
- Sit back down without using their arms or any device

The test should be completed within 14 seconds

Other tests with proven validity may be used.

Box 3

Mutifactorial Assessment

- Identification of falls history
- Review of medication(s) and their dose(s)
- Assessment of gait, balance and mobility and lower extremity joint function
- Assessment of endurance
- Assessment of osteoporosis risk
- Assessment of vision
- Examination of neurological function, muscle strength, proprioception, reflexes and tests of cortical, extrapyramidal and cerebellar function
- Assessment of cognitive function
- Screening for depression
- Assessment of postural blood pressure
- Assessment of heart rate and rhythm and evidence of structural heart disease
- Assessment of heart rate and blood pressure responses to carotid sinus stimulation if appropriate
- Assessment of home hazards
- Assessment of the older person's perceived functional ability and fear relating to falling
- Assessment of urinary incontinence
- Assessment of Vitamin D deficiency
- Assessment of foot problems and footwear
- Other relevant acute or chronic medical conditions e.g. osteoarthritis

Box 4

The multifactorial intervention includes assessment of known fall risk factors and management of those risk factors identified in the multifactorial assessment.

Multifactorial intervention

- Withdrawal or minimisation of psychoactive medications
- Withdrawal or minimisation of other culprit medications
- Gait, strength and balance training
- Prescription and teaching in the use of assistive devices and Occupational Therapy
- Treatment of osteoporosis
- Management of visual abnormalities
- Management of neurological disorders
- Management of cognitive impairment
- Management of depression
- Management of postural hypotension
- Management of other cardiovascular abnormalities
- Adaptation or modification of home environment
- Management of functional disability
- Management of fear of falling
- Management of urinary abnormalities
- Assessment of Vitamin D deficiency
- Management of foot problems and footwear
- Management of other relevant acute or chronic medical conditions

Osteoporosis

- Osteoporosis is a chronic illness. It should be managed in an integrated manner as part of chronic illness care programmes.

- Prevention, treatment and management require a long term approach beginning in childhood. The algorithm outlining the components of care is shown in Figure 6.

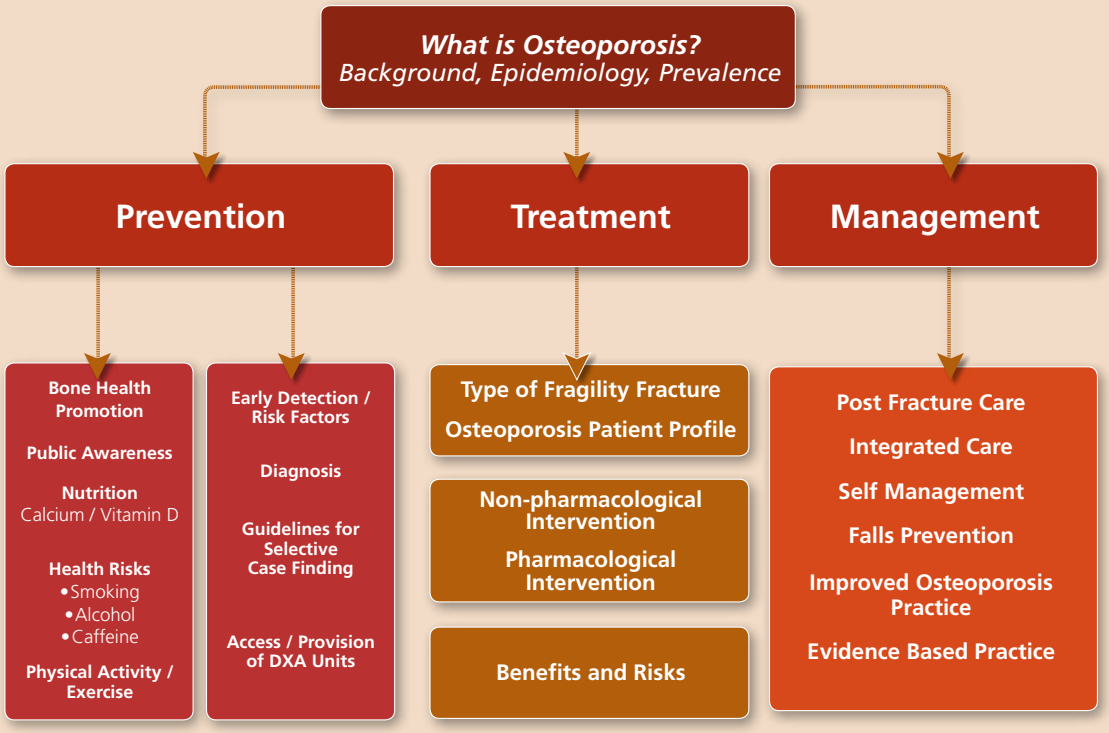
- Prevention should be life long and focus on improving awareness of bone health in particular Calcium and Vitamin D intake, the benefits of physical activity and the risks of smoking for bone health. Prevention includes health promotion and primary and secondary prevention.

- Early detection of osteoporosis is recommended on a selective case finding, based on recognised clinical risk factors e.g. previous low trauma fracture, x-ray evidence of osteopenia, long-term glucocorticoid treatment, and family history of osteoporosis. Diagnosis is made using BMD at a cut off point of 2.5 standard deviation for most people.

- Treatment includes pharmacologic and non-pharmacologic interventions. The aim of osteoporosis treatment is to prevent fracture, stabilise or increase bone mass, relieve symptoms and maximise physical function. Criteria for these interventions are described in the main report.

- Management includes post fracture care, rehabilitation and chronic illness management. Long term management and rehabilitation after a fracture should begin immediately after the acute phase. This should be undertaken by a multidisciplinary team that ensures integration of all services and addresses patient risk factors.

Figure 6: Osteoporosis Algorithm



Strategy and Implementation

The long term vision of this strategy is to improve the bone health of our ageing population and to reduce the burden of falls and fractures. This requires an interagency approach to prevention and care where all the key organisations and professions work together to achieve this aim. The key principles are to focus on prevention, HSE leadership, the use of evidence based interventions that are sustainable, provided in an equitable way and available to all. The key goals are to improve awareness of the problems caused by falls and osteoporosis, build health capacity, provide a comprehensive integrated falls and osteoporosis service and develop a safer environment. (Figure 7) Specific objectives are outlined in the main report.

Figure 7: Strategic Approach

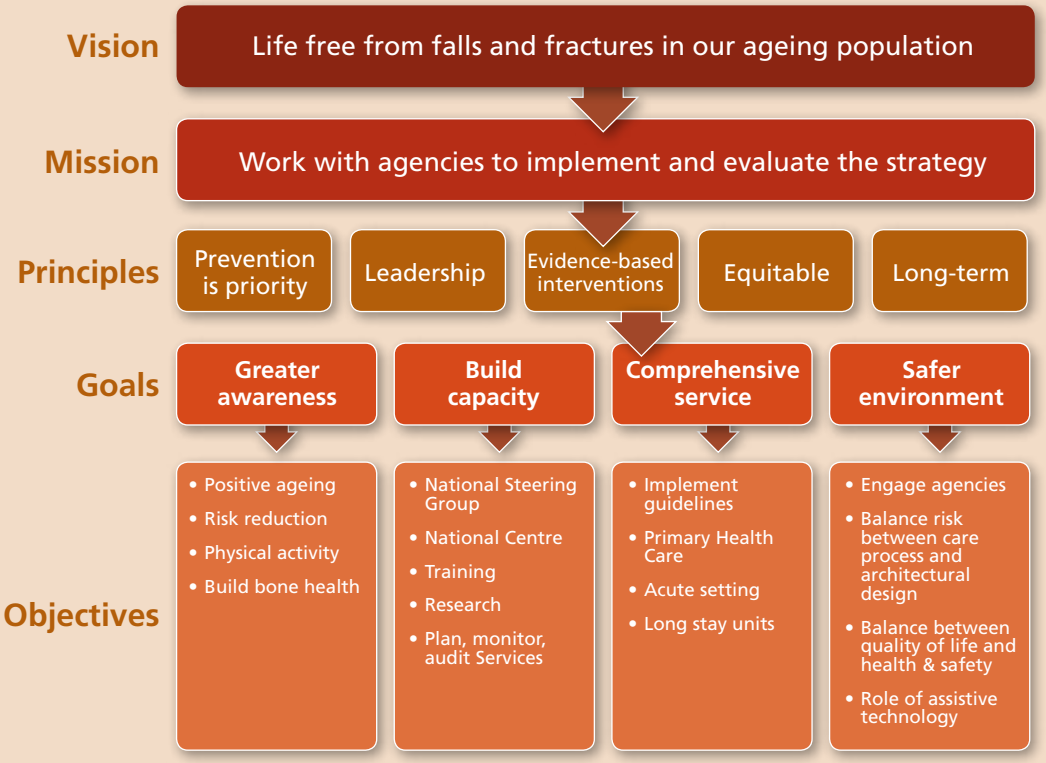


Figure 8, shows how the falls and osteoporosis service should be integrated so as to focus on patient needs and deliver good outcomes:

- A patient presenting with an unexplained fall and/or recurrent falls without fracture receives a multifactorial ***falls*** risk assessment.
- A patient who fails the opportunistic 'screening' and/or has gait and balance deficits receives a multifactorial ***falls*** risk assessment.
- A patient presenting with a fall resulting in a fracture receives both a ***falls*** risk assessment and a ***fracture*** risk assessment.
- A patient presenting with a fracture, without an unexplained fall (including asymptomatic vertebral fractures identified on radiology reports) receives a ***fracture*** risk assessment.

Following a falls assessment, a multifactorial individualised fall prevention programme is developed. Similarly, following fracture risk assessment, intervention based on clinical need is provided. Where a person has received both falls and fracture assessment, an integrated intervention will be provided as appropriate.

Today Irish people suffer unnecessarily from falls, fractures and poor bone health. Falls and fractures in our ageing population can and should be prevented:

- by the implementation of simple measures based on evidence
- through proper integrated working by health professionals and public bodies and
- by achieving greater awareness among people on how they can reduce their risks.

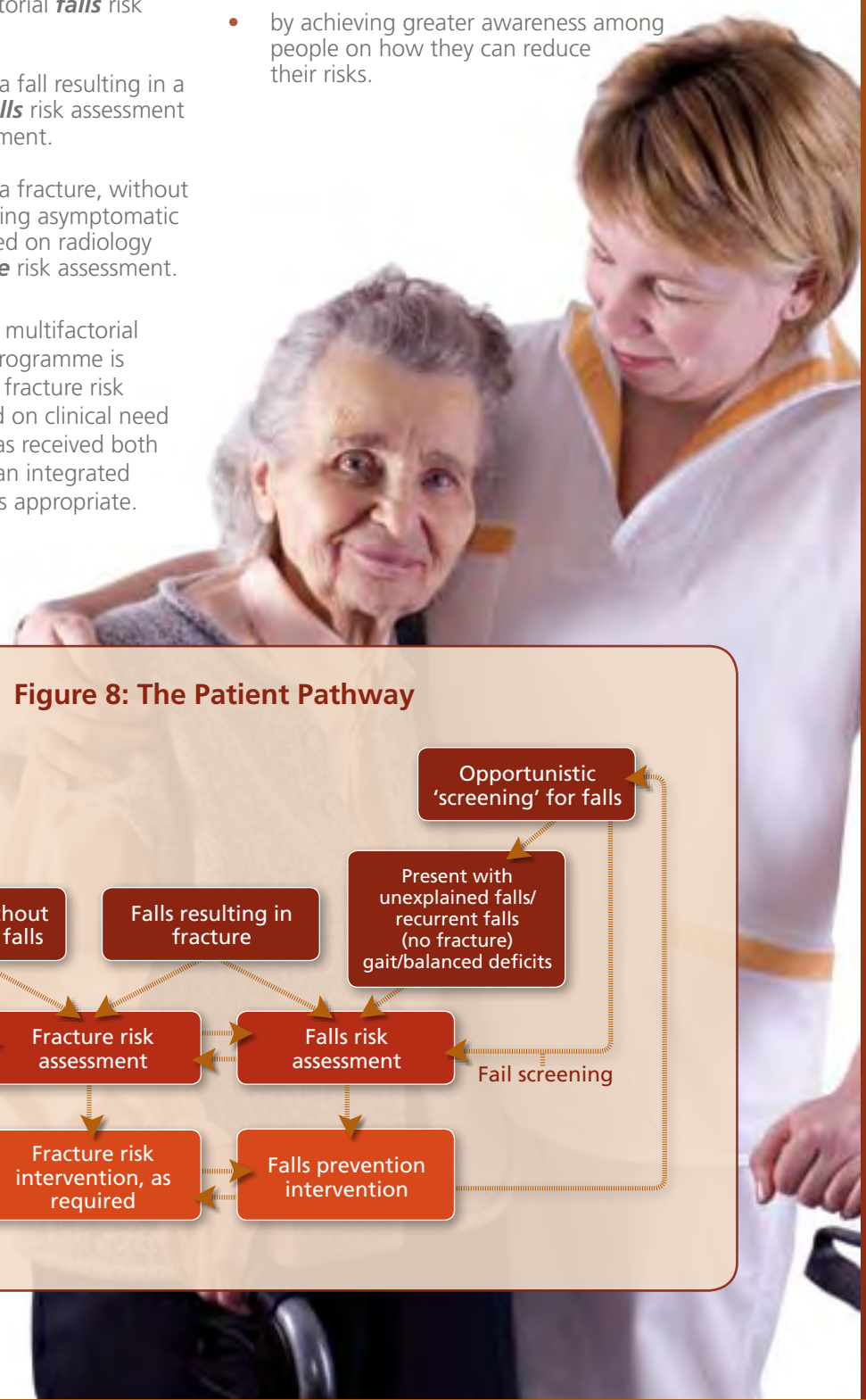


Figure 8: The Patient Pathway

Health Sevice Executive
Strategic Health Planning
Dr Steeven's Hospital
Dublin 8

Phone: +353 1 6352170
Fax: +353 1 6352103
www.hse.ie

National Council on Ageing and Older People
11th Floor
Hawkins House
Hawkins Street
Dublin 2

Phone: +353 1 6743299
Fax: +353 1 6743245
www.ncaop.ie

Department of Health and Children
Hawkins House
Hawkins Street
Dublin 2

Phone: +353 1 6354000
Fax: +353 1 6354001
www.dohc.ie

ISBN 978-1-906218-13-3

Designed by Kanvas 021 482 0800