

Strategaeth Osteoporosis a Ataliad Torasgwrn i Gymru

Strategaeth Gofal Sylfaenol i Fyrddau Iechyd Lleol

Cynhyrchwyd gan y Gymdeithas Osteoporosis Genedlaethol

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Osteoporosis and Fracture Prevention Strategy for Wales

A Primary Care Strategy
for Local Health Boards



National
Osteoporosis
Society

Produced by the National Osteoporosis Society
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Message from the Chief Medical Officer

“Osteoporosis is a very serious disease which results in 12,000 fractures in Wales each year, causing severe pain and disability to individuals at a heavy cost to the Welsh Health Service. But it is one of the few areas in which early intervention to promote and maintain bone health can make a real impact on the burden of the disease.

“I am delighted that the National Osteoporosis Society (NOS) has developed this primary care strategy for osteoporosis and fracture prevention to help inform Local Health Boards (LHBs). The Society’s ‘cradle to grave’ strategy, involving many different agencies, is an excellent example of the type of integrated approach that is likely to be successful in the long-term.”



Professor Ruth Hall
Chief Medical Officer

Message from the Minister for Health and Social Services

“This Osteoporosis and Fracture Prevention Strategy will assist and inform Local Health Boards (LHBs) working with the NHS trusts and social services to address the rising tide of osteoporotic fractures in particular, reducing bed blockage. This approach emphasises the prevention of osteoporotic fractures through the promotion of a healthy active life and the prevention and treatment of osteoporosis. The NOS strategy uses an evidence-based approach and links to national priorities, making it a wonderful example of joined-up thinking.

“By tackling osteoporosis, LHBs have a real opportunity to improve the health of their patients through adopting a systematic approach within multi-agency teams.”



Jane Hutt
Minister for Health and Social Services

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Executive summary

Key recommendations are summarised below:

- Include prevention of osteoporotic fractures in the local Health Improvement Programme (HIP).
- Equality of access for diagnosis and treatment of osteoporosis for the people of Wales.
- Identify lead clinicians in primary and secondary care to develop an osteoporosis programme based on this strategy:
 - each Local Health Board (LHB) should have a lead GP for osteoporosis, responsible for monitoring the implementation of this programme.
 - each acute Trust should have a lead consultant for osteoporosis, responsible for clinical referrals, supervision of diagnostic services and liaison with primary care.
- Establish a local osteoporosis interest group to facilitate multi-disciplinary implementation of this framework.
- Use a selective case-finding approach to target the treatment of individuals at high risk of osteoporotic fracture. This includes individuals with a history of previous fracture, frequent falls, use of oral glucocorticosteroids or other clinical risk factors.
- Provide access to adequate levels of diagnostic and specialist services; thus a LHB serving a population of 100,000 would require approximately 1,000 hip and spine DXA scans per year.
- Promote the use of care pathways and audits to improve standards of care.
- Monitor performance to assess health impact.
- Limit prescribing costs by targeting treatment at those for whom it is really necessary and by identifying those treatments inappropriately prescribed.

This strategic document sets clear standards to enable LHBs to offer a high quality osteoporosis service. LHBs may wish to adopt a stepwise approach to its implementation, identifying which of the high risk groups detailed on pages 15-19 require immediate, medium and long-term action, and targeting resources as appropriate.

Crynodeb Gweithredol

Crynohir yr argymhellion allweddol isod.

- Cynnwys ataliad toresgyrn osteoporotig yn y Rhaglen Gwelliant Iechyd Lleol.
- Sicrhau cydraddoldeb hygyrchedd diagnosis a triniaeth osteoporosis i bobl Cymru.
- Uniaethu clinigwyr arweiniol mewn gofal sylfaenol ac eilaidd i ddatblygu rhaglen osteoporosis leol yn seiliedig ar y strategaeth hon.
 - Dylai pob Bwrdd Iechyd Lleol gael Meddyg Teulu arweiniol dros osteoporosis gyda chyfrifoldeb am gadw gweithrediad y rhaglen hon dan sylw.
 - Dylai pob Ymddiriedolaeth lem gael Meddyg Ymgynghorol dros osteoporosis gyda chyfrifoldeb am ymgynghoriadau clinigol, goruchwyliad gwasanaethau diagnostig a chysylltiad â gofal sylfaenol.
- Sefydlu grwp lleol â diddordeb mewn osteoporosis i hyrwyddo gweithrediad amlddisgyblaethol y fframwaith hwn.
- Defnyddio dull dethol o ddarganfod achosion er mwyn anelu triniaeth at unigolion mewn perygl uchel. Cynnwys hyn unigolion â hanes o dorasgwrn blaenorol, cwmpiau aml neu defnydd steroidiau oral.
- Darparu hygyrchedd lefelau digonol o wasanaethau diagnostig ac arbenigol; felly byddai angen oddeutu 1,000 o archwiliadau amsugnometreg pelydr-X ynni deuol y flwyddyn ar Fwrdd Iechyd Lleol sy'n gwasanaethu poblogaeth o 100,000.
- Hyrwyddo'r defnydd o lwybrau gofal ac archwiliad i wella safonau gofal.
- Adolygu cyflawniad er mwyn asesu dylanwad ar iechyd.
- Cyfyngu costau rhagnodi trwy anelu triniaeth at y rhai sydd a'i angen ac uniaethu rheini â dderbyniast ragnodion anaddas.

Mae'r ddogfen strategol hon yn gosod safonau clir i alluogi Byrddau Iechyd Lleol i gynnig gwasanaeth osteoporosis o ansawdd uchel. Efallai y bydd Byrddau Iechyd Lleol yn dymuno mabwysiadu dull cynyddol o'i gweithredu, gan uniaethu pa fath o gleifion mewn perygl uchel sydd angen gweithrediad yn y tymor byr, canolig neu hir ac anelu adnoddau fel bo angen.

Osteoporosis and Fracture Prevention Strategy for Wales

Introduction

In *Our Healthier Nation*¹ the Secretary of State for Health highlighted the role that osteoporosis plays in causing fractures in older people, noting that, as a result of this disease, falls are a major cause of death and disability. Osteoporosis prevention was therefore included as one of the measures recommended to achieve a 20% reduction in accidents by 2010.

To facilitate progress at a local level towards achieving reductions in fracture incidence and implementation of this, the National Osteoporosis Society (NOS) has developed this osteoporosis strategy that should be implemented by Local Health Boards (LHBs). The strategy offers practical advice for commissioners and providers to enable them to benchmark their current activity on osteoporosis and to identify how to improve health by investing in appropriate osteoporosis services for a base population of 100,000.

Its recommendations arise from:

- i) an epidemiologically-based needs assessment,
- ii) the health impact that action will have on individuals and population,
- iii) a cost-effectiveness analysis,
- iv) consideration of the feasibility of implementation.

Activity stemming from this strategy can be incorporated into LHB programmes for the care of older people and for accident prevention under the local Health Improvement Programme (HIP).

Standards of service provision identified in this strategy relate to evidence-based clinical guidelines recommended by the Royal College of Physicians (RCP) (Royal College of Physicians, 1999)², (Royal College of Physicians and Bone and Tooth Society, 2000)³ incorporated into LHB programmes for the care of older people and for accident prevention under the local HIP.

Section 1

An osteoporosis framework – meeting health needs

Implementation of an osteoporosis framework offers an appropriate and effective means of improving the health and health-related quality of life for older men and women.

Health and social needs

- Osteoporotic fractures are a major cause of pain, disability and death.
- More than 12,000 osteoporotic fractures occur each year in Wales^{5.1}.
- There are over 4,200 hip fractures each year in Wales^{5.1,5.2}.
- 7% of people suffering hip fracture die in hospital within 30 days^{5.3}, and 25% die within the following year⁶.
- Half of those surviving hip fracture fail to regain their pre-fracture level of independence⁷.
- In Wales^{5.1} the care of people with hip fractures alone leads to a total cost to Health and Social Services of £84 million each year.
- Fracture incidence and resulting costs will rise by over 1% per year, simply as a consequence of the ageing of the Welsh population⁸.

Clear standards of evidence for interventions and service delivery

- Department of Health. Report: Advisory Group Report on Osteoporosis. 1994⁹.
- Audit Commission. United They Stand. HMSO 1995¹⁰.
- National Osteoporosis Society. Guidelines for the provision of a clinical bone densitometry service. 2002¹¹.
- Department of Health. Report on Health and Social Subjects 49. Nutrition and Bone Health: with particular reference to calcium and vitamin D. 1998¹².
- Department of Health. Strategy for Osteoporosis. Health Service Circular 124. 1998¹³.
- Department of Health. Local Health Action Sheet 1998¹⁴.
- Royal College of Physicians. Osteoporosis: clinical guidelines for prevention and treatment. 1999².
- Royal College of Physicians, Bone and Tooth Society of Great Britain. Osteoporosis: clinical guidelines for prevention and treatment. Update on pharmacological interventions and an algorithm for management. 2000³.

- Health Evidence Bulletin in Wales Physical Disability and Discomfort, *Osteoporosis* November 2001¹⁵.
- Royal College of Physicians, Bone and Tooth Society of Great Britain, National Osteoporosis Society. Glucocorticoid-induced osteoporosis. Guidelines for prevention and treatment, 2002¹⁶.

Present position

- Wide variations in clinical recognition of osteoporosis and related fractures.
- Wide variation in access to diagnostic and specialist services and in prescribing patterns.
- Range of therapeutic interventions now viable but concerns regarding inappropriate prescribing.
- Limited intervention among high-risk individuals to prevent future fracture¹⁷.

Proposed actions

- Identify lead clinicians in primary and secondary care to develop an osteoporosis programme based on this strategy:
 - each Local Health Board (LHB) should have a lead GP for osteoporosis responsible for monitoring the implementation of this programme.
 - each acute trust should have a lead consultant for osteoporosis, responsible for clinical referrals, supervision of diagnostic services and liaison with primary care.
- Establish a local osteoporosis interest group to facilitate multi-disciplinary implementation of this framework.
- Use a selective case-finding approach to target the treatment of individuals at high risk of osteoporotic fracture. This includes individuals with a history of previous fracture, frequent falls or use of oral glucocorticosteroids.
- Provide access to adequate levels of diagnostic and specialist services; thus a LHB serving a population of 100,000 would require approximately 1,000 hip and spine DXA scans per year.
- Promote the use of care pathways and audits to improve standards of care.
- Monitor performance to assess health impact.
- Equality of access for diagnosis and treatment of osteoporosis for the people of Wales.

Resource implications

- Population-wide primary prevention measures mainly involve health education and are relatively inexpensive.
- Bone density measurement offers good value for money to ensure appropriate prescribing: costs vary, with most falling between £30 and £60, less than the cost of three months' prescription of the least expensive second generation bisphosphonate.
- Approximately 1,000 DXA scans per year would be required for a population of 100,000 (see page 15).
- Prescribing costs are likely to increase but cost-effective interventions are available and clinical assessment with bone densitometry should be used to target treatment at those who will benefit the most.

Performance indicators

- Performance indicators in this health care area have been proposed by this strategy:
 - Incidence of fractured femur.
 - Deaths following fractured femur.
 - Rate of discharge to normal place of residence within 28 days of admission with fractured neck of femur.
 - Rate of deaths in hospital within 30 days of admission with a hip fracture for patients aged 65+.
 - Proportion of older people exhibiting high risk for osteoporotic fracture, but without any injury to their bones, referred for assessment of bone density (BMD) and offered appropriate therapeutic interventions.
- Reducing osteoporotic fractures features in the 'Opportunities and Potentials' of the Fractured Neck of Femur Collaborative, one of the Orthopaedic Services Collaborative programmes under the umbrella of the NHS Modernisation Agency:
 - All fracture patients presenting in A&E to be assessed for osteoporosis treatment.
 - All ambulatory patients residing in residential homes to be prescribed calcium and vitamin D.
- Table 1 on page 8 illustrates indicators for the management of osteoporosis in primary care.

Table 1: Indicators for the management of osteoporosis

DOMAINS OF PERFORMANCE	PERFORMANCE INDICATORS
Health Improvement Programme (HIP)	Age and sex-standardised incidence rates for osteoporosis fracture
Equality of access <ul style="list-style-type: none"> ■ to hip and spine DXA (DXA) scans ■ to appropriate therapeutic interventions ■ to good rehabilitation following fractures 	Referral rates for DXA scans by general practice Audit of prescribing patterns by general practice Rate of discharge within 28 days following hip fracture Rate of re-admission for further fracture
Effective delivery of appropriate health care, ie <ul style="list-style-type: none"> ■ known to be clinically effective and appropriate to need ■ timely ■ complies with standards ■ service organisation 	Audit Local implementation of RCP clinical guidelines and commissioning recommendations: <ul style="list-style-type: none"> ■ referrals for DXA scans ■ prescribing in high risk groups Waiting times for DXA within 3 months Proportion of older people with risk factors for fracture, or previous fragility fracture, who are referred for assessment of bone mineral density (BMD) and/or offered appropriate interventions Incidence of fractured neck of femur
Efficiency	Cost of DXA scans Cost of fracture management per patient
Patient/carer experience	Waiting times for referral for diagnostic services or specialist consultation Proportion of operations for fracture repair carried out within 24 hours of admission by experienced staff Access to information and advice on prevention and long-term management Rate of discharge to normal place of residence within 28 days of admission with a fractured neck of femur for patients aged 65+
Health outcomes of NHS care: <ul style="list-style-type: none"> ■ reduction in risk of fracture ■ optimised function and improved quality of life for patients ■ reduction of falls 'risk' ■ reduction of premature death 	Percentage of people in high-risk groups given preventive advice Percentage of people followed up after fracture and treated to reduce future risk Percentage of people given information about self-care Percentage of people given information about osteoporosis and details of the NOS Percentage of people returned to pre-injury residence and level of independence prior to fracture Percentage of people with hip fracture operated on within 24 hours of admission Standardised mortality rates for hip fracture Rate of deaths in hospital within 30 days of admission with a hip fracture for patients aged 65+ Proportion of frail or housebound elderly who are assessed for fall risk and given calcium and vitamin D and/or hip protectors

Health gain

Current annual expenditure incurred in managing fractures related to osteoporosis is summarised in Table 2.

Table 2: Estimated annual expenditure on fracture management in a Local Health Board (LHB) of 100,000 patients

TYPE OF FRACTURE	PREDICTED NUMBER OF FRACTURES PER LOCAL HEALTH BOARD (LHB) OF 100,000 PATIENTS	HOSPITAL COSTS (£) PER FRACTURE	PER LHB (£)	TOTAL COSTS (£) PER FRACTURE	TOTAL COSTS PER LHB
Hip	145 ^{5.1.5.2}	5,300	768,500	21,500	3,117,500
Wrist	120 ⁴	500	60,000	500	60,000
Vertebral#	40 ⁴ (200)	500	20,000#	500	20,000
Other	100 ⁴	1,400	140,000	1,400	140,000
TOTAL COST			988,500		3,337,500

Of the 200 patients with x-ray evidence of vertebral fractures 40 come to clinical attention and are costed.

The opportunity cost of not taking action to prevent fractures is clearly considerable. The cost of implementing this service strategy will vary according to local unit costs for diagnostic services, professional education requirements, extent of generic prescribing and whether patient costs are included. An illustration is given on page 23. From a societal perspective, fracture prevention will yield significant improvements in quality of life, such as the ability to maintain independent living. It will also reduce demand on social services. In addition, reducing the cost of acute care for osteoporotic fractures will save scarce health care resources.

Section 2

Which approach for primary care?

Preventive strategies for reducing the incidence of falls and osteoporotic fractures need to include measures which target:

- the whole population – lifestyle interventions
- the individual – selective case-finding

Osteoporosis is defined as a progressive systemic skeletal disease characterised by low bone mass and microarchitectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture¹⁸. In Wales this results in over 12,000 osteoporotic fractures each year, causing severe pain and disability to individual patients and at an annual cost to the Welsh health and social care budget of more than £84 million⁴. More than one third of adult women and 1 in 12 adult men will sustain one or more osteoporotic fractures in their lifetime^{4,6}.

Fracture risk depends ultimately on the strength of bone and propensity to trauma. The relative contributions of each of these to fracture pathogenesis varies, even at the three commonest sites at which fractures occur: the hip; wrist and vertebral body. Thus, almost all wrist fractures are associated with a fall, while less than 25% of all vertebral fractures follow such a fall¹⁹. Approaches to prevention include population-based strategies and those targeted to people at the highest risk². Possible measures to reduce fracture risk in the general population include increasing the level of physical activity undertaken at all ages, reducing the prevalence of smoking and increasing dietary calcium intake. Epidemiological studies have shown, with varying degrees of certainty, that these risk factors are associated with osteoporosis. But there is little evidence about the effect of these population interventions on fracture risk from randomised controlled trials and therefore uncertainty about the practical outcome of implementing them on a large scale. Among high-risk strategies, there is no clear evidence that population-wide screening using bone densitometry to identify those at greatest risk is effective in reducing fracture incidence. The major thrust for prevention should therefore be directed towards case-finding.

Assessment of fracture risk in an individual should ideally be expressed as absolute rather than relative risk and be related to a time interval (for example 10 years). Bone densitometry has been shown to predict absolute fracture risk²⁰, in studies of populations independently of other risk factors for fracture (most importantly, age; previous fragility fracture; glucocorticosteroid use and untreated hypogonadism). Methods of assessment of fracture risk in an

individual are still being developed²¹ and will enable determination of absolute rather than relative risk and be related to a time interval (for example 10 years). Furthermore, the addition of bone densitometry to the identification of these risk factors enhances fracture risk prediction. Current national and international guidelines therefore propose a number of clinical indicators for bone densitometry³ in which measurement can aid clinical decision-making and also permit more cost effective use of pharmacological interventions to arrest bone loss.

These include:

- previous fragility fracture (forearm fractures increase the risk of subsequent hip fractures by about 50%²²; 20% of people who sustain a vertebral fracture have another within a year²³)
- radiographic evidence of vertebral deformity or osteopenia
- untreated hypogonadism (premature menopause, secondary amenorrhoea, primary hypogonadism in women; primary or secondary hypogonadism in men)
- treatment with oral glucocorticosteroids (ie prednisolone) for 3 months or more¹⁶
- diseases associated with an increased prevalence of osteoporosis
- sporadic risk factors, such as low body mass index and a family history of fracture.

Approaches to the prevention and treatment of falls and osteoporotic fractures include population-based strategies and those targeted at individuals at highest risk.

Prevention and early detection of osteoporosis

1. Action Plan for primary prevention measures for osteoporosis (**Population-wide approach**)

The Royal College of Physicians guidelines (1999)² reports that possible measures to reduce fracture risk in the general population include increasing the level of physical activity undertaken at all ages, reducing the prevalence of smoking and increasing dietary calcium intake. Epidemiological studies have shown, with varying degrees of certainty, that these lifestyle modifications may help reduce osteoporosis. But there

is little evidence about their effect on fracture risk from randomised controlled trials. The RCP report therefore made no recommendations concerning such population-based strategies.

The most comprehensive approach to finding patients at high risk of future fracture would entail population-wide screening using an effective investigation and intervention in those at the highest risk. However, this is not justifiable because there is no trial-based evidence that such a programme using bone densitometry, biochemical markers of bone turnover or risk factor profiling is effective in fracture reduction nor that such an intervention is cost-effective. For this reason, the RCP report recommended that the major thrust of prevention should be directed towards selective case-finding (the opportunistic identification of high risk patients against predetermined criteria, who are then offered bone densitometry).

2. Selective case-finding

In the absence of current evidence to support a population-wide screening strategy, a selective case-finding strategy has been recommended by all national and international collaborations to examine this issue (The World Health Organisation²⁴, International Osteoporosis Foundation²⁵, the American Society for Bone Mineral Research and the Royal College of Physicians²). Using the selective case-finding strategy, patients are identified, measured and treated because of a fragility fracture or by the presence of strong risk factors.

Recommendation

Peak bone mass is under genetic control²⁶. However, a number of factors, from conception to skeletal maturity, determine the extent to which this genetic potential is achieved. These include: hormonal status; weight-bearing physical activity; nutritional status and lifestyle attributes such as smoking and alcohol intake. Many of these factors also influence the rate of bone loss in later life. Preventive strategies should focus on modifying these factors.

LHBs have an opportunity to integrate health promotion and health care at the individual and population level thanks to their links with other agencies. On the basis of clinical and cost-effectiveness, it is recommended that lifestyle measures* to develop and maintain bone health throughout life are included in health promotion activities since there is synergy with messages for prevention of other chronic diseases, while a selective case-finding approach is adopted to target individuals at high absolute risk of fracture.

Opportunities for population-wide health promotion and the input required from relevant agencies are identified in the following action plan. Further details regarding case-finding at the individual level are given on pages 15-21. The prevention and treatment of osteoporosis requires a collaborative approach between primary, secondary and community care and between health and social services. Identifying key contacts within different agencies and involving them in a local osteoporosis interest group will promote inter-sectoral working and help to ensure a strategic approach to the identification of local priorities and the development of local osteoporosis services. In addition to the work of health and social services, local radio and newspapers may also act as useful media for promoting bone health messages.

*See Table 3 on page 12 for further details

Table 3:

Action plan for primary prevention measures for osteoporosis (This will also benefit other disease areas such as coronary heart disease and diabetes)

LIFE STAGE	OFFER ADVICE ON	AGENCY	SETTING/ACTION EXAMPLES
From conception to school age	Maternal well-being Healthy diet Adequate safe sunshine exposure Adequate weight-bearing activity	Primary health care team*	Ante- and post-natal contacts Child surveillance programme Opportunistic advice
		Other: Pharmacists Playgroups Pre-school clubs Health promotion service Leisure centres Social services Primary health care team	Include bone health and accident prevention messages in health behaviour initiatives
School years	Healthy diet Adequate safe sunshine exposure Adequate weight-bearing activity Avoidance of smoking Caution about excessive dieting and athletic amenorrhoea	Health promotion service Education Authority	Health promoting schools programme Design regular weight-bearing activity into school curriculum
		School catering staff	Provide calcium-rich school meals School milk scheme
		School teachers	Include regular weight-bearing activity into school curriculum
		School nurses	Information on excessive dieting and nutrition
		Primary health care team	Opportunistic information
		Social services	Opportunistic information
		Clubs/voluntary agencies Pharmacists	Education/advice Opportunistic information
Young adults	Women with amenorrhoea > 6 months Early menopause	Primary health care team	Investigate and refer Opportunistic information during consultations, e.g. ■ contraceptive care ■ cervical screening ■ ante-natal care Evaluate risk of osteoporosis/ refer to secondary care Include bone health and accident prevention messages in health behaviour initiatives
	Oral glucocorticosteroid use Healthy diet Adequate safe sunshine exposure Adequate weight-bearing activity Avoidance of smoking	Occupational health	Raise awareness of bone health
	Caution about excessive dieting and athletic amenorrhoea	Leisure centres	Promote and advise on regular weight-bearing activity
	Alcohol within recommended safe limits	Pharmacists	Opportunistic information
		Clubs/voluntary agencies	Education/advice

LIFE STAGE	OFFER ADVICE ON	AGENCY	SETTING/ACTION EXAMPLES
Adults at mid-life	HRT benefit/risk Oral glucocorticosteroid use	Primary health care team	Menopause/Well Woman clinics and opportunistic counselling Refer for DXA and treat according to current glucocorticosteroid guidelines
	Healthy diet Adequate safe sunshine exposure Adequate weight-bearing activity Avoidance of smoking Caution about excessive dieting Alcohol within recommended safe limits	Health promotion	Include bone health and accident prevention messages in health behaviour initiatives
		Leisure centres	Promote and advise on regular weight-bearing activity
		Occupational health	Provide advice to female staff on the menopause and advise both men and women on healthy living and risk of osteoporosis
		Pharmacists	Encourage adherence to pharmacological treatment
	Clubs/voluntary agencies	Education/advice	
65+	Osteoporosis prevention measures	Primary health care team	Selective case finding for patients at highest risk of osteoporotic fracture and initiation of appropriate treatment
			Include falls risk assessment and advise on safe and independent living in health checks for 75+
	Falls prevention measures	Health promotion	Include bone health and accident prevention messages in health behaviour initiatives
		Pharmacists	Ensure patients understand their medication and adhere to dosage regimes
	Oral glucocorticosteroid use Healthy diet Adequate safe sunshine exposure Adequate weight-bearing activity Avoidance of smoking Alcohol within recommended safe limits	Primary health care team Occupational therapists	Offer bone health advice
		Nursing and residential homes/social services	Regularly re-assess patients/residents on osteoporosis/falls risk Review measures to promote good nutrition and exercise
		Physiotherapists	Offer advice on specific exercises
	Clubs/voluntary agencies	Education/advice	

*Including: GPs, Practice Nurses, District Nurses, Health Visitors, Midwives, Physiotherapists, Occupational Therapists and Health Promotion Service

The National Osteoporosis Society is a valuable source for patient and professional literature promoting a healthy lifestyle.

Section 3

Prevention of falls

As with osteoporosis, strategies to reduce the frequency of falls in elderly people may be aimed either at the entire population or at high risk individuals. Epidemiological studies have clearly identified important risk factors for falls in elderly people²⁷. Intrinsic risk factors include problems with walking (reduced balance, gait and muscle strength); use of multiple medications (particularly those leading to sedation and reduced blood pressure), and impairment of vision or memory. Extrinsic factors include poor lighting, unsafe stairs, loose rugs, poorly fitting footwear or clothing, and the lack of safety equipment. The reduction of falls should lead to a reduction in fractures.

Population-wide approaches

Population-based preventive strategies are particularly well placed to reduce fall frequency by encouraging regular weight-bearing physical activity among elderly people (which also increases bone mineral density (BMD) and reduces fractures), encouraging the identification of important risk factors through general health screening, and reducing the prevalence of poly-pharmacy and environmental hazards among the elderly (especially among the institutionalised elderly)²⁸.

High risk approaches

This strategy for the prevention of falls in those at high risk of falling and fracturing is supported by a prospective randomised controlled trial from the United States²⁹. A multi-dimensional assessment and intervention was offered to people identified as being at risk of falls. This achieved a reduction in annual fall incidence of 12% compared with a control sample. Extrapolation from this study suggested that it was relatively cost-effective, but its sample size precluded assessment of health outcomes other than falls (for example, fracture or all cause mortality).

A randomised controlled trial of multi-dimensional interventions to those at the highest risk carried out in the UK supported these findings. The key components of the intervention in these studies are:

- (a) medication reviews
- (b) balance and gait training
- (c) weight-bearing exercise and
- (d) improvement in functional skills

The NHS provides an administrative framework whereby general health screening for the identification of risk factors for falls and systematic intervention with a multi-dimensional series of components could easily be incorporated in primary and secondary care. Indeed a study from Australia suggested a GP health education programme could significantly improve the well being of elderly patients in their care³⁰.

International guidelines have now been developed jointly by the British and American Geriatrics Societies and the American Society of Orthopaedic Surgeons which provide evidence-based strategies³¹.

- Multi-faceted interventions reduce falls in older people and therefore fractures
- Assessment and appropriate referral of high risk nursing home residents is effective
- Home assessment of older people at risk of falls needs to be accompanied by direct intervention or appropriate referral
- Comprehensive assessment and modification of risk factors is effective when offered to community dwelling older people who have presented to an accident and emergency department after a fall³²
- The provision of hip protectors to residents of nursing homes is effective if they have had previous fractures³³

It is essential that clear referral pathways for the assessment and management of osteoporosis are integral to such services.

It is recommended that an approach is based on collaboration between primary care teams and specialists in the medicine of old age.

A similar integrated approach to the management of falls risk will be crucial if effective fracture prevention strategies are to be developed in Wales.

Section 4

Prevention and management of osteoporosis

Selective case-finding

Case-finding may occur in both primary and secondary care although long-term management is mainly the responsibility of primary care teams. Referral for bone density measurement of hip and spine (DXA) should be considered in those who are at increased risk of osteoporosis and therefore of fracture and where the result is likely to change clinical management.

Who to measure?

Most DXA scanning units provide guidelines on appropriate referral that conform to national guidelines. DXA is recommended for individuals with key clinical risk factors to confirm whether treatment is required². Table 4 indicates the groups of people who may be considered for diagnostic DXA scan.

Table 4: Referral criteria for bone density measurement

TARGET HIGH RISK GROUP	ANNUAL ESTIMATED NUMBER OF SCANS PER 100,000 POPULATION*
Men and women with:	
previous low trauma fracture	168
x-ray evidence of osteopenia	110
glucocorticosteroid use (ie. prednisolone for three months or more)	218
family history of osteoporosis (especially maternal hip fracture)	137
other clinical risk factors: height loss, kyphosis, low BMI (<19 kg/m ²)	107
possible secondary osteoporosis, primary hyperparathyroidism, rheumatoid arthritis, liver disease, alcoholism, primary hypogonadism	42
Women with:	
untreated oestrogen deficiency (surgical or natural menopause <45 years, secondary amenorrhoea > 6 months not due to pregnancy, primary hypogonadism)	100
many centres also utilise DXA scanning to monitor therapeutic response	118
TOTAL SCANS	1000

*Data assembled from a national NOS survey³⁴ and from Dr N Peel, Osteoporosis Centre, University of Sheffield

At which site to measure?

Bone density measurement by hip and spine DXA (DXA) remains the “gold standard” for the diagnosis of patients with osteoporosis, although the spine may also be a suitable site for diagnosis in younger people without evidence of osteoarthritis³⁵. If spine and proximal femur bone density measurements are not available, a measurement of forearm or calcaneal bone density by DXA can be used but interpretation of results must be evaluated carefully to identify those at risk of fracture as diagnostic intervention thresholds may differ with these technologies. Quantitative ultrasound in common with DXA must have stringent quality assurance and can be used in the assessment of fracture risk, but not for the diagnosis of osteoporosis³⁶. This is currently an area of active research and the NOS will continue to update its position statements on the use of these peripheral bone density techniques^{36,37}.

At what threshold to treat?

DXA results are conventionally reported according to the number of standard deviations by which a reading differs from the young adult mean (T score)². Instruments also provide information on the number of standard deviations by which a reading differs from the age-specific mean (Z score). Table 5 shows a simple classification of hip and/or spine DXA scan results and indicates when treatment is recommended. Current guidelines recommend that treatment decisions should be based on clinical assessment in addition to T scores. Z scores may be useful in determining management of certain patients; appropriate guidance should be provided by the local bone densitometry service or lead clinician.

Table 5: Indications for management*

HIP OR SPINE DXA T-SCORE	FRACTURE RISK	ACTION
Normal T > -1.0 SD	Low	Reassure/Lifestyle advice
Low bone mass (osteopenia) T -1 to -2.5 SD	Medium	Lifestyle advice Falls prevention Offer treatment if previous fragility or vertebral fracture: See Table 7 on page 17
Osteoporosis T < -2.5 SD	High	Lifestyle advice Falls prevention and offer treatment as detailed on pages 17–18

*Derived from Royal College of Physicians (1999)²

With what treatment?

Several interventions are now available which retard bone loss, reduce fracture risk and are licensed for the prevention and/or treatment of osteoporosis. Lack of comparative data makes it difficult to recommend specific treatments based on a hierarchy of efficacy or clinical effectiveness.

Evidence supporting the use of specific treatment is summarised extensively in the Royal College of Physicians update 2000³. Tables 6 and 7 on the next page are a tabulation of this evidence.

Table 6: Effect of interventions on the prevention/reduction of postmenopausal bone loss: grade of recommendations

Alendronate	A
Calcitonin	A
Calcitriol	A
Calcium	A
Cessation of smoking	B
Cyclic etidronate	A
HRT	A
Physical exercise	A
Raloxifene	A
Reduced alcohol consumption	C
Risedronate	A
Tibolone	A
Vitamin D + calcium	A

Table 7: Anti-fracture efficacy of interventions in post menopausal osteoporotic women: grade of recommendations

	SPINE	NON-VERTEBRAL	HIP
Alendronate	A	A	A
Calcitonin	A	B	B
Calcitriol	A	A	nd
Calcium	A	B	B
Calcium + vit D	nd	A	A
Cyclic etidronate	A	B	B
Hip protectors	–	–	A
HRT	A	A	B
Physical exercise	nd	B	B
Raloxifene	A	nd	nd
Risedronate	A	A	A
Tibolone	nd	nd	nd
Vitamin D	nd	B	B

nd: not demonstrated

A Meta analysis of Randomised Controlled Trials (RCTs) or from at least one RCT

B From at least one other type of well designed quasi-experimental study

From well-designed non-experimental descriptive studies, eg. comparative studies, correlation studies, case-control studies

C From expert committee reports/opinions and/or clinical experience of authorities

Summary statements on the treatment of osteoporosis with various interventions are listed below:

- **Bisphosphonates:** Alendronate and risedronate prevent bone loss at all sites vulnerable to osteoporosis and decrease the risk of spine and hip fracture. Cyclical etidronate reduces bone loss at the spine in women with osteoporosis and reduces the risk of vertebral fracture.
- **Calcium** supplements of 1g or more daily decrease bone loss in elderly women but the effects are less marked than those of HRT or the bisphosphonates. Calcium in combination with vitamin D has also been shown to reduce the hip fracture rate. It is important to note that calcium and vitamin D were used in addition to therapy in the bisphosphonate and raloxifene studies, either for all participants, or where dietary/lifestyle information suggested less than optimal levels. This may have contributed to the beneficial effects in these studies.
- **Oestrogen** (HRT) prevents bone loss; its effects are dose dependent. Vertebral and hip fracture frequency decrease while on treatment. Observational studies indicate potential protective effects on distal forearm fractures. Anti-fracture efficacy will wane on cessation of treatment³⁸.
- **Nasal Calcitonin** prevents bone loss, reduces vertebral fracture frequency but there is no trial-based evidence that it prevents fractures at other sites.
- **SERMs** (selective estrogen receptor modulator): Raloxifene has been shown to increase bone density at the spine and hip in women with low bone density (osteopenia and established osteoporosis) and decrease the risk of vertebral (but not hip) fracture.
- **Testosterone** and anabolic steroids have been shown to prevent bone loss in men and older people respectively but adequate studies have not been performed to examine their effect against fracture.
- **Vitamin D** metabolites (calcitriol and alfacacidol) retard bone loss and some studies have demonstrated an effect against vertebral fracture; but not hip fracture. There is some evidence that replacement of vitamin D insufficiency may reduce falls via an enhancement of neuromuscular and/or psychomotor performance.

All patients commencing pharmacological therapy should also be counselled on lifestyle measures to reduce bone loss including: weight-bearing physical activity; nutritional status and lifestyle attributes such as smoking and alcohol intake.

Advice regarding smoking cessation and safe drinking should always be given, not only because there is good evidence that these behaviours can increase the risk of osteoporosis but also because, as with all the modifiable lifestyle factors, there is secondary gain in other areas such as coronary heart disease and diabetes.

The National Osteoporosis Society is a valuable source for patient and professional literature promoting a healthy lifestyle.

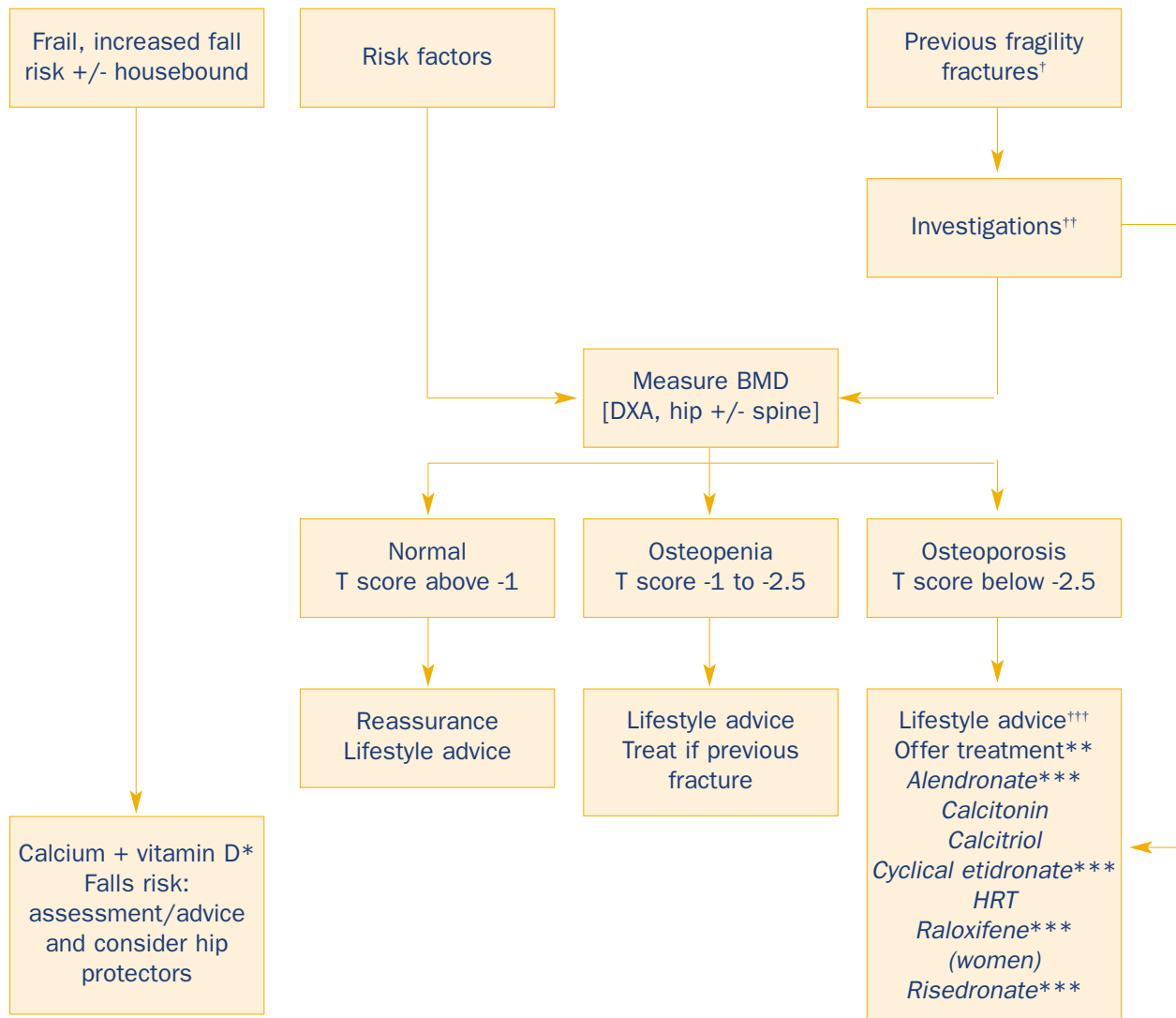
Examples of selective case-finding

Patients at risk of osteoporosis may present in both primary and secondary care, hence the need for a collaborative approach to identify appropriate patients and to agree subsequent management policies. Table 8 provides some examples of opportunities for identifying patients at high risk of osteoporosis. Audits of computer records to identify such patients offer a more systematic approach. The National Osteoporosis Society (NOS) holds examples of validated audit protocols which are available on request.

Table 8: Examples of opportunities for selective case-finding

HIGH RISK GROUP	SETTING	ACTION
Patients with previous fragility fracture	a. Hospital falls & fracture clinic: advise patient of possible osteoporosis risk and inform primary care team of need for follow up	Inform primary care team of need for follow up Encourage patient to visit GP for osteoporosis advice and follow-up
	b. Encourage patient to visit GP for follow up	
	c. Offer advice to patient during rehabilitation after hip fracture	
	d. Primary care audit of records	Consider need for diagnostic evaluation of osteoporosis and/or referral to falls service
Patients on oral glucocorticosteroids	a. On initiation of glucocorticosteroid treatment	Warn of possible osteoporosis risk
	b. In hospital outpatient department or during general practice consultation	Refer for densitometry and treat according to RCP guidelines on glucocorticosteroid induced osteoporosis ¹⁶
	c. On prescription review for patients already prescribed glucocorticosteroids	Review dose of glucocorticosteroid Offer general lifestyle advice and NOS details
Frail elderly	a. Residential/Nursing homes and house-bound elderly	Consider osteoporosis risk and need for calcium and vitamin D supplements
		Consider falls prevention and use of hip protectors

Figure 1: Medical management of men and women aged over 45 years who have or are at risk of osteoporosis



For men aged less than 65 years, specialist referral should be considered.

* Recommended daily dose 0.5-1g and 800iu respectively.

** Treatments listed in alphabetical order. Calcium and vitamin D are generally regarded as adjuncts to treatment. HRT: oestrogen in women, testosterone in hypogonadal men.

*** Calcium and vitamin D should be offered as adjunctive therapy

BMD: bone mineral density

DXA: dual energy x-ray absorptiometry

HRT: hormone replacement therapy

† see page 21

†† see page 21

††† see page 21

Below is an explanation of Figure 1 featured on page 20.

Major risk factors (other than previous fragility fracture – a fracture sustained from a fall from standing height or less) include the following:

1. Untreated hypogonadism (premature menopause, 2° amenorrhoea, 1° hypogonadism in women; 1° or 2° hypogonadism in men).
2. Glucocorticosteroids (prednisolone for 3 months or more).
3. Disease associated with increased prevalence of osteoporosis (eg, gastrointestinal disease, chronic liver disease, hyperparathyroidism, hyperthyroidism).
4. Radiological evidence of vertebral deformity or osteopenia.

Other risk factors in national and international guidelines include family history, low body weight, cigarette smoking, height loss or low bone mass as assessed by other techniques.

†Previous fragility fracture

Defined as a fracture sustained from a fall from standing height or less and includes prevalent vertebral deformity. A previous fragility fracture is a strong independent risk factor for further fracture and may be regarded as an indication for treatment without the need for BMD measurement when the clinical history is unequivocal.

††Investigations

- FBC, ESR
- Bone and liver function tests (Ca, P, alk phos, albumin, AST/GT)
- Serum creatinine
- Serum TSH

If indicated

- Lateral thoracic and lumbar spine x-rays.
- Serum paraproteins and urine Bence Jones protein.
- Isotope bone scan.
- Serum FSH if hormonal status unclear (women).
- Serum testosterone, LH and SHBG (men).

†††Lifestyle advice

- Adequate nutrition especially with calcium and vitamin D.
- Regular weight-bearing activity.
- Avoidance of tobacco use or alcohol abuse.

Derived from Royal College of Physicians.
Osteoporosis: Clinical guidelines for prevention and treatment update. RCP (2000)³

Section 5

Is this strategy cost-effective?

1. Population-wide: bone health promotion

There are current health promotion activities in which osteoporosis bone health messages could be included, such as Heart Health campaigns.

Patient information leaflets and other educational resources are available from the National Osteoporosis Society.

2. Referral for hip and spine DXA (DXA)

The cost-effectiveness of bone densitometry depends upon the costs of treatment, targeted on the basis of the results: the more expensive the intervention, the greater the cost-effectiveness of bone density referral and measurement. It is not cost effective to measure BMD where treatment costs less than £100 per annum, for example calcium and vitamin D².

3. Prescribing

Prescribing costs can be limited by using clinical assessment and bone density measurement to identify individuals at greatest risk of fracture who will derive greatest benefit from treatment and by identifying those who are being treated inappropriately and whose treatment can be discontinued.

Meeting clinical governance requirements

Assessing standards of care for all those with or at risk of osteoporosis requires clear process and outcome indicators as well as effective tools for monitoring performance. The key performance indicators are summarised on page 7.

The major objective is fracture reduction, and it is important that LHBs are able to access local fracture data. Hip fracture data is available through the Patient Episode Database for Wales (PEDW) and the All Wales Injury Surveillance System (AWISS). Currently wrist and vertebral fractures are poorly recorded. LHBs may wish to liaise with their local acute providers to identify what local data are available. Vertebral fractures are commonly under-reported but this is in part because only approximately one-third come to clinical attention. Benefits in fracture reduction may be seen within one year, particularly if interventions are aimed at those aged over 65.

The RCP Clinical Guidelines (1999/2000)^{2,3} provide standards for clinical care. Standards for service configuration which will enable such care to be provided are outlined for secondary care in *Guidelines for the provision of a clinical bone densitometry service*¹¹ and for primary care in this osteoporosis strategy. Standards for falls prevention and management services are given in the joint British and American Geriatric Societies Guidelines³¹. The NOS has examples of audit protocols which focus on management of high-risk groups such as patients being prescribed oral glucocorticosteroids, that can be used by LHBs to assess their performance against these standards.

Section 6

Service commissioning

LHBs may wish to adopt a stepwise approach to the implementation of an osteoporosis strategy, identifying which of the high-risk groups require immediate, medium or long-term action, and targeting resources appropriately. Initially, as a temporary measure, LHBs may want to adopt a few of the steps below before providing a full osteoporosis service.

The following indicates the annual cost that might be incurred in providing the service framework for osteoporosis as outlined. It is viewed from the perspective of a LHB serving a population of 100,000 and will vary according to local unit costs.

Table 9

	ANNUAL COST (£)
Identification of a lead clinician(s) for osteoporosis in secondary care and a lead GP for the LHB	nil
GP time to participate in local district-wide interest group, implement framework and monitor performance: 1 GP session per week (£110 plus NI) plus travel expenses	7,500
Population-wide bone health promotion (absorbed within ongoing health promotion activity)	nil
Referral for hip and spine DXA (approximately 1,000 scans assuming a cost of £50) (The actual cost of DXA scans varies)	50,000
Access to specialist expertise on treatment for established osteoporosis	12,000
1 part-time osteoporosis nurse to assist with case finding	16,000
Prescribing costs (500 patients @ average drug cost of £170 per patient with 4 GP consultations per year)	97,000
TOTAL COSTS	182,500

This service would cost the same as managing 9 out of the 145 hip fractures which occur in a population of 100,000 per year³⁹ (see Table 2 on page 9).

Further resources

For health professionals

Appendix 1

National Osteoporosis Society (NOS) literature:

Examples of audit protocols which have been effectively piloted by GP practices targeting:

- all high risk groups
- women after hysterectomy
- oral glucocorticosteroid patients

NOS position statements:

- The use of peripheral x-ray absorptiometry in the management of osteoporosis
- The use of quantitative ultrasound in the management of osteoporosis
- Guidelines for the provision of a clinical bone density service
- The reporting of dual-energy x-ray absorptiometry bone mineral density scans

Examples of NOS patient information – further leaflets are available

- Osteoporosis – causes, prevention and treatment
- Are you at risk?
- Coping with a broken hip
- Six steps to healthy bones
- Healthy bones for all the family
- Fit but fragile
- Drug treatments
- Living with osteoporosis – coping after broken bones

The NOS has worked with many LHBs to develop and implement local osteoporosis strategies – please contact the NOS if you require further information:

Angela Jordan
Acting Health Services Liaison Manager
National Osteoporosis Society
Camerton
Bath BA2 0PJ

tel: 01761 471771
fax: 01761 471104

Professional helpline
(staffed by osteoporosis nurses): 0845 450 0230

email: hsl@nos.org.uk
website: www.nos.org.uk

For further information on the government's strategy for osteoporosis please see:

Department of Health website:
www.open.gov.uk/doh/osteop.htm

For further information on glucocorticoid-induced osteoporosis please see:

Royal College of Physicians, Bone and Tooth Society of Great Britain, National Osteoporosis Society. Glucocorticoid-induced osteoporosis. Guidelines for prevention and treatment. 2002

For the public

The NOS has a wide range of literature for the public, which may be useful for health promotion activity. Its telephone helpline offers confidential advice on the treatment and prevention of osteoporosis, and membership offers practical and continuing support to people with osteoporosis.

To obtain further information, please contact:

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Camerton
Bath BA2 0PJ

tel: 01761 471771
fax: 01761 471104
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Priorities for action

Key recommendations are summarised below:

- Include prevention of osteoporotic fractures in the local HIP
- Identify lead clinicians in primary and secondary care to develop an osteoporosis program based on this strategy:
 - each Local Health Board (LHB) should have a lead GP for osteoporosis, responsible for monitoring the implementation of this program.
 - each acute trust should have a lead consultant for osteoporosis, responsible for clinical referrals, supervision of diagnostic services and liaison with primary care.
- Establish a local osteoporosis interest group to facilitate multi-disciplinary implementation of this framework.
- Use a selective case-finding approach to target the treatment of individuals at high risk of osteoporotic fracture. This includes individuals with a history of previous fracture, frequent falls or use of oral glucocorticosteroids.
- Provide access to adequate levels of diagnostic and specialist services; thus a LHB serving a population of 100,000 would require approximately 1,000 hip and spine DXA scans per year.
- Promote the use of care pathways and audits to improve standards of care.
- Monitor performance to assess health impact.
- Equality of access for diagnosis and treatment of osteoporosis for the people of Wales.

This strategic document sets clear standards to enable LHBs to offer a high quality osteoporosis. LHBs may wish to adopt a stepwise approach to its implementation, identifying which of the high risk groups detailed on pages 15-19 require immediate, medium and long-term action, and targeting resources as appropriate.

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Osteoporosis and fracture prevention across the LHB

