Somerset
Bone Health (osteoporosis)
Health Needs Assessment

December 2013

CONTENTS

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Executive Summary

Osteoporosis is a disease where the bone mass is reduced and there is deterioration of bone tissue, this in turn leads to decreased bone strength and a risk of fracture which increases with age.

Somerset's ageing population has a significant impact on the provision of health and social care services, for example we know that by 2021 there will be a projected increase of 46% in those aged over 90. Acknowledging that one in three women and between one in five, and one in twelve men will develop osteoporosis the costs associated with poor bone health are likely to increase significantly. It is estimated that by 2021 there will be 34,500 postmenopausal women with osteoporosis in Somerset, an increase of 15% from 2013.

Osteoporosis can cause disability, pain, reduced independence and if it then leads to a hip fracture a high risk of mortality, with 20% of people dying within the first four months.

Research has shown each hip fracture costs the NHS £10,000, in addition to high social care costs; a large amount of available budgets are spent on a small number of frail older people. In Somerset in 2012/13 737 people sustained a hip fracture equating to a cost of £7.4 million to the NHS alone. Further evidence suggests that we are likely to spend £626,000 (4% of the annual community hospital inpatient spend) on approximately 1% of our older population, plus a further 4% of the local adult social care budget.

It is important to focus on the building of strong bones across the life course. This starts with children and young people so they and the services that provide support can help them achieve maximum bone mass through a healthy diet and regular physical activity.

Calcium and vitamin D are required to build and maintain strong bones and help keep muscles strong. Although diet is important the majority of our vitamin D is made as a result of the action of sunlight on the skin.

Health inequalities have been noted which suggest those from lower socioeconomic backgrounds are disadvantaged from childhood in terms of their bone mineral density and lifestyle choices for some adults impact on their bone health.

There is some evidence of weight-bearing physical activity improving bone health in older people at specified levels and there are recognised benefits of specialist exercise improving balance and muscle strength which can then lead to a reduction in falls, helping to reduce likelihood of fracture.

Identifying the first fragility fracture is an essential part of secondary prevention of osteoporosis as in at least 50% of cases this is often a minor fracture, which gives opportunity for appropriate treatment and support to help prevent a future more serious fracture.

Generally Somerset compares to both the South West and England when considering data around death rates following a hip fracture, however when data for deaths within 30 days of emergency admission to hospital following a hip fracture is viewed the Somerset rate appears to have increased slightly and this should be monitored.

Although progress had been made in Somerset since the 2008 HNA and the subsequent Somerset Bone Health and Falls Prevention Commissioning Strategy, there is still considerable improvement to be made to ensure that the bone health needs of our ageing population are adequately met.

The report identifies gaps in service provision in Somerset and the recommendations below suggest specific actions that would contribute to a more cohesive approach to promoting bone health and osteoporosis services across the county:

Responsibility of - Primary Care, Secondary Care, Public Health and other stakeholders led by Clinical Commissioning Group

- Raise the profile of importance of physical activity, calcium and vitamin D intake and safe exposure to sunlight to support bone mass accrual, bone health and the primary prevention of osteoporosis across the life course (including children and adolescents)
- Promote the use of the FRAX® tool in primary, secondary and community care settings and through a wide range of stakeholders to identify those at risk of osteoporosis
- Multi-factorial assessments should be carried out for those at risk of a fall, also at point of being prescribed with osteoporosis medication to ensure falls risks are reduced as much as possible
- Increase primary and secondary care referrals to Somerset's Independent Living Teams, also from other agencies
- Encourage care homes to implement guidance produced by NICE and the Department of Health on calcium and vitamin D supplementation
- Ensure Somerset continues to participate in national audits and initiatives to benchmark progress in bone health and osteoporosis services
- Develop pathways across the health and wellbeing system which encourage the uptake of physical activity at all ages, but which also refer to the specialist exercise provision as appropriate

- Develop and agree a multi-agency bone health care pathway and clarify the issues regarding ownership of the person's care and disease management of osteoporosis. Develop a multi-agency group to develop and monitor progress against the pathway

- Ensure the bone health care pathway links to Somerset's Independent Living Teams

Responsibility of Public Health

- Ensure continued availability of specific exercise programmes aimed at improving balance and reducing the risk of falls e.g. OTAGO and Postural Stability; which is of a duration shown to be effective, for some this will also assist in increasing bone density

- Raise public awareness of osteoporosis i.e. National Osteoporosis Society 'Stop at one' campaign

Responsibility of Primary Care

- Ensure primary diagnosis rates of osteoporosis is increased; bone health needs to be discussed regularly particularly with postmenopausal women

- Ensure men with osteoporosis and subsequent fragility fractures are identified and services respond appropriately to their needs

- Continue to monitor the prescribing audit of bisphosphonates in primary care, investigate GP practices where prescribing levels are low

- Ensure GP practices develop robust QOF osteoporosis registers

- GP practices to explore and take action if people are unwilling or unable to adhere and/or comply with prescribed osteoporosis treatments

Responsibility of Secondary Care

- Increase identification rates of first fractures through an adequately resourced fracture liaison service across Somerset; only half the county is currently covered and the existing service needs to be more comprehensive

- Ensure men with osteoporosis and subsequent fragility fractures are identified and services respond appropriately to their needs

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Somerset Bone Health (osteoporosis) Health Needs Assessment

1 Purpose

1.1 This health needs assessment (HNA) builds on the previous HNA completed in 2008 which was used to influence the development and maintenance of services within Somerset. Recognising the usefulness of the previous HNA commissioners within Somerset have requested a refresh. It will then be used to identify specific areas of need in relation to the continued development of bone health services within the county, and other initiatives that support lifelong bone health.

1.2 It aims to provide an overview of local and national osteoporosis data along with some of the most recent evidence of interventions to optimise bone health and prevent osteoporosis. In addition it brings attention to the importance of bone health across the life course, recognising the importance of building healthy bones in childhood and adolescence, and how lifestyle and behavioural factors through adulthood influence bone health in later life.

2 Introduction

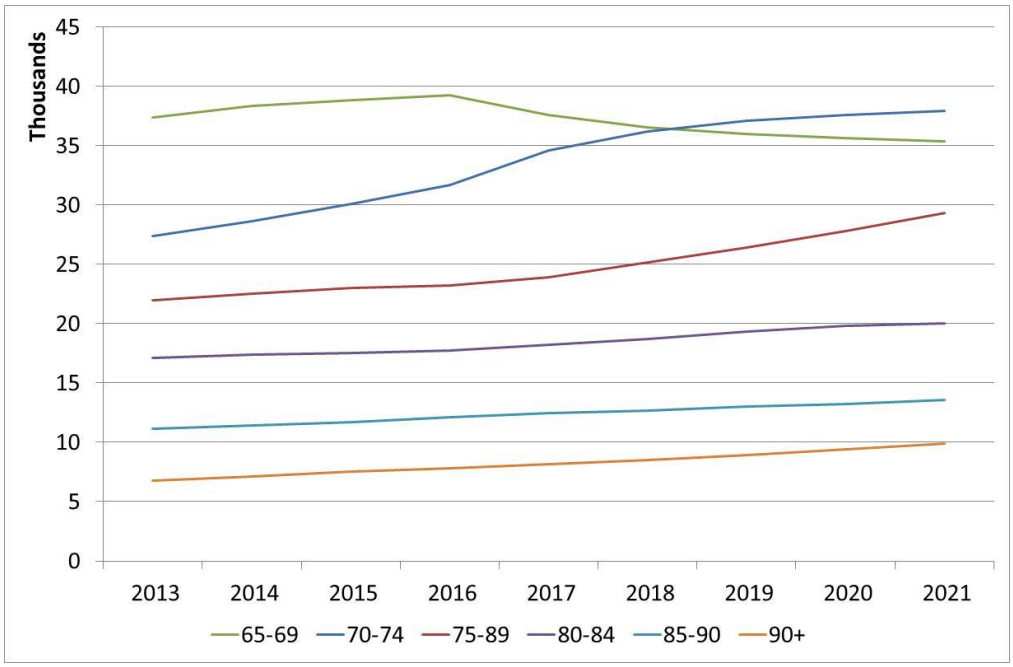
2.1 Osteoporosis is a disease characterised by reduced bone mass and structural deterioration of bone tissue, leading to decreased bone strength and increased risk fracture, particularly of the spine, hip, wrist, humerus and pelvis.[1] As bone mass starts to decrease in the fourth or fifth decade of life[2], osteoporosis and fragility fractures are most commonly seen in older people. The risk of fracture increases steeply with age and are most often seen in those aged over 75.[3,4]

2.2 Data suggests that between one in two/ three women[1,5] and between one in five[5] or one in twelve men[1] will suffer a fracture after the age of 50. Most research centres on postmenopausal women, however it is important to consider men as they can be under recognised in diagnosis and services.[6]

2.3 With an increasingly ageing population the fragility (osteoporotic) fracture rate is likely to increase further. Osteoporotic-related fractures are responsible for excess mortality, morbidity, chronic pain, reduction in quality of life, admission to long-term care and health and social care costs.[7]

2.4 The Office for National Statistics estimates that the older population in Somerset will increase substantially over the next few years as shown in Figure 1, particularly the oldest age groups. For example the 90+ population is estimated to increase by 46% in only 8 years from 6,700 in 2013 to 9,900 in 2021. Overall there is a projected increase of approximately 20% or 24,000 additional people aged 65 and above in Somerset by 2021.

Figure 1: Somerset older population projections for 2013 to 2021 by age



2.5 Osteoporosis is a long term, chronic disease and often people are not aware they have the disease until they sustain a fracture. Fractures can vary from wrist fractures where patients experience minor levels of pain and morbidity to vertebral fractures associated with varying levels of pain and disability to the major distress and disability of a hip fracture.

2.6 There is strong evidence to suggest that at least 50% [8-10] of those who experience a hip fracture, have sustained a previous fracture. In addition, two meta analyses[11-12] concluded that a prior fracture at least doubled a patient's future fracture risk, while further studies have concluded that the risk of further fractures may be even higher in the future for men.[13-15]

2.7 However, only 25% of fragility fractures occur to the hip and the remainder most commonly occur at distal radius, ulna, pelvis, tibia, humerus and ankle.[16-17] This indicates another group of at risk patients that should be considered when planning services. This clearly demonstrates the importance of secondary prevention as the first fracture should serve as an early warning and a trigger for further investigations such as a dual energy x-ray absorptiometry (DXA) scan and falls assessment.[8,18]

2.8 The National Osteoporosis Society's 'Stop At One' campaign launched in 2013 aims to raise public awareness by highlighting the importance of identifying osteoporosis at the first fracture and seeking advice.

3 Risk factors for osteoporosis

3.1 There are a number of risk factors associated with osteoporosis, in addition to increasing age and low bone mineral density (BMD), some of these are at least partly independent of bone mineral density and include parental history of hip fracture, low body mass index (BMI) (less than 19kg/m2) alcohol intake of more than 14 units per week for women and more than 21 units per week for men, current smoking and current or frequent recent use of oral or systemic glucocorticoids.[19]

3.2 Other secondary risk factors include untreated hypogonadism (including untreated premature menopause), malabsorption, endocrine disease, chronic renal and liver disease, chronic obstructive pulmonary disease, inflammatory bowel disease, Crohn's or coeliac disease, rheumatoid arthritis, immobility and some medications e.g. aromatase inhibitors and androgen deprivation therapy.[2] It is difficult to determine the impact of secondary osteoporosis, but studies have estimated that 20-30% of postmenopausal women and 50% of men are affected.[20-21]

3.3 Those with anorexia have a high risk of osteoporosis as the onset often correlates with the time young people are building bone mass, osteoporosis is present in almost 40% of those with anorexia, with osteopenia affecting 90% of people.[22]

3.4 There is also a difference in prevalence between men and women. Postmenopausal women tend to have lower peak bone mass, increased bone loss at the menopause and also increases in life expectancy have meant that the disease is more common in women.[4] Evidence suggests that osteoporosis is most common in white and Asian women.[19] However, it is important to note that often osteoporosis in men is under recognised and that hip fractures in men can be associated with higher levels of morbidity, so early diagnosis is crucial.[6]

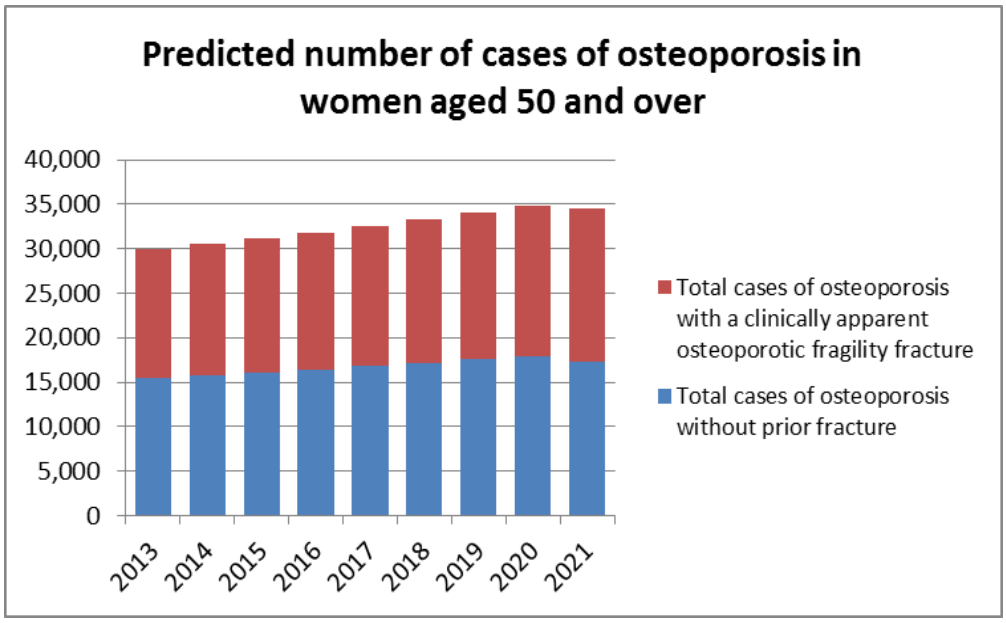
4 Prevalence of osteoporosis

4.1 It is estimated that more than 2 million women have osteoporosis (that is, have a T-score of −2.5 SD or below) in England and Wales.[19] It has been estimated that the lifetime risk of any fragility (osteoporotic) fracture lies within the range of 40-50% in women and 13-22% in men.[23] This estimation of risk suggests that there may many people who have undiagnosed osteoporosis.

4.2 Using a costing template from the National Institute for Health and Care Excellence (NICE)[24] which uses national data for osteoporosis to give local estimates for osteoporosis and fragility fractures Figure 2 is an analysis of the numbers of women predicted to have osteoporosis in Somerset. For 2013 this template estimates that there are 122,748 postmenopausal women in Somerset of whom 15,452 (12.6%) women have osteoporosis without a prior fracture and 14,494 (11.8%) women have osteoporosis with clinically apparent osteoporotic fragility fractures. Figure 2 clearly shows a steady trend in

increased prevalence of osteoporosis until 2021 when there is predicted to be 34,500 women with osteoporosis, compared to 29,900 in 2013, an increase of 15%. The increase of those with clinically apparent osteoporotic fragility fractures is predicted to rise by 19% over the same period.

Figure 2



4.3 The prevalence of osteoporosis is often described using the mortality and morbidity associated with fragility fractures. Each year in the UK 300,000 people present with fragility fractures to hospitals, these will include hip, vertebral and wrist fractures.[1,25] The National Osteoporosis Guideline Group (NOGG) predict that the ageing population will give rise to a doubling of the rate of fragility fractures over the next 50 years if changes are not made to present practice.[26]

4.4 Fractures related to osteoporosis cost the healthcare economy over £1.73 billion each year and this is expected to rise to £2.2 billion per year in 2025. [27-28] Fractures in patients over 60 years old account for more than 2 million hospital bed days in England. This exceeds the bed occupancy attributable to diabetes, ischaemic heart disease, heart failure or chronic obstructive pulmonary disease.[26] Most of the costs outlined above are associated with hip fractures and data shows the admission rate for hip fractures has increased in England by 2.1% per year since 1999 and hospital bed days have increased by 5.9% per year.[26] It is estimated that each hip fracture costs the NHS £10,000, in addition due to the high levels of morbidity and disability associated with fractures, particularly hip fractures, the costs following discharge from hospital to local authority social care are also very high.[8,29]

In Somerset in 2012/2013 737 people sustained a hip fracture. Applying the above model of £10,000 per hip fracture this gives a total cost of £7.4 million to the NHS in Somerset alone.

4.5 A recent King's Fund study[30] showed that for a group of people aged over 65 admitted to hospital following a fall (not solely a hip fracture) the costs of hospital, community and social care services were almost four times as much in the 12 months after admission as the cost of the admission itself. The study concludes that for just over 1% of the local over 65 population, 4% of the annual community hospital inpatient spend and 4% of the local adult social care budget was used to support their needs.

For Somerset this model would suggest we are likely to spend £626,356 on community hospital inpatient care (4% of £15.6 million) and £2.9 million of the adult over 65's social care budget (4% of £73.3 million) on approximately 1% of those aged over 65. (Using 2013/2014 figures supplied by South West Commissioning Support and Somerset County Council).

4.6 The information above outlines the health and social care costs as a result of osteoporosis and subsequent fractures, but it is also important to consider the cost to the individual and their families. Often a fracture will affect an individual's ability to maintain their level of independence and cause pain and reduced mobility, especially with more severe vertebral fractures and hip fractures with the inevitable impact on quality of life. [8] For patients who sustain a hip fracture only 50% will return to their former level of independence, with most experiencing some form of hip discomfort and half will suffer a deterioration in their walking ability.[1] It is therefore not surprising, given the level of morbidity associated with a hip fracture, that 10-20%[1] of patients will move permanently from their home to a residential or nursing home. A survey of elderly women found that 80% would rather die than have to move to a nursing home as a result of losing their independence following a hip fracture.[31]

5 Health inequalities

5.1 As with any disease or condition there are associated health inequalities that need to be addressed. One study suggests that childhood socioeconomic advantage and adult education level were positively associated with spine BMD, so that across the life course a lower socioeconomic background may influence bone health outcomes (the reasons are complex and not fully understood).[32]

5.2 Studies have also suggested significantly higher fracture rates reported in lower socioeconomic groups. [33-35] One study involving 7500 people [36] found the incidence of hip fracture was 1.3 times higher in the most deprived populations, with this group suffering a fracture, on average, 1.1 years earlier. It also showed the mortality rate proved to be significantly higher in the most deprived population.

5.3 In addition to this there are health inequalities associated with some osteoporosis risk factors, for example smoking and alcohol consumption. The

evidence base clearly suggests that lower socioeconomic groups are more at risk of an unhealthy lifestyle, including physical inactivity, poor nutrition,

smoking and higher alcohol consumptions, these can all result in poor bone health.[37] Other health inequalities that have been noted in relation to osteoporosis relate to access to services, specifically DXA scans.[38]

6 Building healthy bones and primary prevention of osteoporosis

6.1 The key elements for reducing the risk of osteoporosis involve building and maintaining bone density through physical activity, particularly weight bearing exercise, a balanced diet with adequate levels of calcium and vitamin D, also safe exposure to sunlight to aid the manufacture of vitamin D. Bone mineral accrual during childhood and adolescence is shown to be an important determinant of osteoporosis in later life.[39] Estimates are that a 5% increase in peak bone mass at population level would reduce the risk of fracture in later life by 50%.[40] Although it is recognised that genetic factors account for 50-85% of the variance in adult bone density, modification of environmental factors during childhood may be beneficial for peak bone mass in later life.[41]

6.2 Evidence shows dietary calcium intake and weight-bearing physical activity increase bone mass accrual during growth in childhood years.[42] In addition to a balanced diet with an adequate intake of calcium throughout childhood and adolescence it is essential to have an adequate dietary intake of vitamin D to aid calcium absorption.

6.3 One meta-analysis [43] suggests that vitamin D supplementation in deficient children and adolescents can deliver clinically significant improvements in bone health, however no benefits are shown for those with sufficient from dietary intake alone.

6.4 Public Health has an important role to play in encouraging healthy diets including calcium intake for all children and young people. Health Visitors support families through the Healthy Child Programme and those parents that are entitled to it receive the ‘Healthy Start Vitamin programme’ free of charge. Somerset County Council Public Health supports schools through its Health and Wellbeing in Learning Programme which includes messages and interventions that promote healthy eating and exercise.

6.5 Somerset follows National recommendations for vitamin D supplementation for ‘at risk’ groups as follows:

All pregnant and breastfeeding women should take a daily supplement containing 10µg of vitamin D, to ensure the mother's requirements for vitamin D are met and to build adequate fetal stores for early infancy.

All infants and young children aged 6 months to 5 years should take a daily supplement containing vitamin D in the form of vitamin drops, to help them meet the requirement set for this age group of 7-8.5 micrograms of vitamin D per day. However, those infants who are fed infant formula will not need vitamin drops until they are receiving less than 500ml of infant formula a day, as these products are fortified with vitamin D. Breastfed infants may need to receive drops containing vitamin D from one month of age if their mother has not taken vitamin D supplements throughout pregnancy.

6.6 Evidence suggests that adequate vitamin D status is required throughout childhood and adolescence. In the future further advice on sensible sun exposure and more extensive food fortification need to be considered as adequate vitamin D levels in all young people are unlikely to be met through current vitamin D supplementation routes. [43]

6.7 For older people aged 65 years and over, and those who are not exposed regularly to sunlight it is recommended they take a daily supplement containing 10 micrograms of vitamin D. [44] Vitamin D is also shown to provide a role in maintaining skeletal muscle in older people, a recent meta-analysis [45] concluded a significant positive effect on lower limb muscle strength following vitamin D supplementation, which could contribute to reducing falls. at

6.8 The importance of exposure to sunlight, which accounts for 90% of our vitamin D has been well documented, sunlight stimulates vitamin D production in our bodies.[46-47] To clarify safe levels of sunlight a Consensus Vitamin D position statement was issued in 2010 by organisations including the British Association of Dermatologists, Cancer Research UK, and the National Osteoporosis Society. [48] This concluded that some exposure to sunlight was beneficial and although this did not specify a length of time it has been interpreted as 10 - 15 minutes of sunlight on the skin daily or at least 3-4 times a week without sun screen during the months May – September, depending on skin type. This should be between 11am and 3pm, however avoiding strong midday sun. This guidance applies to adults; there is a lack of evidence about appropriate sun exposure for children at this time.

6.9 Somerset emphasises the benefits of physical activity across the life course, and a Strategic Framework 'Move, Play, Achieve' [49] draws partners together creating a joined up approach to ensure all children and adults are encouraged to and have the opportunity to participate in regular physical activity, including activity for bone strength. While this is not directed at primary prevention of osteoporosis, it is an important part of a preventative agenda as a lifetime of regular physical activity can reduce the risk of hip fracture by up to 50%.[50] A recent Cochrane review of the benefits of physical

activity on balance[51] showed certain types of exercise could have a beneficial effect on improving balance in older people.

6.10 In 2011 the Chief Medical Officers in the UK issued new guidelines for the amount of physical activity people should undertake.[52] For older people they conclude that any physical activity will have some health benefits, however there are suggested levels of activity and a recommendation to include specific activity to improve muscle strength, and activity to improve balance and co-ordination, also to avoid sitting for long periods.

6.11 There is some evidence on physical activity improving bone strength in older people, however the activity needs to target vulnerable bone sites and be progressive and stress or mechanically load bones. Good examples where the weight of the body is supported or movement is resisted (for example using weights) include aerobics, strength training, walking and Tai Chi.[51,53] A further Cochrane review in 2011[7] considered the evidence of exercise to improve bone health in postmenopausal women. This concluded there was 3.2% less BMD loss at the spine for those that exercised than those who did not, and people who exercised through strength training had on average 1.03% less BMD loss at the neck of femur. However the review did not find a statistically significant result for exercise reducing the risk of fracture.

6.12 For many older frail people adherence to an exercise programme of sufficient intensity may be more than they can achieve, therefore it is very difficult to see benefits in terms of increased bone density.[54] However as mentioned, the benefits of physical activity reducing the risk of falls in older people by improving balance and maintaining muscle strength means it is essential to promote opportunities, including more specialist exercise for those with poor balance or who have had a fall.

6.13 One study in 2010 by Horne et al [55] demonstrated that people found advice from primary health care professionals was a motivator for the initiation of exercise and physical activity for people aged 60 – 70; primary health care professionals are therefore valuable in promoting physical activity and for the younger older age group, real benefits could be realised.

7 Assessing the risk of fragility fracture and diagnosis

7.1 Recent NICE clinical guidance issued, CG 146, for assessing the risk of fragility fracture[1] also includes an osteoporosis pathway with implementation tools to assist with applying the guidance.

The guidance advises considering assessment of fracture risk:

- In all women aged 65 years and over and all men aged 75 years and over
- in women aged under 65 years and men aged under 75 years in the presence of risk factors, for example:

- previous fragility fracture
- current use or frequent recent use of oral or systemic glucocorticoids
- history of falls
- family history of hip fracture
- other causes of secondary osteoporosis
- low body mass index (BMI) (less than 18.5 kg/m^2)
- smoking
- alcohol intake of more than 14 units per week for women and more than 21 units per week for men.

7.2 It is recommended to use either FRAX® (without a bone mineral density [BMD] value if a dual-energy X-ray absorptiometry [DXA] scan has not previously been undertaken) or QFracture®, to estimate 10-year predicted absolute fracture risk when assessing risk of fracture. (FRAX® and QFracture® are online tools which can be used to identify someone's risk of having a fragility fracture).

7.3 The diagnosis of osteoporosis relies on the quantitative assessment of bone mineral density (BMD), usually by axial dual energy X-ray absorptiometry (DXA). BMD at the femoral neck provides the reference site. Osteoporosis is defined as a value for BMD 2.5 SD or more below the young female adult mean (T-score < –2.5 SD). However, the diagnosis may be assumed in women aged 75 years or older if the clinician considers a DXA scan to be clinically inappropriate or unfeasible.

7.4 The preferred scan is that of the central skeleton as this measures the BMD of the lumbar spine and hip.[56] The hip is most reliable place to measure to predict future risk of fracture,[57-59] and the BMD of spine for monitoring treatment.[60-61] There is general consensus that the spine and hip measurements in white women can be interpreted by using the World health Organisation's (WHO) T-score definitions of osteoporosis and osteopenia.[26,62-63] (Osteopenia refers to BMD that is lower than normal peak BMD but not low enough to be classified as osteoporosis). The additional advantages of a central DXA scan include the short scan times, low radiation dose and availability of reliable reference ranges.[56]

7.5 There are other methods of measuring BMD, including quantitative computed tomography (QCT) measurement of the spine and hip, peripheral DXA (pDXA) for measuring the forearm, heel or hand and quantitative ultrasound (QUS). All these methods have been described as cheap, quick and convenient ways of measuring BMD.[56] However, the outputs from these measurement methods do not correlate well with the outputs from a central DXA scan, with correlation coefficients ranging from r=0.5 to 0.65.[64] This lack of correlation

between these methods has meant it has been difficult to reach a consensus on the use of methods other than the central skeleton DXA.[64-65]

7.6 This issue of whether to screen postmenopausal women for osteoporosis has been debated for some time, however following a public consultation and review the National Screening Committee released a policy position statement in March 2013 stating that it is not appropriate to implement a national screening programme for osteoporosis.[66] This in part was related to the cost effectiveness of any current approach to screening; there is not enough information about the long term clinical and cost effectiveness of osteoporosis treatment, and also a lack of consensus between the National Osteoporosis Guideline Group (NOGG) and NICE on who should be eligible for treatment. NOGG merely recommends 'selective case finding'[26] for the prevention of osteoporosis whereas NICE's treatment thresholds are different as based on a quality-associated life-year (QALY) model.

8 Treatment

8.1 NICE provides evidence based guidelines for the prescribing of medication for the primary and secondary prevention of fragility fractures. Although the guidelines focus on postmenopausal women men are also included where risk factors are identified.

8.2 Treatment options for primary prevention from NICE technology appraisals TA160[19] and TA204[67] are the prescribing of bisphosphonates, specifically alendronate, etidronate and risedronate. Other medication such as denosumab or strontium ranelate are also recommended under specific circumstances. The guidelines also highlight the importance of a balanced diet providing sufficient levels of calcium and vitamin D. However, if a patient is not receiving an adequate amount of these nutrients through diet, vitamin D and calcium supplements can also be prescribed, including for older people who have limited exposure to sunlight.

8.3 NICE technology appraisals TA161[68] and TA204[67] recommend prescribing for secondary prevention of fragility (osteoporotic) fractures for all women over 50 who have suffered a fragility fracture. This could include alendronate, etidronate, risedronate, denosumab, raloxifene, strontium ranelate or teriparatide also other treatments may be recommended.

8.4 These technology appraisals discuss the extensive evidence base to support the routine use of bisphosphonates for the secondary prevention of fragility (osteoporotic) fractures, as they have been found to increase bone mass density by altering osteoclast activation and function and reduced the risk of fracture in both women[69] and men.[70]

8.5 NICE also recommends the following treatment regime for the secondary prevention of osteoporotic fragility fractures in postmenopausal women (other criteria apply for men):

- aged ≥75 years without need for DEXA scan
- aged between 65 and 74 years if osteoporosis confirmed by DEXA scan
- aged < 65 years with very low BMD (T-score -3SD or below)
- confirmed osteoporosis plus one or more age independent additional risk factors:

    - low BMI (< 19kg/sq m)
    - family history of maternal hip fracture < 75 years
    - untreated premature menopause
    - chronic inflammatory bowel disease
    - rheumatoid arthritis
    - hyperthyroidism
    - coeliac disease
    - prolonged immobility

8.6 Many people may have difficulty complying with the medication regime, which then impacts on effectiveness. The issue of compliance with bisphosphonates has been widely documented[71-76] and covers a range of issues:

- taking medication correctly (such as after an overnight fast, with water to wash the tablet down, and a delay before any subsequent food, drinks or medication)

- adherence to the medication (defined as the proportion of days for which people have medication in their possession – the medication possession ratio or MPR)

- persistence (number of days from initiation of therapy to the last day of available medication)

8.7 Overall, research has shown that 20-30% of those prescribed will discontinue their medication within six to 12 months. [77-79] There are a number of reasons for this, for example a lack of interest in taking medication (related to the person's health beliefs), the adverse side effects, complicated administration, dosing frequency,[73] increasing age, number of co-morbidities and having a number of other medications.[74]

8.8 Those at risk of non-compliance or persistence with their medication have been show to include those with previous adverse experiences with the medication, people with a perception that their bone mass density scan did not reveal the presence of osteoporosis and pain. [77] Indicators where people had good compliance included experience of a non-vertebral or vertebral fracture,[77, 80-82] early menopause,[81] family history of osteoporosis, having a diagnostic test for osteoporosis.[80-81, 83]

8.9 There is strong evidence that less frequent dosing is associated with improved compliance and persistence with bisphosphonates.[74, 77, 84] An increase in persistence and compliance rates has been seen with a reduction in dosing frequency in other areas and with other conditions.[85-86] In addition, patients,

when given the choice expressed a preference for weekly rather than daily administration.[87-88]

8.10 The Medicines and Healthcare products Regulatory Agency (MHRA) bring attention to safety issues identified with bisphosphonate use. A risk of osteonecrosis of the jaw has been identified, with a greater risk for those receiving intravenous bisphosphonates for cancer than those taking oral bisphosphonates for osteoporosis.[89] People should be encouraged to maintain good oral hygiene, have regular dental check-ups and to report any oral symptoms such as dental mobility, pain, or swelling. In addition there have been rare reports of atypical femoral fractures with bisphosphonate therapy, mainly in patients receiving long-term treatment for osteoporosis.[90]

8.11 In 2011 the MHRA issued guidance regarding taking calcium and vitamin D supplements as some research[91] had suggested a possible modest increase in the risk of some cardiovascular events in postmenopausal women who use supplements to prevent fragility (osteoporotic) fractures. The MHRA identified limitations in the study data however and no evidence of an increase of mortality and currently recommend no changes to prescribing practice, [92] however they also recommend dietary intake of calcium should always be explored to establish the need for supplementation.

9 Secondary prevention

9.1 The secondary prevention of a second fragility fracture is particularly important as often the initial fragility fracture is fairly minor and can be considered as a warning sign for a more severe fracture and associated morbidity and even mortality. In up to 50% of hip fracture cases there is opportunity for intervention, as studies have shown about half of those who experience a hip fracture have had a previous fragility fracture.[8]

9.2 In 2009 the Department of Health launched its Prevention Package for Older People which included in its objectives ensuring people received a correct assessment and appropriate treatment after a first fracture to prevent a second.[8] The Prevention Package led on from the British Orthopaedic Association and British Geriatrics Society 'Blue Book' published in 2007 on care of patients with fragility fracture.[25] This made a case for an integrated approach to secondary fracture prevention for those presenting with any fragility fracture, and also called for nation-wide implementation of a systematic approach to hip fracture care.

9.3 In 2007 the National Hip Fracture Database (NHFD) was launched with the aim of improving the care and secondary prevention of hip fracture in the UK. The 2013 NHFD National Report [93] provides details on the case mix, care and outcomes of 61,508 cases of hip fracture from all 186 eligible hospitals in England, Wales and Northern Ireland. The audit which provides data for the report found that 69% of patients with hip fractures were discharged on bone protection medication and 94% received a falls assessment, these figures have significantly improved since the start of the NHFD.

9.4 Since April 2010 the Department of Health Best Practice Tariff for hip fracture care has used financial incentives to drive adherence with the core standards benchmarked by the NHFD, which include an assessment of bone health and risk of falling. Since the introduction of the tariff, the proportion of patients with fragility hip fracture for whom all six standards were met has risen from 24% to 60%.[93]

9.5 Another measure which is important to improve standards is the Royal College of Physicians National Audit of Falls and Bone Health in Older People which was commissioned in 2010.[94]
This national audit aimed to:

- Assess the national progress in the implementation of integrated falls services as described in Chapter 6 of the NSF for Older People
- Assess the national progress in the implementation of the NICE Guideline and Health Technology Appraisal relating to falls and osteoporosis.

9.6 Four objectives as set out in the Prevention Package[8] have been used as benchmarks. These are:

1) Improve care and quality of life after a hip fracture
2) Provide correct assessment and treatment after a first fracture to prevent a second by using fracture liaison services in hospitals and the community
3) Provide timely help from hospital and community services both to enable people to return to independent living and to prevent further falls and fractures
4) Promote healthy lifestyles and reduce environmental hazards to reduce the risk of falls and fractures and improve quality of life

9.7 In relation to bone health the audit's recommendations for Somerset were as follows:

- Commission an adequate volume of DXA bone density scans for the local population
- Establish Fracture Liaison Services at acute hospitals
- Audit prescribing in Primary Care and monitor improvement
- Provide training for osteoporosis management in primary care
- Ensure all providers are screening people who present to emergency departments and Minor Injury Units following a fall or fracture
- Establish therapeutic exercise programmes for those who are at risk of a fall or fracture in community settings
- Ensure care homes residents receive regular medication reviews including treatment of osteoporosis, raise awareness of falls and bone health in care home

9.8 The audit is part of the Royal College of Physicians Falls and Fragility Fracture Audit Programme[95] which is also currently developing a Fracture Liaison Service database. This will gather data on patterns of assessment and

treatment for osteoporosis and falls across primary and secondary care and seeks to improve practice.

9.9 The Prevention Package for Older People[8] also provides documents to support the development of services to prevent falls and fractures including an economic evaluation which evidences that Fracture Liaison Services (FLS) are cost effective. This model estimates that for a population of 320,000 it would cost £234,181 to set up and maintain the service and over a five year period there would be savings of £290,708 to NHS acute and community services and local authority social care. Applying the above model to the Somerset population of 538,000 this would imply net savings of £95,000 could be achieved over 5 years.

9.10 A suggested FLS model includes the employment of a specialist/ osteoporosis nurse to identify people with new fragility fractures either on an orthopaedic ward or through fracture clinics, with some clinician support. People are then referred to a one stop shop FLS which would arrange DXA scans to assess future fracture risk, initiate appropriate treatment and refer into the falls service/pathway if appropriate.

10. Other national drivers

10.1 From April 2012 The Quality and Outcomes Framework (QOF) has included osteoporosis in the UK-wide GP contract with GP practices receiving funding for:

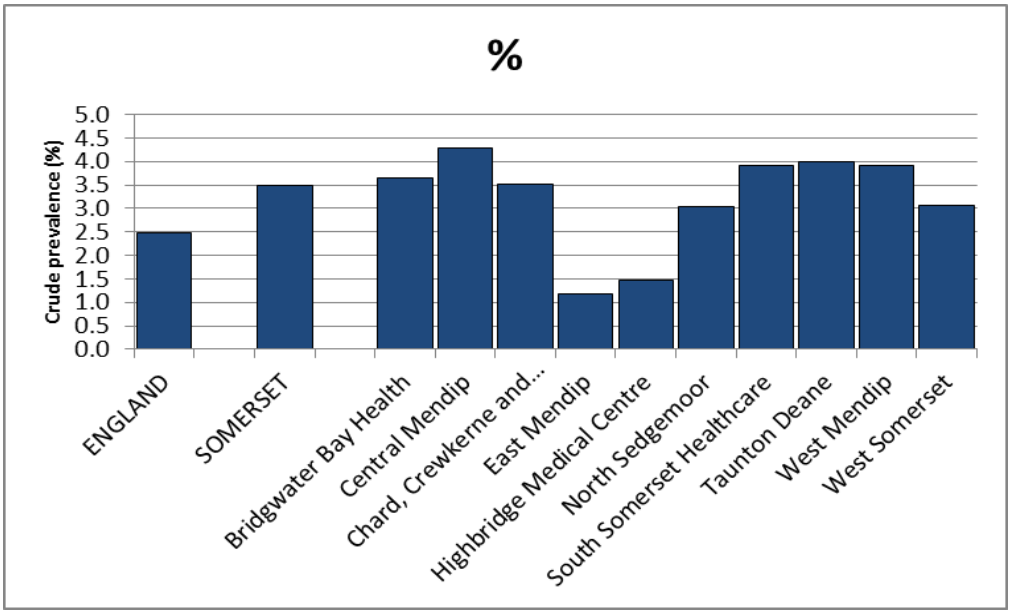
- Producing a register of their patients (a) aged 50-74 years with a record of a fragility fracture and a diagnosis of osteoporosis confirmed on DXA scan; or (b) aged 75 years and over with a record of a fragility fracture.
- Ensuring that patients on the register who are aged between 50 and 74 years, with a fragility fracture, in whom osteoporosis is confirmed on DXA scan, are treated with an appropriate bone-sparing agent.
- Ensuring that patients aged 75 years and over with a fragility fracture are treated with an appropriate bone-sparing agent.

10.2 Somerset currently has 812 people on the QOF osteoporosis register (data via Read coding) as at the end of March 2013, this is low in part due to the register starting in 2012. The NICE costing template [24] predicts 29,946 of women over 50 with osteoporosis in Somerset, and in addition there would be men with osteoporosis which are not included (Figure 2).

10.3 Figure 3 uses crude prevalence and shows the prevalence of osteoporosis from QOF data at GP Federation level. (Alongside the eight Somerset Federations Highbridge Medical Centre is shown as it does not sit within a Federation). However as the register started in 2012, the numbers are low at present. Against the national average of 2.47%, Somerset has a higher rate of 3.5% at least partly due to its older population, most Federations are in line

with the average except East Mendip Federation and Highbridge Medical Centre, which are lower.

Figure 3: Prevalence of Osteoporosis in those aged 50+



10.4 The Commissioning for Quality and Innovation (CQUIN) payment framework enables commissioners to reward excellence by linking a proportion of provider income to local quality improvement goals; 'Fragility fractures Fracture Prevention Service' is included as an exemplar CQUIN goal.[96]

10.5 The NICE clinical guideline Falls: assessment and prevention of falls in older people[68] considers those aged 65 or older in its recommendations as they have the highest risk of falling. It states over 65's who are admitted to hospital should be considered for a multifactorial assessment – which looks at multiple components - for their risk of falling during their hospital stay. They should also be offered a multifactorial assessment of their community-based falls risk, if appropriate. (This guideline was amended in 2013 to include those in hospital – previously CG 21). The guideline also supports people aged 50 to 64 who are admitted to hospital and are judged to be at higher risk of falling because of an underlying condition. A pathway is included to guide health professionals to the most appropriate outcome for the person.

11 Mortality

11.1 Hip fracture is the commonest cause of accident related death in older people. The levels of mortality as a result of a hip fracture are surprisingly high as 20% of older people will die within four months and 30% within a year of their fracture.[8]

11.2 Data on the mortality rates resulting from a fractured femur is available from the Health and Social Care Information Centre (HSCIC). The most recent

data, released in October 2013 is a pooled figure for 2010 – 2012. The data is shown as a directly standardised rate, standardised for age and sex, to enable comparisons between areas.

Figure 4: Death rate from Fractured neck of Femur: all ages: Persons : 2010-2012

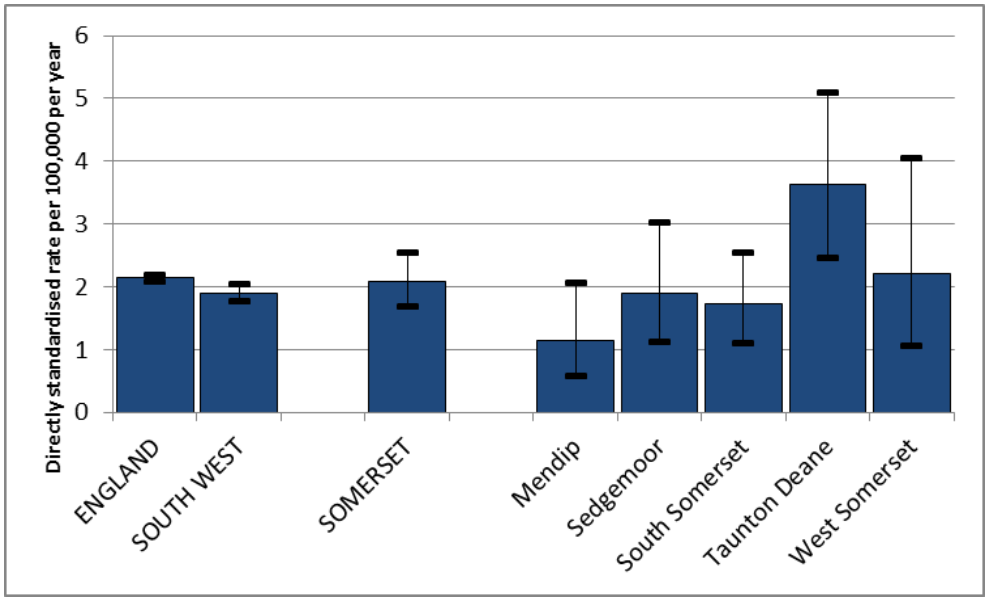
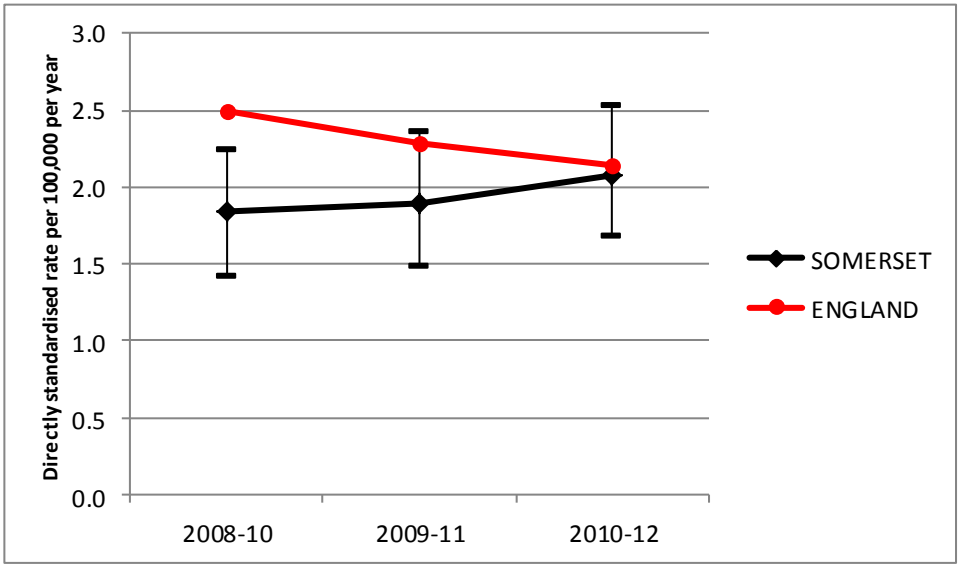


Figure 4 shows Somerset has comparable death rate for a fractured neck of femur to both the South West and England as a whole. However, the trend in Figure 5 suggests there might be an increase in Somerset compared to a decrease in England as a whole, although it is not statistically significant at this time. (Demographics have been taken into account so the data is not influenced by this).

Figure 5: Death rate from Fractured neck of Femur: all ages : Persons : 2008-10 to 2010-2012

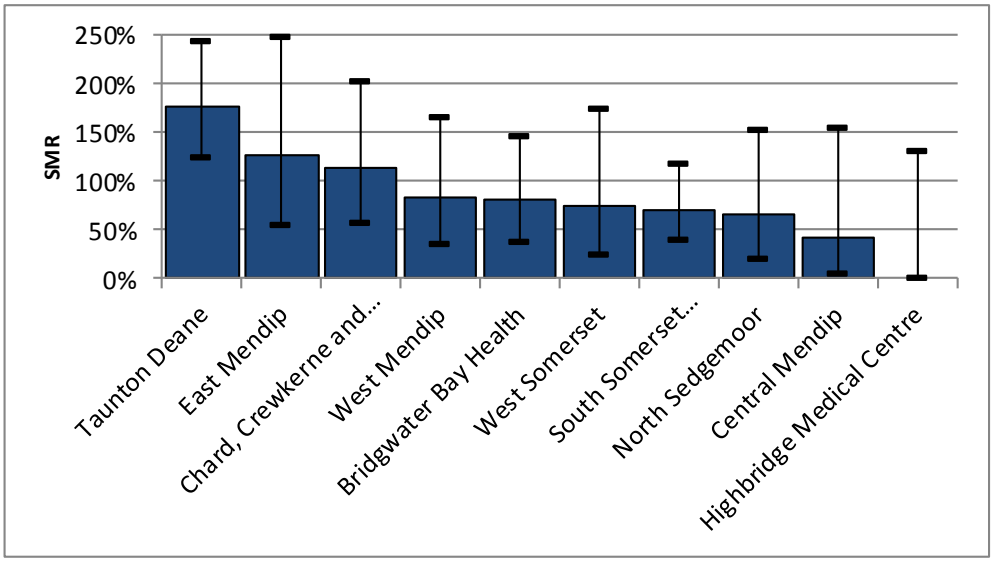


11.3 Figures 6 and 7 below show at Federation level (which means that the populations are slightly different to the resident populations in the Figures

above). The standardised mortality ratio shows how much the Federation is above or below the Somerset average of 100%. Although there are no significant differences between Federations, there are wide confidence limits on these ratios as there are so few deaths, Taunton Deane appears to have a significantly higher mortality than Somerset as a whole.

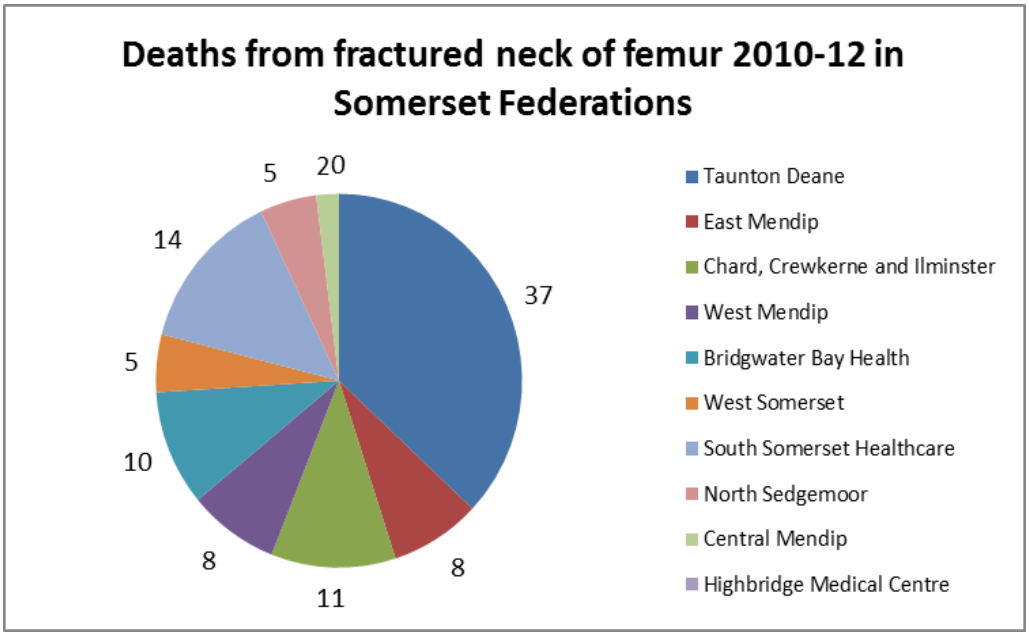
(A confidence interval indicates the range of values within which the true value is likely to lie. Therefore a wide confidence interval indicates a greater range and therefore is a less precise estimate of the true value).

Figure 6: SMR from Fractured neck of Femur (compared to Somerset average) : all ages : Persons : 2010-2012



Source: ONS primary care mortality database and GP populations from Primary Care Exeter system

Figure 7: Deaths from Fractured neck of Femur: all ages: Persons: 2010-2012

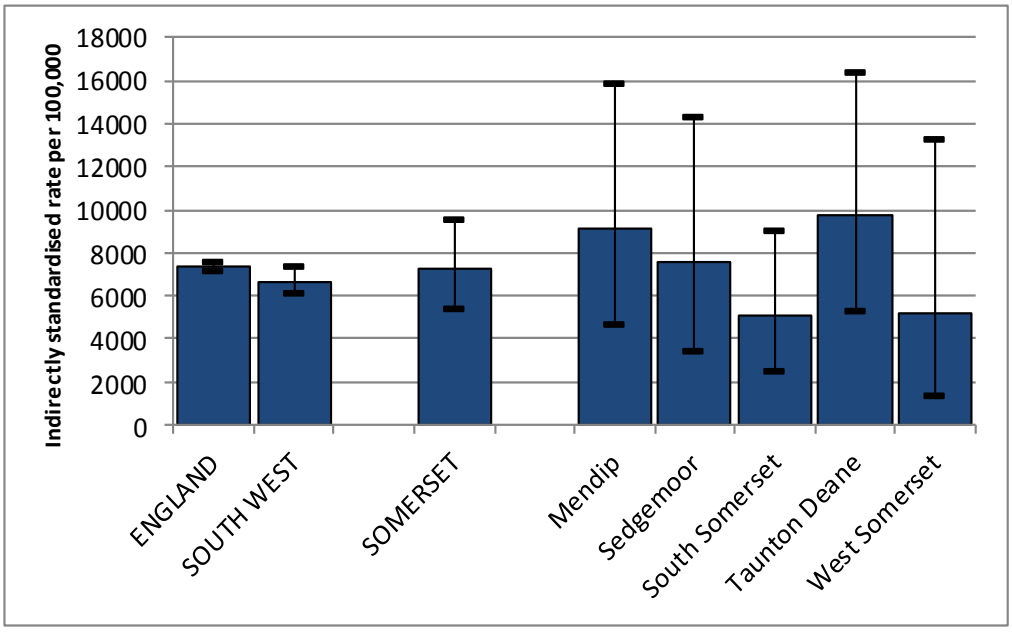


Source: ONS primary care mortality database and GP populations from Primary Care Exeter system

11.4 Another indicator that is used to measure mortality associated with a fall and fracture is deaths within 30 days of emergency hospital admission for a fractured proximal femur, as it is widely acknowledged that a fractured femur can accelerate death.[62] The data is derived from Hospital Episode Statistics (HES) and has been age and sex standardised (accessed through the HSCIC indicator portal).

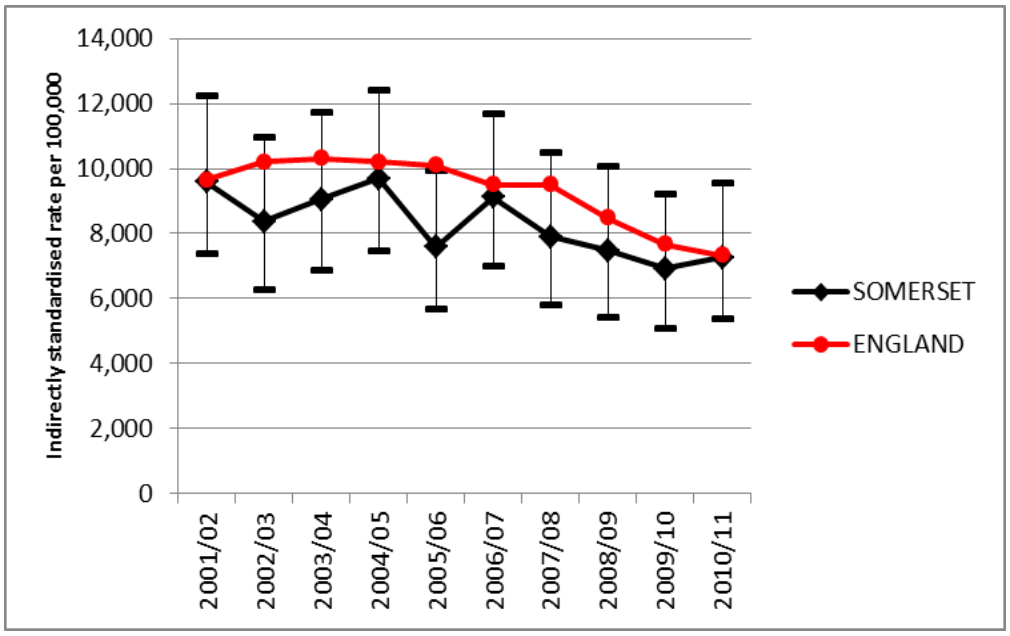
11.5 For the period 2010 - 2011 in England there were 4,119 deaths within 30 days of hospital admission for a fractured proximal femur, in Somerset there were 50 deaths for the same period. Figure 8 below shows no significant differences between Somerset, South West and England rates; indirectly standardised rate per 100,000 people.

11.6 **Figure 8: Deaths within 30 days of emergency admission to hospital: fractured proximal femur: all ages: Persons: 2010/11**



11.7 Comparing data since 2001 for deaths within 30 days of emergency admission to hospital for a fractured proximal femur, Figure 9 compares Somerset with England. While this data does not show statistically significant differences in any year, the rate in Somerset had been consistently lower than the national rate for some time. However in the last year shown the Somerset rate has increased to be very similar to the national rate and this should be monitored.

Figure 9: Deaths within 30 days of emergency admission to hospital: fractured proximal femur: all ages: Persons: 2001/02 to 2010/11



12 Morbidity

12.1 The physical, mental and social impacts of a hip fracture can be considerable, and many people do not make a full recovery and regain their former levels of independence, it is estimated that half of all people who fracture who were previously independent become partly dependent on support and one third completely dependent.[8]

12.2 An indicator used to measure morbidity is timely surgery following an emergency admission for fractured proximal femur. Research strongly suggests that a significant delay from admission to surgery increases the risk of morbidity, complications, and poor rehabilitation, therefore the standard that all people who are medically fit should have surgery within 48 hours of admission is in place to encourage this.[8]

12.3 Somerset is in line with the South West and England data for timely surgery within 48 hours of admission, and there are no significant differences between the districts of Somerset. Data since 2002 shows Somerset has a generally better rate of access to timely surgery than England, although there is some evidence that the rate of improvement in Somerset has been slower than the national rate of improvement. Data for the latest year reflects this trend.

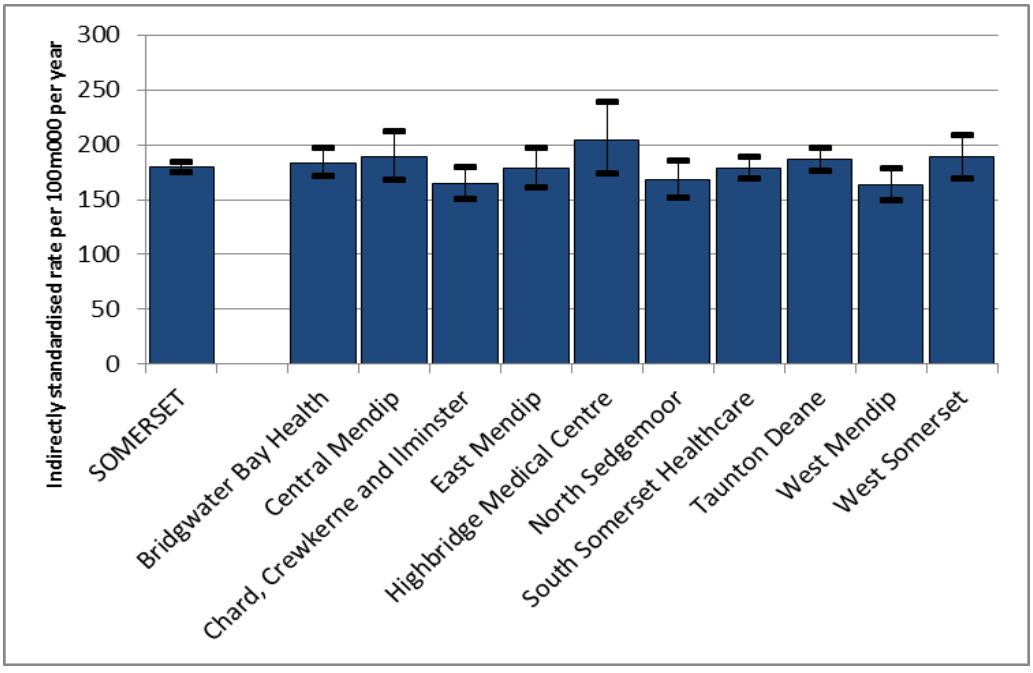
13 Admissions to hospital with fragility fracture

13.1 Figure 10 shows data extracted from Hospital Episode Statistics and includes any admission to hospital of a Somerset registered patient, with a main diagnosis of a fragility (osteoporotic) fracture, as defined by the International Classification of Disease version 10 (ICD-10) codes below:

M800	Postmenopausal osteoporosis with pathological fracture
M801	Postoophorectomy osteoporosis with pathological fracture
M802	Osteoporosis of disuse with pathological fracture
M803	Postsurgical malabsorption osteoporosis with pathological fracture
M804	Drug-induced osteoporosis with pathological fracture
M805	Idiopathic osteoporosis with pathological fracture
M808	Other osteoporosis with pathological fracture
M809	Unspecified osteoporosis with pathological fracture
S525	Fracture of lower end of radius
S720	Fracture of neck of femur
S721	Pertrochanteric fracture
S722	Subtrochanteric fracture

13.2 Figure 10 compares Somerset GP Federations against Somerset as a whole. The data has been standardised by age and gender to enable comparisons and there are no significant differences between Federations.

Figure 10: Admissions with "osteoporotic" fracture as primary diagnosis 2007/8 to 2012/13



13.3 Somerset data over the last six years of admissions for a fragility (osteoporotic) fracture as the main diagnosis shows there is a slight upward trend in the standardised rate although the difference is not statistically significant at this stage. However as previously discussed in light of the ageing population and evidence of increasing osteoporosis and fragility fractures in a frail older population national predictions suggest we will see an increase in fragility fractures in the next few years.

14 Current levels of service

14.1 The Somerset Bone Health and Falls Prevention Commissioning Strategy 2009-2014 has enabled some progress in addressing the issues surrounding bone health and osteoporosis, including co-ordinating feedback on national audits through a Steering Group led by the previous NHS Somerset.

14.2 The South West Falls, Bone Health and Fractures Review action plan for NHS Somerset in January 2012 outlined planned actions following national recommendations, some of which have been implemented. This was previously monitored by the Falls and Bone Health Steering Group under NHS Somerset and is yet to be re-established under the CCG.

14.3 There is a therapeutic exercise programme in place for those who have fallen or are at risk of falls and fractures through OTAGO trained staff within Somerset Partnership NHS Trust's community rehabilitation teams. This sees the provision of evidence based home based exercises over a six to eight week period. There is limited availability of Postural Stability exercise classes in community settings to support people who have had a fall or wish to improve their balance. Investment was made in training fitness instructors in this specialist qualification however classes have reduced in number due to qualified staff leaving, and also difficulty recruiting participants. In addition identifying appropriate venues for the classes is proving a challenge.

14.4 Somerset's multi-agency Independent Living Teams support those who have had previous falls or are at risk of falling via referrals from various health and social care professionals, or self-referral, and generally support people with higher level needs. Independent Living Teams have been introduced across most of the county and are part of the Reablement Programme for Somerset. Reablement describes a spectrum of services and interventions currently provided by health, adult social care, independent sector and voluntary organisations in Somerset which support individuals to become as independent as possible following treatment in an acute or community hospital, and support people in the community with long term conditions whose health, functioning and independence is beginning to deteriorate, to ensure that they are able to retain the best quality of life possible and to prevent unnecessary admissions to hospital and/or long term care using a personalisation approach. To date there has been a significant variation in levels of awareness and referrals to appropriate services regarding falls prevention from various health, social care and voluntary sector agencies supporting older people.

14.5 Somerset residents sustaining a fracture requiring treatment could attend one of four acute trusts Accident and Emergency (A&E) departments. At present the hospitals operate slightly different systems for identifying potential fragility fractures. This highlights the need to develop a uniform approach for Somerset.

14.6 A fracture liaison service (FLS) is in place at Yeovil District Hospital, consisting of an initial questionnaire for those who have been identified with a possible fragility fracture at A&E, which is then followed up if osteoporosis is suspected. The service does not meet national recommendations for a FLS in terms of its scope and there is no service available at Musgrove Park Hospital.

14.7 An audit of osteoporosis medication prescribing has been carried out, supported by the Medicines Management team at Somerset Clinical Commissioning Group. In addition quarterly prescribing data is available which indicates significant variations in the prescribing practice for bisphosphonates in primary care.

14.8 Somerset GP's are developing QOF osteoporosis registers for their patients who have received a fragility fracture and who depending on their age may have had their osteoporosis confirmed following a DXA scan, currently there are variations in the robustness of the register between practices.

14.9 There appears to be a lack of clarity regarding the roles of primary and secondary care in the ownership and management of those with osteoporosis.

15 Conclusion

15.1 This paper has identified many key elements for promoting bone health across the life course, with an overview of current evidence to support identification of osteoporosis and the importance of identifying the first fragility fracture someone may experience. It is clear that the importance of robust secondary prevention services cannot be underestimated.

15.2 There have been several national initiatives to improve bone health in the past few years, this enables benchmarking against standards to ensure best practice. However this can also lead to a degree of complication as there are a number of suggested pathways and recommendations.

15.3 It is clear that with the Somerset population demographic changing, particularly a dramatic rise in those aged over 80 and over 90 over the next few years the level of need for primary and secondary osteoporosis prevention services is set to increase. This is also likely to continue into the future.

15.4 Although progress had been made in Somerset since the 2008 HNA was completed and the subsequent Somerset Bone Health and Falls Prevention Commissioning Strategy, there is still considerable improvement to be made to ensure that the bone health needs of our ageing population are adequately met. This report has also identified some gaps in service provision in Somerset and the recommendations below identify specific actions that would

contribute to a more cohesive approach to promoting bone health and osteoporosis services across the county.

16 Recommendations

16.1 The following recommendations are made:

Responsibility of Primary Care, Secondary Care, Public Health and other stakeholders led by Clinical Commissioning Group

- Raise the profile of importance of physical activity, calcium and vitamin D intake and safe exposure to sunlight to support bone mass accrual, bone health and the primary prevention of osteoporosis across the life course (including children and adolescents)
- Promote the use of the FRAX® tool in primary, secondary and community care settings and through a wide range of stakeholders to identify those at risk of osteoporosis
- Multi-factorial assessments should be carried out for those at risk of a fall, also at point of being prescribed with osteoporosis medication to ensure falls risks are reduced as much as possible
- Increase primary and secondary care referrals to Somerset's Independent Living Teams, also from other agencies
- Encourage care homes to implement guidance produced by NICE and the Department of Health on calcium and vitamin D supplementation
- Ensure Somerset continues to participate in national audits and initiatives to benchmark progress in bone health and osteoporosis services
- Develop pathways across the health and wellbeing system which encourage the uptake of physical activity at all ages, but which also refer to the specialist exercise provision as appropriate
- Develop and agree a multi-agency bone health care pathway and clarify the issues regarding ownership of the person's care and disease management of osteoporosis. Develop a multi-agency group to develop and monitor progress against the pathway
- Ensure the bone health care pathway links to Somerset's Independent Living Teams

Responsibility of Public Health

- Ensure continued availability of specific exercise programmes aimed at improving balance and reducing the risk of falls e.g. OTAGO and Postural Stability; which is of a duration shown to be effective, for some this will also assist in increasing bone density
- Raise public awareness of osteoporosis i.e. National Osteoporosis Society 'Stop at one' campaign

Responsibility of Primary Care

- Ensure primary diagnosis rates of osteoporosis is increased; bone health needs to be discussed regularly particularly with postmenopausal women
- Ensure men with osteoporosis and subsequent fragility fractures are identified and services respond appropriately to their needs
- Continue to monitor the prescribing audit of bisphosphonates in primary care, investigate GP practices where prescribing levels are low
- Ensure GP practices develop robust QOF osteoporosis registers
- GP practices to explore and take action if people are unwilling or unable to adhere and/or comply with prescribed osteoporosis treatments

Responsibility of Secondary Care

- Increase identification rates of first fractures through an adequately resourced fracture liaison service across Somerset; only half the county is currently covered and the existing service needs to be more comprehensive
- Ensure men with osteoporosis and subsequent fragility fractures are identified and services respond appropriately to their needs

Carolyn Arscott
Health Promotion Manager, Public Health, 2013

(update to HNA completed by Sarah Scott Public Health Specialty Registrar in 2008)

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